

Identifying and mitigating the wastage and inefficient use of plastic bags in Singapore

A position paper by the Singapore Environment Council

This paper analyses patterns of plastic bag use in Singapore using data gathered from quantitative and qualitative research. An approximation of the percentage and type of plastic bag use that can be considered wasteful is derived from this research, and a broad range of recommendations is made to mitigate the wasteful use of plastic bags in Singapore. These recommendations are targeted at policy makers, retailers, educators, and members of the public.

Acknowledgements

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SEC would also like to thank our research partners AECOM for their expertise in designing and conducting the qualitative research.

Foreword

The issue of plastic bag usage has been discussed very often over the last two years.

Like many other issues, there have been various views and points which have been put forth over the issue, and quite a bit of discussion has also taken place in the public domain, including through many letters which have been submitted to the newspapers for publishing.

The Singapore Environment Council (SEC) has been involved in the discussion over the plastic bag issue since 2007, and over the last few years, have been trying our best to work with various stakeholders to find a solution to the issue here in Singapore.

This is one of the reasons why we decided to embark on a thorough research project so that we could take in as many views as possible from a diverse group of people, and to suggest various recommendations to try and minimise the use of plastic bags in Singapore.

Our Motivations

In the months leading up to the project, we had been receiving a high volume of feedback from passionate, concerned members of the public requesting SEC to step in and mitigate the high number of plastic bags that were taken at supermarkets. The most common suggestions we received called for a ban on plastic bags altogether, or for shops to start charging for each bag given out. The most common rationale for these suggestions was that “if other countries are doing it to, why can’t Singapore?”

However, SEC felt that introducing these two solutions in Singapore would be ill-suited to our local context wherein all household waste is packed in plastic bags prior to disposal, which means plastic bags are to a certain degree, necessities in each household. Furthermore, we did not want to introduce a solution that would impose an additional financial burden on low-income households.

Hence, we decided to undertake our own research into the issue to arrive at solutions that were culturally appropriate, environmentally sound and economically inclusive.

Conceptualising the Project

SEC felt that the key to achieving reductions in plastic bag wastage in Singapore lay in achieving large-scale behavioural change within the community.

Whether this change involves encouraging the public to be more mindful about remembering to bring their reusable bags, training cashiers to gently remind customers to think about whether they really need that bag, or motivating retailers and policymakers to introduce measures to curb plastic bag waste, the common thread is that human behaviour is at the heart of each possible solution.

Hence, we approached the issue of plastic bag use primarily from a behavioural perspective. However, we also extensively consulted environmental, waste management and economics experts to present a robust analysis from the environmental and economic angle.

The Research Process

The quantitative research process was undertaken in collaboration with the Ministry of the Environment and Water Resources (MEWR), who incorporated 10 questions about household behaviours concerning plastic bags into MEWR's survey of 2,500 households on recycling practices.

SEC designed the qualitative research in collaboration with the environmental consulting firm, AECOM, who designed and carried focus group discussions with members of the public, retailers and conducted interviews with environment and economics experts.

How we arrived at the Recommendations

Knowing that it was essential to balance diverse sets of opinions on plastic bag use in Singapore, SEC developed a set of criteria that any recommendations we posed would need to meet – namely, that recommendations should be realistic and feasible, effective and clear, should not result in an additional financial burden on low-income households or be disadvantageous to retailers. Lastly, we also intended for the recommendations to be sustainable on a long-term basis.

We intend to incorporate these findings into possibly developing our own campaign to help reduce plastic bag wastage in Singapore. We also aim to keep the conversation going through social media.

In conclusion, this research paper should not be the end of the discussion, but in fact, it should be the start of a period of reflection, which we hope will then translate into an understanding that we have a problem. The only way we can solve this problem is that we work together towards changing our attitudes and behaviour.

Just a little change will go a long way in making a huge difference.

Jose Raymond
Executive Director
Singapore Environment Council

Executive Summary

Approximately 3 billion plastic bags were used in Singapore in 2011 (Lee & Goh, 2012); this figure has raised concerns amongst environmentalists and members of the public about the negative environmental impact of excessive and wasteful plastic bag usage. However, suggestions by concerned parties to implement a blanket ban on plastic bags in Singapore, or impose a charge on each bag given out at retail establishments have often been met by vocal concerns and opposition from members of the public. A common factor in all concerns expressed has been the undesirability of introducing an additional expense into everyday life in Singapore.

Through extensive qualitative and quantitative research on the environmental, economic, social and behavioural factors shaping plastic bag use in Singapore, the SEC found that firstly, there is a certain proportion of plastic bag acquisition, use and storage that can be classified as wasteful, and therefore needs to be curbed. Secondly, the two main root causes for consumers to continue taking plastic bags are a sense of entitlement to free bags because their cost is perceived to be factored into supermarket goods anyway, and a lack of mindfulness and planning, causing consumers to forget to bring along reusable bags when shopping. Lastly, while the idea of paying for plastic bags does not have universal appeal and acceptance yet, there were pockets of receptiveness to this solution, especially when this measure was teamed with incentive schemes for shoppers who did bring their own bags.

Based on these findings, the SEC put forth a set of 10 recommendations that combine legislative and policy action, proactive steps by retailers to introduce schemes to encourage shoppers to refuse plastic bags in favour of their own reusable bags, and initiatives by government agencies, environmental NGOs and community groups to step up education efforts on the environmental harm that arises from wasteful plastic bag use.

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1 Introduction

The widespread usage and availability of plastic bags has emerged as one of the most polarising environmental issues in Singapore in recent times. On one hand, there have been several calls by concerned environmentalists and citizens for Singapore to follow the example of other countries and cities ban plastic bags altogether, or impose a levy for their use. On the other hand, others have argued that plastic bags should remain available to the public at no charge, due to the fact that they are necessary for the hygienic disposal of rubbish, and that their costs are already factored into the price of goods by supermarkets (Teo, 2012).

This issue has remained at the forefront of environmental dialogue for a sustained period of time, with vocal arguments being made for and against the decision to impose a ban or levy on plastic bag use in Singapore.

Calls for stricter controls on plastic bag use in Singapore stem from concern about the various negative environmental impact of these carrier bags, including resource consumption, harm to marine wildlife, air and water pollution, and stress on limited landfill resources.

However, the two main proposed measures to curb the wasteful use of plastic bags – a blanket ban on giving out free plastic bags, and charging customers for plastic bags at the point of sale – are likely to have practical and socio-economic ramifications when implemented in Singapore. These ramifications include an additional financial burden on low-income¹ families, and a shortage of plastic bags for hygienic waste disposal.

1.1 Objectives of Position Paper

The Singapore Environment Council (SEC) aims to contribute to resolving this paradox through the publication of this Position Paper. Based on findings collected through extensive quantitative and qualitative research, SEC undertakes a thorough examination of the issue of plastic bag usage in Singapore from environmental, economic and social perspectives, and proposes a set of

¹ For the purposes of this paper, “low-income” refers to households whose average income is S\$1,500 or less. This statistic is aligned with the 1st – 10th deciles for “Average Monthly Household Income from Work excluding Employer CPF Contributions”, wherein the average monthly income for households in the 1st to 10th decile was S\$1,518 in 2012 (Department of Statistics Singapore, 2013). This is also aligned with the income ceiling for rental HDB flats, which is pegged at S\$1,500 (Housing & Development Board, 2013).

recommendations to curb the wasteful use of plastic bags that are appropriate to Singapore's environmental and cultural context, environmentally effective, and socially inclusive.

SEC hopes that the recommendations put forth will be adopted by policymakers, retailers, environmental organisations, and individuals, with the long-term aim of eliminating all wasteful use of plastic bags in Singapore, and achieving positive behavioural change in the way the community uses plastic bags.

1.2 Outline

Section 2 of this paper establishes a context for the study by providing an overview of plastic bag usage patterns in Singapore, and sociocultural factors influencing plastic bag use. A brief overview of the environmental and economic issues surrounding plastic bag usage follows. Section 3 shares findings and analysis from the quantitative and qualitative research conducted by SEC, in collaboration with the Ministry of the Environment and Water Resources and AECOM respectively. The final section of this paper then puts forth a set of recommendations to mitigate excess plastic bag wastage in Singapore, followed by concluding remarks from SEC on the findings and recommendations, and our own future plans to tackle this issue.

2 Plastic Bag Usage in Singapore: An overview

2.1 Defining parameters for 'plastic bags'

The main types of plastic bags given out during retail transactions in Singapore include High Density Polyethylene (HDPE) plastic bags, and Low Density Polyethylene (LDPE) bags. HDPE bags are commonly used in supermarkets and convenience stores, while LDPE bags are primarily used by department stores (National Environment Agency, 2013c).

HDPE bags are available in a variety of sizes. Larger bags (approximately 44cm wide x 50cm tall or bigger) are commonly distributed at the point of sale in supermarkets or local markets. Slightly smaller bags (approximately 30cm wide x 40cm height or smaller) are given out in hawker centres and convenience stores. Food bags are the smallest size of HDPE bags that are commonly used in Singapore. For a photographic depiction and size reference for these three common types of bags (i.e. supermarket carriers, food takeaway carriers and food bags), refer to Appendix B.

LDPE plastic bags, which are primarily available from department stores or non-F&B shops, are more widely varied in terms of dimensions and shapes.

For the purposes of this paper, the term 'plastic bags' refers primarily to the HDPE bags used in supermarkets, convenience stores, hawker centres, and food outlets. However, the points raised should be considered as salient to LDPE bags acquired from department stores as well.

2.2 Environmental concerns surrounding plastic bag use in Singapore

Approximately 3 billion plastic bags were used in Singapore in 2011 (Lee & Goh, 2012), resulting in an average of 1.6 plastic bags used per person on a daily basis. This high annual usage of plastic bags has been cause of much concern from environmentalists and concerned members of the public alike. Concerns about the environmental harm done by plastic bags is expressed primarily through letters sent to the forum sections of national newspapers (Wong, 2013; Chew, 2013), complaints sent to the National Environment Agency's public feedback channels, and bottom-up initiatives by environmental groups, such as the Singapore Environment Council's 'Bring Your Own Bag Day' campaign that ran from 2007 to 2010.

The key environmental concerns surrounding plastic bag use in Singapore are:

2.2.1 Consumption of natural resources

Approximately 37 million kilograms of crude oil, and 12 million kilograms of natural gas (Lee & Goh, 2012) were required to manufacture the 3 billion plastic bags used in Singapore in 2011. Averaging at about 1.2 kg of crude oil for every kilogram of plastic bag usage, this statistic warrants further examination of ways to reduce our reliance on crude oil on an everyday basis.

2.2.2 Energy, air quality and waste management considerations

Waste management in Singapore is done primarily through incineration at one of Singapore's four waste-to-energy plant, namely Tuas, Senoko, Tuas South and Keppel Seghers Tuas Waste-To-Energy Plant (KSTP) (National Environment Agency, 2012). The incineration ash is then sent to Singapore's only landfill on Pulau Semakau, located to the south of the main island.

At the incineration stage of the waste management process, burning plastic waste results in the emission of greenhouse gases such as Carbon Dioxide and Methane, and toxic compounds such as Nitrogen Oxides, Sulphur Oxides, Hydrogen Fluoride and Hydrogen Chloride (Khoo & Tan, 2010, p. 341). While most incineration plants are equipped with facilities to filter out these harmful gases before they are released into the atmosphere, the process still consumes energy and resources that could otherwise be conserved.

Incinerating plastic waste also requires an energy input of 252 megajoules per tonne of waste (Khoo & Tan, 2010, p. 341). While Singapore's sophisticated waste-to-energy plants recover a significant portion of this expended energy by using heat from the combustion process to generate electricity (National Environment Agency, 2013b), it is unclear whether the recovered energy completely offsets the energy required throughout the life cycle of the plastic bag. Hence, every tonne of plastic waste that can be saved reduces the burden on Singapore's energy grid.

2.2.3 Additional loading on landfill resources

After incineration, the ash residue is sent to Pulau Semakau for landfilling. Approximately 200,000 tonnes of solid waste and ash are sent to Pulau Semakau each year; at this rate, the landfill is expected to run out space by 2035 (Ministry of the Environment and Water Resources, 2013). Given that Pulau Semakau is the only landfill that Singapore has, it is crucial to take all possible measures to prolong its lifespan by reducing waste generation.

In 2012, a total of 721,300 tonnes of plastic waste were generated, out of which only 82,100 tonnes were recycled (National Environment Agency, 2013a). While there is no available data on the proportion of this plastic waste accounted for by plastic carrier bags, the 2.5 billion plastic bags used annually (Spykerman, 2013) are certainly likely to account for a significant proportion of plastic waste that is incinerated and then sent to landfills.

2.2.4 Impact of improper plastic bag disposal on marine life

Disturbing images of marine life inextricably entangled in plastic bags are commonly cited as an example of the ecological harm arising from plastic bags. A summary of the ecological arguments against plastic bag use goes as follows:

Plastic bags cannot be digested or passed by an animal; they stay in the gut, causing pain and certain death. When dead animals decay, the bags are freed and often eaten again by other animals for many years to come.

Marine animals often mistake them for jellyfish and eat them, and birds, who [sic] cannot fly once they are entangled in them, die of starvation.

(Das, 2004)

While these are indeed disturbing outcomes of improper plastic bag disposal, these claims are “based on anecdotal evidence and case studies”, and it is “impossible to know the extent of the problem” (Lewis, Verghese, & Fitzpatrick, 2010, p. 147) due to a lack of conclusive quantitative data. Furthermore, it is important to note that “injury and death to marine species has been linked to plastic litter in general rather than plastic bags alone” (Lewis, Verghese, & Fitzpatrick, 2010, p. 147). Nevertheless, it has been deemed that “a precautionary approach is appropriate” (Lewis, Verghese, & Fitzpatrick, 2010, p. 147) with regard to reducing plastic bag use in Singapore.

2.3 Economic impact of plastic bag usage and legislation

International studies on the economic costs of plastic bags reveal mixed opinions on the economic aspect of plastic bag usage, and the benefits or costs of imposing a plastic bag ban.

A study by the National Centre for Policy Analysis in Washington DC (Villareal & Feigenbaum, 2012) compared the economic performance of stores in Los Angeles that were subject to a plastic bag ban and those that were not, and found that stores subject to a plastic bag ban reported a decline in sales of -3.3 per cent, and a reduction in the number of individuals they employed by an average of 10.4 per cent (Villareal & Feigenbaum, 2012, p. 4). Stores subject to the plastic bag ban in the abovementioned study also reported an average reduction in procurement of plastic bags by up to as much as 91 per cent (Villareal & Feigenbaum, 2012, p. 5), but the report argued that this would be offset by increased spending on reusable bags.

An Economic Impact Report on Checkout Bag Charges in San Francisco (City and County of San Francisco, 2011) presents findings that diverge from the abovementioned case study of Los Angeles. The report claims that legislation to ban free plastic bags at the point of sale will “have a very slight positive impact on the economy”, with job creation, a fall in retail prices and higher profits for retailers predicted (City and County of San Francisco, 2011, p. 2).

Despite the ambivalence of findings from the two studies above, general conclusions that can be drawn about the economic impact of a plastic bag ban or charge in Singapore include:

- Supermarkets that impose a plastic bag levy for shoppers can potentially suffer a competitive disadvantage when compared with those that do not.
- Should a levy on plastic bags not be accompanied by a downward adjustment of retail prices, retailers would be likely to reap higher profits while costs for consumers increase.

In the Singapore context, there is little research or publicly available data about the cost of plastic bags to retailers and consumers. However, anecdotal evidence suggests that major retail chains may pay as little as less than one cent per plastic bag procured and distributed. This cost indication

is salient to considerations of consumer willingness to pay a charge for plastic bags, as well as costs incurred by supermarkets in offering rebates or incentives for consumers to not take free plastic bags at the point of sale.

2.4 Strategies and alternatives to conventional plastic bag use patterns

There have been several efforts by manufacturers, retailers, and members of the community to mitigate the negative environmental impact of plastic bags. This ranges from product alternatives like biodegradable or paper bags, to efforts to promote recycling of plastic bags, to policy measures such as plastic bag bans. This section provides a brief overview, analysis and evaluation of the most commonly cited strategies based on three key criteria: environmental impact over product life cycle, economic viability, and relevance to Singapore context.

2.4.1 Legislative measures: plastic bag bans and levies

Several countries and cities around the world have already introduced legal measures such as plastic bag levies and taxes, to put an end to the practice of shoppers receiving an unlimited amount of plastic bags at no charge.

These financial disincentives take two main forms – taxes that are enforced on plastic bag manufacturers or importers for the plastic bags sold by them (Duboise, 2012) , and levies that are imposed on consumers at the point of sale (Shankleman, 2013).

A summary of levies and taxes imposed in various cities or countries worldwide, and a comparative analysis of the impact of these levies on consumer responses is shown by the diagram below:

Location	Date	Bags Affected	Retailers Affected	Charge	Reduction in Affected Bags	Notes/ Source
Ireland	2002	Plastic	All	€0.15 (\$0.21)	90%	Sources: Herrera Environmental Consultants, ICF International, Hyder Consulting. Increased from 15 euro cents to 21 in 2007.
Washington DC	2010	Plastic & Paper	All stores selling food	\$0.05	60%	Safeway stores reported a 60% decline in both paper and plastic bags distributed at its DC stores. This is the most accurate available pre-and post-estimate.
Denmark	1994	Plastic & Paper	All	\$0.03/\$0.12	66%	The fee is included in the price of bags to the retailer. Sources: Herrera Environmental Consultants, San Jose and Seattle Bag Studies, Nolan-ITU, AECOM.
Taiwan	2007	Plastic	All	\$0.10	68%	Reduction in plastic bags is 68%; reduction in all bags is 57% due to some consumers switching to paper bags. Sources: Herrera Environmental Consultants, Nolan-ITU, GHK .
Victoria, Australia	2008	Plastic	Grocery	\$0.10	79%	Based on actual results from trial \$0.10 charge for carryout bags in 3 cities over a 4 week period in 2008. KPMG, "Trial of a Government and Industry Charge for Plastic Bags," Australia.
IKEA (retailer)	2007	Plastic	NA	\$0.05	92%	During trial period of IKEA's 'bag the plastic bag' program, consumers were offered IKEA's reusable bags for \$0.59, or they could purchase a plastic bag for \$0.05. Source: IKEA

FIGURE 1: COMPARISON OF PLASTIC BAG LEVIES WORLDWIDE AND IMPACT ON CONSUMER BEHAVIOUR.
SOURCE: (CITY AND COUNTY OF SAN FRANCISCO, 2011, P. 6)

In addition to the entities whose levies and taxes on plastic bags are reflected in the table above, some other countries and cities² who have recently introduced legislation to curb free plastic bag availability are:

- Bulgaria raised an existing tax on plastic bag manufacturers and importers from US\$0.10 (S\$0.13) per bag sold in 2011, to US\$0.30 (S\$0.38) per bag sold in 2013, with further increases to US\$0.37 (S\$0.47) in 2014 (Duboise, 2012). This tax is applicable for “all bags made of conventional plastic polymers and used by consumers for holding and carrying goods” with exceptions made for degradable and compostable bags.
- New Delhi, India, “approved a ban on the storage, sale, use and manufacture of plastic bag within the city’s limits” (Florida Department of Environmental Protection, 2012)
- Wales, United Kingdom introduced a 5p (S\$0.10) charge on single-use plastic bags in October 2011; supermarkets reported reductions in plastic bag usage of up to 96%, while the number of Welsh people taking their own bags to the supermarket rose from 42% before the charge to 64% after. Support for the charge also grew over time, increasing from 35% (of 1,000 survey participants) to 49% after its introduction (Vaughan, 2012).

In Singapore, the SEC collaborated with the National Environment Agency to run a campaign known as “Bring Your Own Bag Day” from 2007 to 2010. Through this public education initiative, SEC worked with approximately 300 retailers to encourage shoppers to bring their own bags every Wednesday. Shoppers who accepted plastic bags were prompted to consider making a voluntary donation of 10 cents into collection tins placed at each cash register. Participating retailers included Cold Storage, Giant, Carrefour, NTUC Fairprice, Sheng Siong, Prime and Shop & Save. Responses to this campaign were mixed, but reports claimed that as many as 100,000 plastic bags were saved (Channel NewsAsia, 2007). The Bring Your Own Bag Day campaign was discontinued by SEC in 2010 to pave way for a new programme built around the concept of “Bring Your Own Bag Everyday”.

After the discontinuation of the Bring Your Own Bag Day campaign in 2010, most retailers have continued to engage with their customers on various ways to reduce plastic bag use. Some niche retailers, such as IKEA in Singapore have stopped giving out plastic bags for free altogether (IKEA, 2013). Supermarket chains also do their part. NTUC Fairprice, for example, offers 10-cent rebates to customers who spend a minimum of \$10.00 and bring their own bags (NTUC Fairprice Co-operative Limited, 2013). NTUC Fairprice also conducted a data collection exercise of their own initiative, wherein it was found that “about six in 10 NTUC Fairprice customers bring their own shopping bags for groceries and said no thanks to disposable plastic bags” (TODAY Online, 2013). Retail chains under the Dairy Farm group in Singapore have a ‘Green Ambassador’ programme, which includes an effort to encourage children to reduce plastic bags. While these initiatives have met with some degree of success in reducing the number of plastic bags taken over a short period of time, it is important to explore how these initiatives can be scaled up, and their efficacy can be further increased.

² A comprehensive overview of plastic bag policies globally can be accessed at <http://www.dep.state.fl.us/waste/retailbags/default.htm>.

1.1.1 2.4.1 Material alternatives to single-use HDPE plastic bags – a life cycle environmental impact evaluation

A life-cycle analysis of a product includes “extraction of natural resources, production of raw materials, processing, manufacturing, and fabrication of the product; transportation or distribution of the product; and the disposal or recovery of the product after its useful life” (Sustainability Victoria, 2007, p. 5). A basic life-cycle of a plastic carrier bag can be graphically represented as follows:

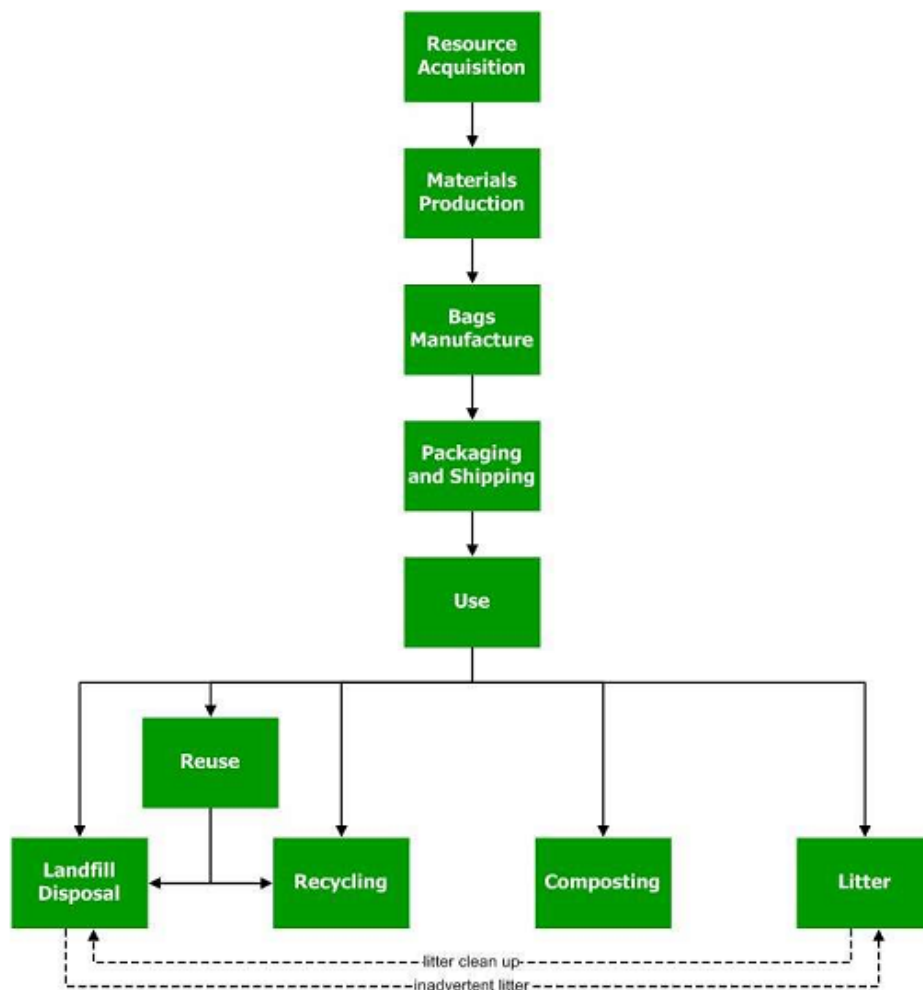


FIGURE 2: GENERIC LIFECYCLE OF SHOPPING BAG. SOURCE: (SUSTAINABILITY VICTORIA, 2007)

Environmental advocates propose several alternatives to traditional HDPE plastic bags, including biodegradable or compostable bags for single-use purposes, paper bags for single-use purposes, reusable bags made from low density polyethylene (LDPE) or non-woven polypropylene, and cotton tote bags. To gain a clearer sense of which option is the most environmentally viable

alternative to single-use HDPE bags, a life-cycle analysis of the environmental impact of each type of commonly proposed alternative is necessary. However, the studies from which the data presented below is extracted are mostly based on overseas contexts, and therefore purely indicative when applied to the Singapore context. This is because variables such as country of origin of the raw materials, overseas transport routes and waste disposal processes in the Singapore context are different from those in the countries examined in the cited studies.

Degradable bags

“Degradable bags” or carrier bags are made from starch-polyester blends, which combine commercially manufactured hydrocarbons with starches derived from biomass fibres such as corn, potato, tapioca or wheat. Over time, these biodegradable polymers decompose and break down into carbon dioxide, methane, water, inorganic compounds or biomass (Edwards & Fry, 2011, p. 13). The more commonly available form of biodegradable plastic carrier bags is oxo-degradable bags. Oxo-degradable bags are those that are made from plastics with certain additives added in, that promote the degradation process in the presence of natural daylight, and heat. Other forms of degradable bags might include “biodegradable bags” which decompose into carbon dioxide, methane, water, and inorganic compounds, or “compostable bags” which are degradable under the action of microorganisms and achieve total conversion into carbon dioxide, methane, water and inorganic compounds (Sustainability Victoria, 2007, p. 2).

In terms of environmental performance, oxo-degradable bags require 10% less raw materials to produce as compared to HDPE bags (Edwards & Fry, 2011), and studies have also shown that “the incineration of PP (Polyethylene Plastic) bags generates about double the amount of greenhouse gases compared to the incineration of bio-bags” (Khoo & Tan, 2010, p. 341). Oxo-degradable bags are also cited as having a lower impact in the littering stream. As compared to HDPE bags, they require a much shorter period to degrade in the environment (Lewis et al, 2010).

However, depending on the type of degradable bag, the plastic may not break down into harmless compounds, but rather, “microplastic” fragments, which can still be ingested by marine life (Thomson, et al., 2004). Additionally, just like HDPE bags, oxo-degradable bags are neither thick nor durable and are intended mainly for single use. Consumer complacency that a degradable bag would disintegrate even if disposed might lead to higher rates of littering.

Oxo-degradable bags are also not designed for material recycling. A typical plastic recycling process involves re-heating, during which biodegradable bags will decompose and make further processing impossible. Furthermore, mixing of biodegradable bags in the feedstock of recycling will damage the process and the quality of recycled products (Ren, 2003).

While bags made entirely of bio-based polymers might have a lower environmental impact than the commonly available oxo-degradable alternative, the lack of these options in the market as of 2013 makes them an unlikely solution to the problem of plastic bag wastage for now.

Paper bags

Paper shopping bags, and other light duty bags are commonly made of a single layer of paper. They are not waterproof, but some bags may have a laminate that protects the outside to a limited degree. While paper bags are not widely used in Singapore supermarkets, they continue to be commonly used to distribute small snack items to consumers, as well as in some department stores in Singapore.

Paper carry bags were found to have the lowest impact in the littering stream. They are less visible than plastic bags and take a shorter period to break down in the environment. Also, paper bags are less likely to cause injury to wildlife through ingestion, smothering or entanglement as they degrade relatively quickly and are unlikely to be mistaken for food (Lewis, Verghese, & Fitzpatrick, 2010). Paper bags are also highly recyclable and can be manufactured back into paper products. During production, paper bags can incorporate some recycled material.

However, the paper bags found in Singapore – i.e. smaller sized bags found at food outlets and department stores – are suitable primarily for single use, due to their small size, lack of durability, and permeability to water. Hence, they cannot be used as bin liners. The production process of paper bags requires the usage of larger volumes of water as compared to plastic bags (Ayalon, Goldrath, Rosenthal, & Grossman, 2009) and can cost 6 times higher than plastic bags (Njeru, 2006).

Non-Woven Bags

Non-woven bags made from polyethylene terephthalate (PET) or polypropylene plastics (PP) are intended for reuse. They are waterproof, durable and can be reused several times as compared to single-use plastic or paper bags. These qualities of non-woven bags make them highly functional for all products due to a high strength to weight ratio, being able to carry approximately 7-9 grocery items, and good moisture barrier (Lewis, Verghese, & Fitzpatrick, 2010). The reusability of these bags implies that several single-use carry bags can be avoided through the repeated use of these bags. There is a potential cost saving for retailers from the avoided purchase and storage of single-use bags. This also minimises the amount of waste caused by supermarket carrier bags, as consumers are less likely to throw away reusable bags. The production of non-woven bags also has the potential to incorporate recycled materials such as Polyethylene terephthalate (PET), unlike bags in common use, further helping reduce resource wastage.

However, non-woven bags may be less convenient for both consumers and retailers. Before going out, consumers have to remember to bring their reusable bags along for shopping. If they forget, they might have to purchase additional bags. For retailers, checkouts may have to be redesigned to handle the new reusable bags and maintain hygiene of groceries purchased.

From a life-cycle analysis perspective, the global warming potential of non-woven bags is the highest as compared to all other types of carrier bags, as shown in the chart below:

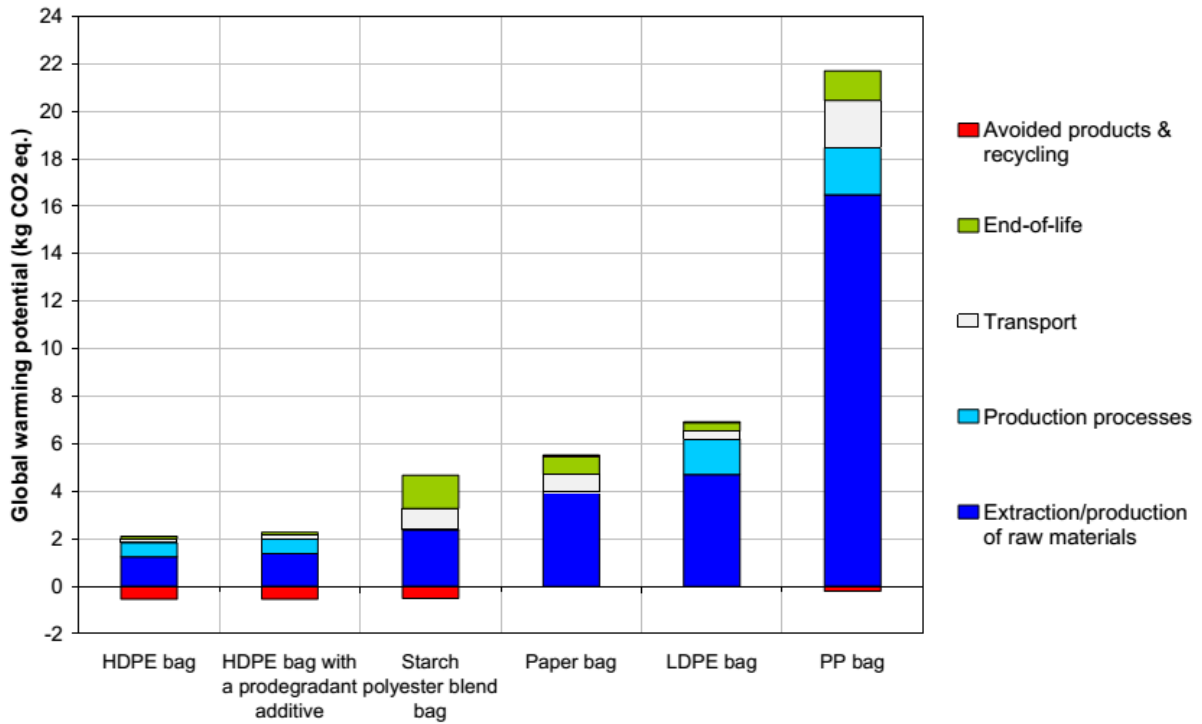


FIGURE 3: THE LIFECYCLE IMPACT OF EACH CARRIER BAG ON GLOBAL WARMING POTENTIAL
 SOURCE: (EDWARDS & FRY, 2011, P. 34)

The higher global warming potential of non-woven PP bags makes it necessary for the bag to be reused several times in order for the negative global warming potential accrued from avoided disposal and recycling to offset the carbon dioxide emission arising from extraction of raw materials.

2.4.2 Reusable bags made from cotton

Another popular alternative to single-use plastic carrier bags are cotton or canvas tote bags. These bags are durable and highly reusable, but not waterproof.

From a life cycle analysis perspective, Edwards & Fry (2011, p. 33) explain that Cotton Bags are not featured in the graphical comparison of global warming potential as shown in Figure 3, because their global warming potential is more “than ten times that of any other carrier bag”. The extraction and production of raw materials has the highest percentage of impact in terms of the life cycle of the cotton bag.

2.5 Conclusion

The overview of various material alternatives to single-use plastic carrier bags has shown that there is no panacea to the solution of plastic bag use in supermarkets. The criteria to evaluate the environmental preferability of these measures are complex and varied, and the environmental performance of each type of bag varies according to each specific criterion.

In general, however, a comparison of the number of times each type of reusable bag is required to be reused in order to achieve a lower global warming potential than a single-use HDPE carrier bag is a useful indicator of the relative environmental preferability of each alternative:

	HDPE bag (No secondary reuse)	HDPE bag (40.3% reused as bin liners)	HDPE bag (100% reused as bin liners)	HDPE bag (Used 3 times)
Paper bag	3	4	7	9
LDPE bag	4	5	9	12
Non-woven PP bag	11	14	26	33
Cotton bag	131	173	327	393

FIGURE 4: THE AMOUNT OF PRIMARY USE REQUIRED TO TAKE REUSABLE BAGS BELOW THE GLOBAL WARMING POTENTIAL OF HDPE BAGS WITH AND WITHOUT SECONDARY REUSE. SOURCE: (EDWARDS & FRY, 2011, P. 61)

From the table above, we can infer that to offset the wastage of plastic bags that are not reused in any way, non-woven PP bags would need to be reused 11 times, while cotton bags would need to be reused 131 times to achieve the same low levels of greenhouse gas emissions. For the purposes of this paper, which seeks to mitigate the negative environmental impact of the wasteful use of plastic bag use and not the legitimate need for plastic bags to line bins, the other scenarios do not warrant further investigation.

From the life cycle analysis, we can also infer that ultimately, reducing overall demand for plastic bags by end-users, and thereby reducing the manufacture of plastic bags to meet this demand at the source is an important strategy to mitigate the negative environmental impact of plastic bags.

To this end, SEC has undertaken extensive quantitative and qualitative research to gain a better understanding of these issues, and make a set of relevant and appropriate recommendations to mitigate the wasteful use of plastic bags.

3 Research and Findings

3.1 Overview

These changes in consumer behaviour require an in-depth understanding of the environmental context in Singapore, the social and cultural motivations behind behavioural patterns and attitudes towards reducing plastic bag use in Singapore, and the economic viability of implementing measures to ban or tax plastic bags. To control the numbers of plastic bags made available to the public, the cooperation of retailers and supermarket chains is crucial. Hence, understanding the concerns and attitudes of retailers regarding measures to reduce the wasteful use of plastic bags is also necessary.

3.2 Methodology

3.2.1 Quantitative Research

SEC worked with the Ministry of the Environment and Water Resources (MEWR) to develop a set of survey questions designed to investigate how households in Singapore obtain and reuse plastic bags. These questions were incorporated into a wider survey on Household Recycling undertaken by MEWR. 2,500 participants, who were Singapore Citizens or PRs, and at least 15 years old, were surveyed for this household survey, from all household types (i.e. HDB housing, private condominiums and landed property). The geographical distribution of the sampled households was island wide. One person per household was interviewed – this participant would be selected using the Kish Grid sampling method³. The fieldwork took place between August and late November 2012.

3.2.2 Qualitative Research

SEC worked with the environmental consulting firm, AECOM to conduct in-depth qualitative research to dig deeper into the behavioural trends and usage patterns identified through the quantitative research done by MEWR. Between 30 May 2013 and 30 June 2013, SEC arranged for 2 Focus Group Discussions (FGD), and 5 in-depth interviews, all of which were conducted by researchers from AECOM.

All participation in the qualitative research was on a confidential basis to facilitate the open and honest discussion of ideas.

3.2.2.1 Focus Group Discussions

The first FGD was held on 30 May 2013, at 7:30 p.m. to gather views on plastic bag usage from members of the public. A total of 7 participants were recruited through a public call for participants on SEC's social media channels, and word-of-mouth recruitment by SEC staff. Family members of SEC staff were not eligible to participate. The discussion was moderated by researchers from AECOM.

³ The Kish Grid sampling method uses a pre-assigned table of random numbers to find the person to be interviewed.

The second FGD was held on 31 May 2013, at 7:30 p.m. to gather views on the feasibility of measures implemented to reduce plastic bag use on retail operations. A total of 4 senior management representatives from Singapore’s major retailers were recruited through targeted phone-calls and emails.

The questionnaire used for these discussions are attached in Appendix A.

3.2.2.2 In-depth Interviews

To substantiate the findings garnered through the quantitative research and FGDs, a total of 5 in-depth interviews were conducted with stakeholders from the academic, environmental and manufacturing sectors, as well as the general public. For sample questionnaires used for each group, refer to Appendix A.

3.3 Findings from Quantitative Surveys

The quantitative analysis undertaken through the surveys yielded information on three key areas of plastic bag use in Singapore:

- i. Obtaining and storing plastic bags
- ii. Plastic bag usage patterns
- iii. Reusable bag usage patterns

3.3.1 Obtaining and storing plastic bags

Participants were asked to indicate the number of plastic bags they obtained in a typical week from all sources, including grocery shopping, one-off purchases, food and beverages and general shopping. 75.2% of respondents indicated that they obtained 10 bags a week or less from all source, while 4.3 % of respondents indicated that they obtained more than 20 bags per week, as shown in Chart 1.

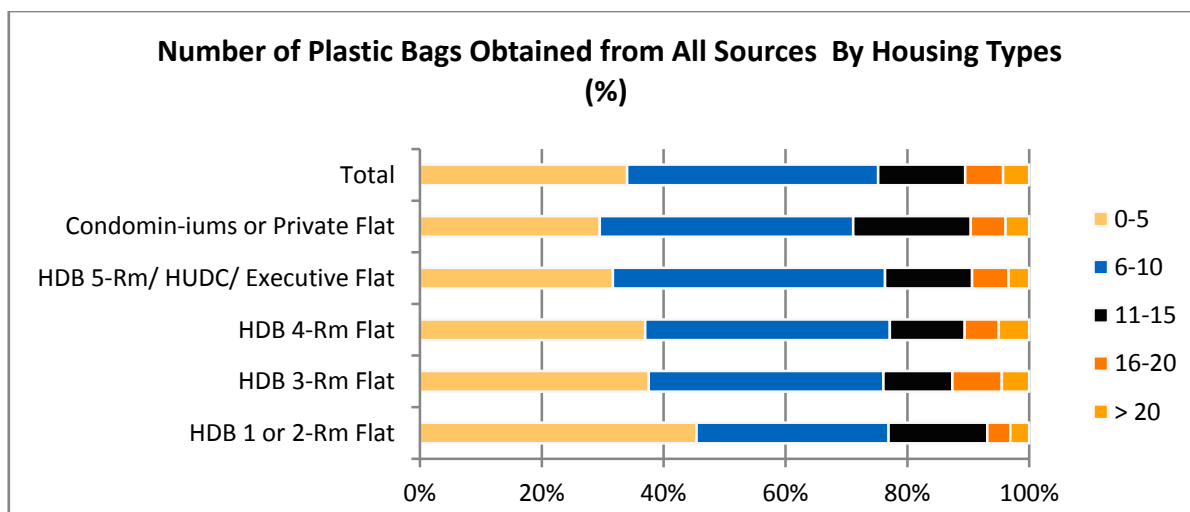


CHART 1: NUMBER OF PLASTIC BAGS OBTAINED FROM ALL SOURCES BY HOUSING TYPES (%)

When asked for the number of plastic bags that each respondent had currently stored at home at the time of being surveyed, 15.8% indicated that they had between 0 to 10 bags stored at home; 54.5% had between 11 and 40 bags stored at home, and 29.7% of respondents had more than 40 bags stored in their homes.

When the data was broken down by household type, respondents staying in 3-room and 5-room HDB flats and landed property were more likely to have more plastic bags stored at home.

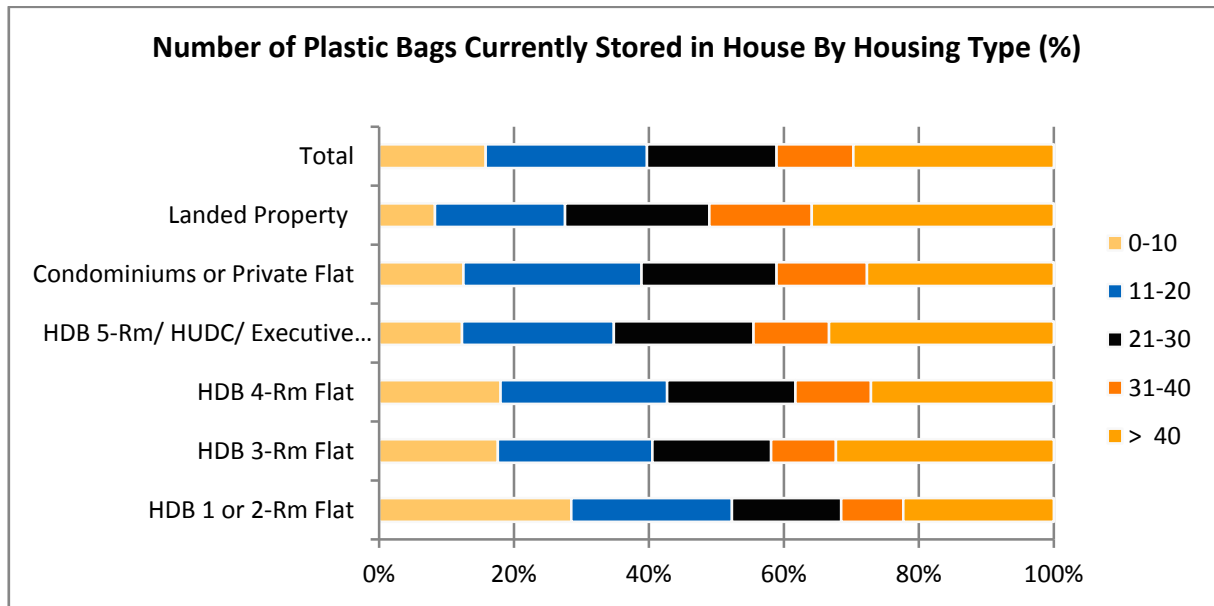


CHART 2: NUMBER OF PLASTIC BAGS CURRENTLY STORED IN HOUSE BY HOUSING TYPE (%)

3.3.2 Plastic Bag Usage Patterns

When asked what they would do to the plastic bags they had brought home, 89.9% of respondents (2247) indicated that they would reuse the plastic bags to dispose general waste. 8.5% would recycle the bags, while 6.3% of participants said that they would throw the bags away without reusing them.

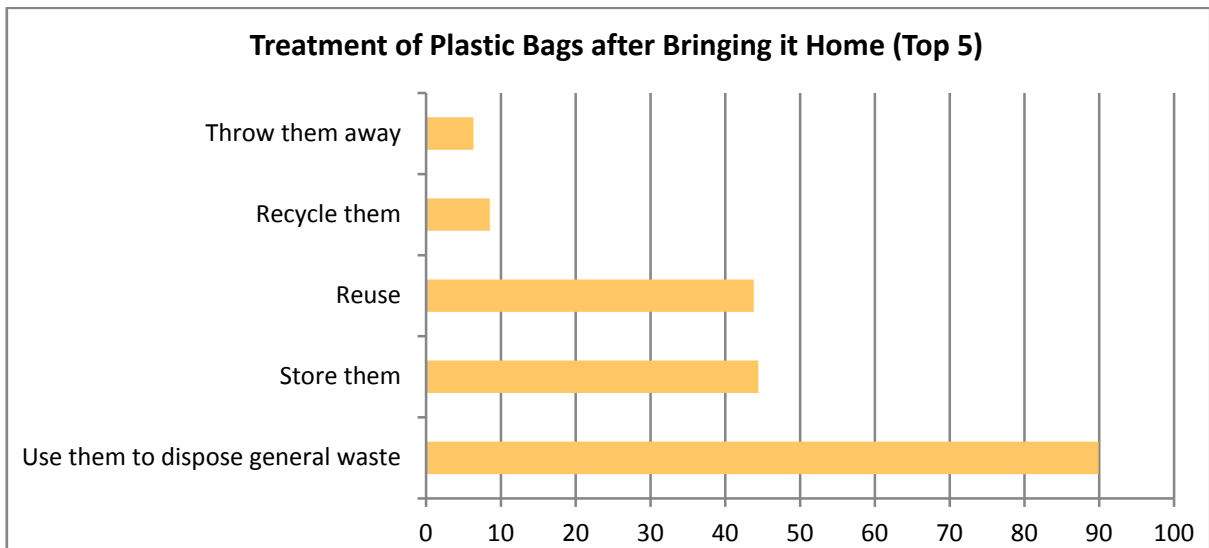


CHART 3: TREATMENT OF PLASTIC BAGS AFTER BRINGING THEM HOME (TOP 5)

Out of the respondents who reused plastic bags, 44.1% of them reused between 6-10 bags on a weekly basis. Another 28.3% reused 5 bags or less per week, while only 5.3% of respondents reused more than 20 plastic bags per week. Smaller housing types tended to reuse fewer bags.

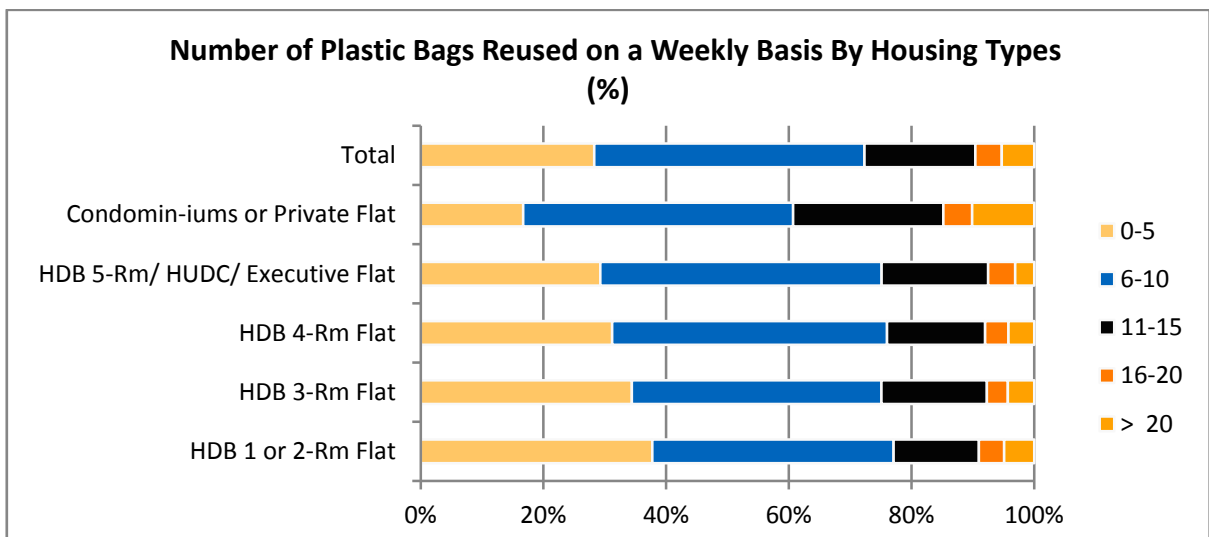


CHART 4: NUMBER OF PLASTIC BAGS REUSED ON A WEEKLY BASIS BY HOUSING TYPES

3.3.3 Reusable bag patterns

The survey data indicated that 14.1% of respondents identified as using reusable bags all the time, while 32% of respondents never used reusable bags for shopping.

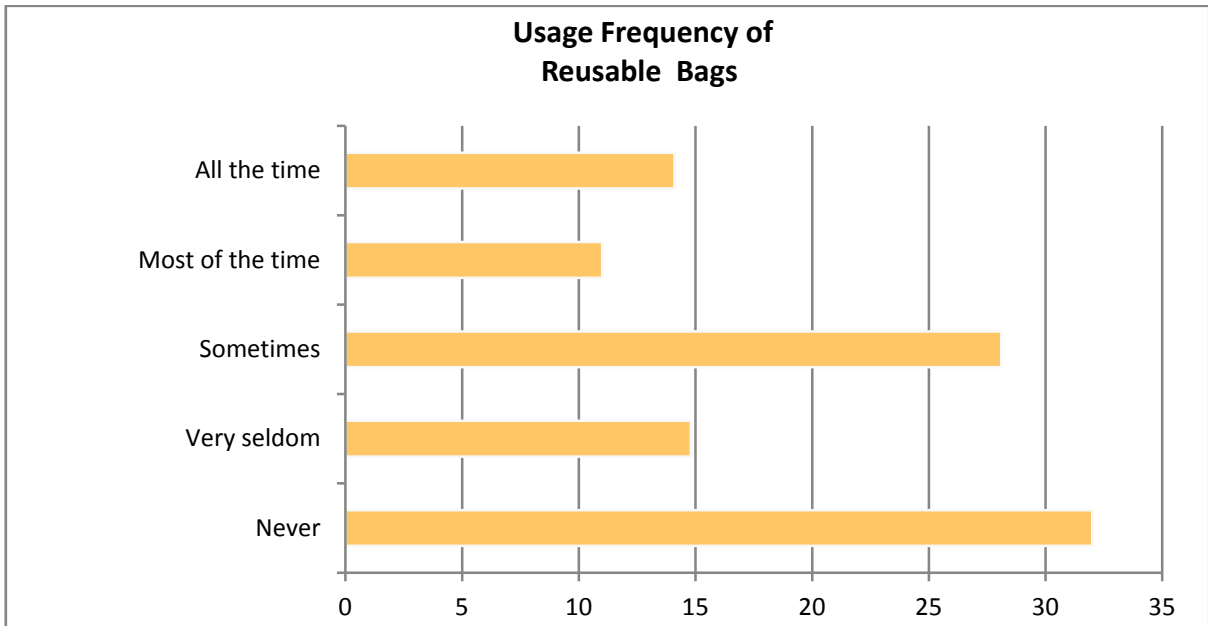


CHART 5: USAGE FREQUENCY OF REUSABLE BAGS

Respondents who did not use reusable bags all the time were asked about their reasons for not doing so. The top-most cited reason for not using reusable bags was that plastic bags were provided (39.3%). 33.5% of respondents mentioned that they did not have reusable bags with them when they made unplanned purchases, and 27% forgot to bring their reusable bags with them when they went shopping. 23.2% also consciously took plastic bags from supermarkets so that they would have bags in which to dispose of their household waste, or for other types of reuse.

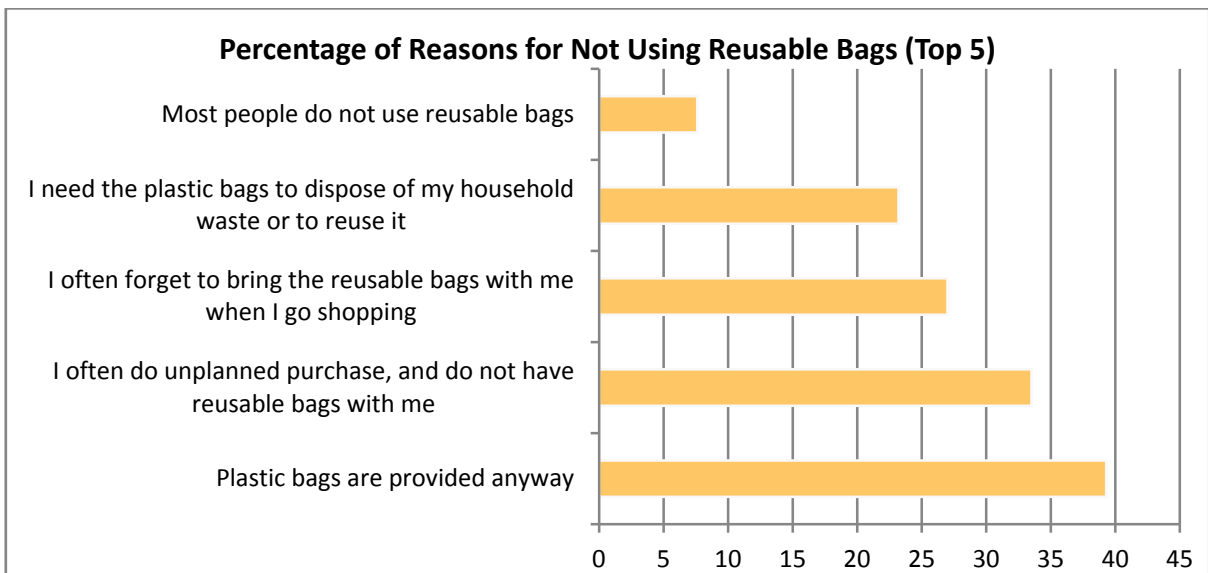


CHART 6: PERCENTAGE OF REASONS FOR NOT USING REUSABLE BAGS (TOP 5)

3.4 Findings from Focus Group Discussions and Interviews

The qualitative analysis undertaken through the FGDs and Interviews conducted by SEC and AECOM aimed to delve deeper into the behavioural trends uncovered through the qualitative research. The information gathered from consulting with members of the public, senior management from retail chains, experts on waste management and environmental economics and senior management from a company that manufactures plastic bags, contributed to a greater understanding of the following aspects of plastic bag use:

- i. Consumer awareness about the negative environmental impact of plastic bag use in Singapore
- ii. Environmental and socio-cultural factors influencing plastic bag use in Singapore
- iii. Possible solutions to mitigate wasteful use of plastic bags in Singapore

3.4.1 Consumer awareness about the negative environmental impact of plastic bag use in Singapore

The following insights about consumer awareness about the negative environmental impact of plastic bag use in Singapore were shared by members of the public, academic experts and retailers:

Need for higher awareness levels

The members of the public who participated in the FGDs and interviews had relatively high levels of awareness about the impact of plastic bag use, such as greenhouse gas emissions resulting from the incineration of plastics and impact on marine life. Participants cited Singapore-related consequences of the negative impact of plastic waste such as the harmful chemicals released upon plastic incineration, as well as international consequences such as the Great Pacific Garbage Patch.

However, retailers and experts felt that there was a need to increase awareness about the negative impact of wasteful plastic bag use in Singapore.

I think Singapore's education on environmental issues is quite effective, but of course, there is room for improvement.

- Environmental Expert #1

I don't think people really see the problems of plastic bags, you know they don't really see whether it reaches chutes as litters, or whether they go to the sea, they haven't seen the impact of it. (...) I think most Singaporeans understand the need to reuse the plastic bags. Just that they don't really see the problems of plastic bags yet.

- Environmental Expert #2

I think the message has not filtered down to a lot of people...

- Supermarket Management Representative #1

Effective strategies to raise awareness

The two main strategies suggested by experts to raise public awareness about the negative environmental impact of excessive plastic bag usage were to step up environmental education efforts in schools, and to incorporate strong visual element in campaigns to boost their effectiveness.

Experts felt that inculcating environmental consciousness and best practices in young children would have positive knock-on effects for the rest of the population, and help achieve long-term behavioural change in the population:

Teach the kids first, and then they can go home and tell the parents to use less plastic bags. Or you can do some advertisement on TV during PG time, when the family watches TV together.

- Environmental Expert #1

The second correlation [between demographic profile and environmental consciousness] is education. The more educated tend to be more interested.

- Supermarket Management Representative #1

We try to engage the schools, the pre-primary schools, get them involved so the parents will be involved (...). And this group of young children, when they grow up, they can pass the message down. We hope that (...) through time, more and more people will become environmental conscious and their habits will be much better.

- Supermarket Management Representative #3

Participants also felt that awareness campaigns using visual means such as television commercials or powerful images of the environmental harm caused by plastic bags would be a highly effective strategy:

We can do a lot of marketing to the TV (...). A lot of advertisement campaigns are targeted at educated people, so for those people like my parents, they won't get this message because they can't understand. So

it will be good to have it through TV and maybe in different dialects or languages.

- Interview participant from consumer group

On how to get impact across, I think images are the best (...). The images of the clogged drains, seashores, things like that... how much you keep it I don't know, but at least at the point when you see it, you can understand, and you connect better with the problem.

- Supermarket Management Representative #3

3.4.2 Environmental and socio-cultural factors influencing plastic bag use in Singapore

Participants in the FGDs and interviews identified a variety of factors that would affect patterns of plastic bag use in Singapore, by posing barriers to achieving reductions in the wasteful use of plastic bags, or providing incentives for doing so.

Waste management infrastructure in Singapore

The foremost reason that plastic bags were deemed a necessity in Singapore was the widespread household practice of disposing waste in rubbish chutes. Members of the public, retailers and experts alike stated that this system of waste management made the need for a certain number of plastic bags in each household inevitable.

Most Singaporeans stay in high rise flats, and they need something to throw their rubbish in, and I think that problem has not really been resolved. And NEA said "it's fine" (and they encourage them to do so), so you have conflicting messages.

- Supermarket Management Representative #1

If we stop the plastic bags, two things will happen. One is they will just throw the rubbish (into the rubbish chute) without using plastic bags which will create lot of problems for the cleaners and the hygiene in general. (...) The other thing is people will buy their own bags, which will incur an additional cost. Buying is an additional cost for them, they will not be happy.

- Environmental Expert #2

Hygiene concerns amongst shoppers

In addition to hygiene concerns associated with disposing household waste in rubbish chutes, retailers and consumers also expressed concern about hygiene when purchasing “wet” items such as fresh produce and meat.

We all need plastic bags because there are several benefits from using plastic bags (...). It helps to sort out between the dry goods and non-dry goods so there is lesser potential for cross-contamination.

- Environmental Expert #3

However, some shoppers feel that the use of plastic bags to contain moisture can be wasteful at times:

They tend to like, you know, the Yakult, they will separate out into small bags and then put it into one big bag. It actually will not contaminate anything but they just try to put it in something so it contains the wetness of the Yakult. I think that’s quite a waste.

- FGD participant #3

Sometimes the cashier will put my things into 2 bags, so I say 1 bag is enough. Or sometimes when there is a wet and dry item, they will put the wet item into the plastic bag and put the plastic bag into another bag because they want to separate the wet and the dry. So, I tell cashiers its ok, put everything together, because if my dry item gets wet, it’s ok.

- Interview participant from consumer group

A deeply ingrained “convenience culture”

Some experts expressed the view that even if awareness levels about the negative environmental impact of plastic bags were high this may not translate to action because of the perceived inconvenience of doing so:

Even if they are aware, my own belief is they really don’t care because Singaporeans, also I think many different societies, care about convenience costs (...). That’s why this movement towards environmental consciousness (...) must come from passion. You must believe that you want to do good for this earth and so on, only then you spur people on.

- Environmental Expert #3

I think the problem now here is that the adults in Singapore have been exposed to 20 – 30 years of having the plastic bags free of charge, so to change this overnight can be very difficult.

- Supermarket Management Representative #3

Retailers need to maintain competitive advantage and good customer relations

We even trained our cashiers/staff to ask, “Do you need a plastic bag?” And customers always asked back, “So how am I going to take it if I don’t have a plastic bag?” And we also received lots of complaints. That’s why we stopped our frontline from asking such questions.

- Supermarket Management Representative #2

Last time, our management tried reducing the number of places for plastic rolls, but we received a lot of complaints via emails that “I go to your shops and I have to walk very far to get a plastic bag”. Whatever we do, we have to think about the convenience of the customer.

- Supermarket Management Representative #2

6 or 7 years ago, I started asking customers to bring their own bags on certain Wednesdays of the month. I think the impact is quite significant, we noticed a drop in customers coming on that day. It was significant enough to cause concern.

- Supermarket Management Representative #1

This perception was corroborated by a consumer participating in the FGD, who said: “If it was me, I would avoid going there on Wednesday; I don’t want to pay for a reusable bag”.

Retailers agreed that any measures that could potentially upset customers would have to be implemented across the board in order to preserve competitive advantage across the board.

If you charge another 10 cents, the customers would think, “Here’s an opportunity for these greedy retailers to squeeze me for another 10 dollars or 10 cents”. That’s the reason why we earlier said if everybody is doing the same way, (...) nobody is singled out as the bad guy. Then, it’s ok.

- Supermarket Management Representative #3

3.4.3 Possible solutions to mitigate wasteful use of plastic bags in Singapore

In the course of the FGDs and Interviews, several suggestions were offered to mitigate the wasteful use of plastic bags in Singapore, ranging from overhauling Singapore's entire waste management infrastructure, to introducing levies for plastic bag use, to providing incentives for shoppers to bring their own reusable bags.

The potential solutions discussed by consumers, retailers and environment experts fell into the following categories:

- i. Tackling the problem of small sized plastic bags, which were less likely to be reused for waste disposal
- ii. Views on imposing penalties and/or incentives to discourage plastic bag use
- iii. Training supermarket service staff to discern between situations when more bags were required, and when they were not.

Differentiating plastic bag utility by size

Several research participants reported that while they did reuse some plastic bags for rubbish disposal, the bags that were smaller sized were thrown away.

Actually, the smaller bags are much harder to recycle. It's very difficult to use as trash bags because most of the time, it's too small.

- FGD Participant #2

When we go to buy little food, then we will get the small red coloured plastic bag which is not quite useful so at the end of the day a lot of people just throw away...

- Interview participant from consumer group

The frequency at which small plastic bags were given out at bread shops and bakeries emerged as a common theme amongst respondents:

I think the worst is the bread shop because I have breakfast every day at the nearby bread shop where they sell the individual bread, so every bread will have its own bag, and they will put it together in a big bag.

- FGD Participant #5

What happened is that when I try to buy a few bread, they just put 1 bread into 1 plastic bag, so end up if I buy 5 bread I have 6 plastic bags. This is so wasteful because we just need to bring back the bread. After we consume the bread, we just throw the plastics away. So that's the reason why I wrote to NEA on how we can minimize (the use of plastic bags).

- Interview participant from consumer group

The representative from the plastic bag manufacturing industry also agreed that small bags had a lower potential for reuse⁴, and that measures should be taken to restrict their circulation:

When you buy a fish ball, you put in a very small bag (6 x 9 inches). Now this bag does not have a potential for secondary usage. (...)

Let's put it in this way: size of bag does matter. We should have standard, in my opinion, from a dustbin perspective. We should study the Singapore household's dustbin size. They don't use a big bin; they use this kind of bin, or the pedal bin which is slightly bigger. So looking from a bin perspective, you can design so that the user can be encouraged to reuse the plastic bag as a bin liner. Then you are encouraging them to use (the bag) two times. If you use the chicken rice bag, which is this size, it is just too small. Can it fit? Cannot. So instead of encouraging people not to use plastic bag, you should encourage, but make it such that it is big enough. That means you put a standard there, all plastic bags must be minimum this size, because it can fit into this bin, in a HDB flat. Then you can eliminate all the small plastic bags which cannot be used for the second time.

- Plastic Bag Manufacturing Representative

Views on imposing penalties and/or incentives to discourage plastic bag use

While retailers were concerned that imposing penalties for consumers who requested plastic bags at the point of purchase would be detrimental to customer relations and the company's business, there were mixed views amongst consumers on imposing a levy for plastic bag use.

Some consumers acknowledged that while a penalty to reduce plastic bag use was a good way to discourage consumers from taking more bags than necessary, it should not be too high:

⁴ A possible circumstance of reuse of smaller food bags could be for pet owners to pick up after their pets. However, assuming that a small percentage of households would own dogs, and that small bags used to contain wet food items, sauce or drinks are unlikely to be stored for reuse; the contribution of this circumstance to waste mitigation can be considered negligible.

Ok, for the levy of each plastic bag, I think we shouldn't go too much, pay a dollar a bag. I know it's a good way to push people but sometimes we just tend to forget. It's not we purposely forget, sometimes we just happen to forget. So, it's a bit troublesome. So I mean, a small amount of fee is reasonable, it makes people to think twice before you actually get a bag. Or at least, buy a bag and fit everything in it, or rather buy two or three bag and put an item in each.

- FGD Participant #4

Other consumers did not oppose the introduction of a levy, but did feel that measures would be needed to mitigate the perceived harshness of such a measure:

Before we implement this [a plastic bag levy], we need to give some time to prepare the citizens, so they know that this levy will come out. Because if they bring their own bags they will not be penalised. So a lot of education needs to be done before the implementation of this levy.

- Interview participant from consumer group

A consumer who supported the idea of a levy also supported the view of retailers that a levy would have to be a nationwide measure, backed by legislation:

Maybe the retail shops, they can come together. We need to have consistency throughout the shops, but if the government can come in, it will be more effective. Like some countries, they have carbon tax. And GST, we all pay GST. So I think people have no choice but to follow. It has to be a nationwide campaign, so actually everyone has to come in, even the hawker centres.

- Interview participant from consumer group

Most consumers agreed that offering incentives to discourage plastic bag use was a good idea, but felt that the current incentive of a 10-cent rebate for every transaction in which a reusable bag was used is not adequate:

A lot of food shops they have (schemes where) every time you use a reusable bag, you have a stamp, other ways like when I go to the food shop, and get the reusable bag, so like maybe, I get a free something, a free cookie or something, it's something they give us also for doing our part.

- FGD Participant #1

So, maybe like you provide incentives, so you go like those people, they change, and give social motive to those people who don't change

because if you select a penalty, everyone will be upset about it. Some uneducated party will be oh, why, why, why like this? If you do a penalty, people that are less fortunate, it will always be used to their disadvantage. I think it is better to search for another option. For like this stamp and points, we are willing to take, or maybe it could be things like that, (...) it's a better solution.

- FGD Participant #4

And NTUC gives 10 cents rebate for us. But I think it's not quite effective. What's 10 cents to Singaporean? I think it is more effective to penalize them for using plastic bags.

- Interview participant from consumer group

Speculating on the economic feasibility of retail incentives for discouraging plastic bag use, one FGD participant suggested that the practice of retailers giving incentives for not using plastic bags should be restructured as a tax-deductible practice:

If the government really wants to help retailers, then they will say whatever you want to give as incentive, plastic bags will get a tax to go. See, when you donate to charitable organisations, you gain tax benefit, the reason being charitable organisation does the work for society, acting on behalf of the government, so in this case, if the retailers are incentivizing the public, they are acting on behalf of the government, they give tax benefit, which is good. It is much easier.

- FGD Participant #5

Views on providing second-hand reusable bags for free, but charging for plastic bags

Respondents were asked about their thoughts on a proposed middle-ground solution wherein a levy would be imposed for plastic bags, but reusable bags would be made available for free to customers at the point of sale. While customers had strong concerns that this would be an unhygienic way to store and carry food, they felt that the overall concept was a workable one.

I think [proposal to impose an environmental levy on plastic bags but provide shoppers with option of free second hand reusable bag from a bin at point of sale] is maybe more preferred. I don't mind the second hand reusable bags.

- Interview participant from consumer group

A lot of people also suggest this measure, but from a food safety point of view, we don't want the situation whereby the bag is contaminated, and that the customers put something into the bags that think that it was contaminated by our supermarket.

- Supermarket Management Representative #1

It's a nice way to encourage people, plus you keep so many recycled bags at home you don't use. But this gives me an option, (...)I can bring my extra recycled bag to share with people that forget to bring. I actually like the idea, but there is the issue about hygiene. I am a vegetarian, and if it's used to keep meat, (I would be uncomfortable). Maybe if used for things like dry food, I am comfortable with sharing.

- FGD Participant #4

Other solutions proposed

One participant in the focus group discussion felt that personal leadership through setting a good example, with others automatically following suit:

One sure way to raise awareness is by being good examples. When you go as a consumer to shops, telling others, some people feel shy about it, for example, I don't feel shy, in going and telling people I don't need a plastic bag or returning a plastic bag. Some people take offence, oh you're here to return a plastic bag, out of the norm, cause people in front or behind the queue don't do it. In Singapore when you look at it, (...) people don't litter, and I observed the reason is not because every time you litter, you get fined, (...) but because 10 people in front of you don't litter so as a 11th person behind the queue, I don't litter.

- FGD Participant #2

This participant cited the no-plastic-bag policy implemented by IKEA as a step in the right direction. They mentioned that providing old newspapers to wrap purchases in prior to carrying was a good idea:

Has anybody been to Ikea recently? They banned plastic bags from 23rd of March. They have old newspapers for you to wrap or you buy the blue Ikea bag for 90 cents. So, it's an effort by a big company like Ikea its quite good. You can see that so many shoppers come every day and you see them wrapping in newspapers or bringing their own bag or buying their (blue) bag. It's a good example, I've never seen it happen in Singapore,

and it's the first time I have seen a big retailer completely banning plastic bags.

- FGD Participant #2

3.4.4 Training supermarket service staff to give out fewer bags

As the main point of contact between consumers and retailers, frontline staff such as cashiers and bakery attendants are the main channel through which plastic bags are given out to the public.

Some consumers feel that it is crucial to train them to be more judicious about giving out plastic bags:

I think the retailers are important people, especially the front lines people. They need to be educated to not give out plastic bag freely. Like what I mentioned about the bakery shop. We are still fine if they put 2 breads in one plastic bag. So I guess the retailers need to be more proactive to ask the customers if it is ok for them to put a few breads in one plastic bag.

- Interview participant from consumer group

Actually the bags can take sufficient weight, but they always give you double. Sometimes, I actually reject one bag back. But the counter, they keep giving you two, three bags.

- FGD Participant #2

However, retailers attest to training staff about this on a regular basis. Certain factors such as a high staff turnover rate may hamper these efforts though:

All cashiers have regular training and they are supposed to utter: "Do you want a bag? Do you want a bag?" etc. (...) Over time, we are getting more people get used to it. Only problem is the staff turnover is quite high so the new ones catch on, that might take some time. In terms of training frequency, what happens is that before a person takes on a job, he has to attend at least 2 weeks of training, plus other skills. And the store manager, the one who's in charge of the store will conduct briefings daily. They might not do it every day, but will refresh at least once a week.

- Supermarket Management Representative #3

Their efforts may also be hampered by customers who may complain or confront them. A representative from a retailer that has banned plastic bags in their stores said, “I am most worried about the cashiers since they are the ones who have to face the clients”.

Another retailer also acknowledged that negotiating with each customer about plastic bags would be tedious for cashiers, especially during peak hours:

I think about it, long queue for cashiers sometimes can be worse than for the taxi drivers. First you have to stand to scan, cannot leave the counters, you have to smile and thanks, etc., it’s very tedious.

- Supermarket Management Representative #1

Yet another retailer cited angry customers as the reason for ceasing the practice of cashiers giving out fewer bags:

We even trained our cashiers/staff to ask “Do you need a plastic bag?” and the customers always asked back “So how am I going take if I don’t have a plastic bag?” And we also received lots of complaints. That’s why we stopped our frontline from asking such question.

- Supermarket Management Representative #2

3.5 Addressing remainder of plastic waste stream

When consumers were asked at the end of the FGDs and Interviews if there was anything they wanted to talk about but had not been addressed in the course of conversation, they often expressed the view that we should not be concerned about the negative environmental impact of plastic bags alone, but of other types of plastic waste as well:

I think besides the plastic bags, I am also concerned about the disposable utensils. I think they are also excessively used. And it’s very unfriendly to the environment. We should ban the hawkers to give out those disposable utensils. The reasons why the hawkers use the disposable utensils is because it saves them the trouble of having to wash them.

- Interview participant from consumer group

Are you looking only at plastic bags or are you looking at even the use of plastics, packaging and all that. This is kind of invisible right? It’s not so obvious actually, packaging is not so obvious, (inaudible) so your focus group is only on plastic bags.

- FGD Participant 2

4 Analysis of Findings

4.1 Differentiating between 'need' and 'waste'

SEC posits that needing plastic bags for the disposal of household waste in rubbish chutes is deemed a legitimate requirement, due to reasons of hygiene and consideration for waste collectors. This is corroborated by the views of experts as shared in section 3.4.2, and the quantitative data which demonstrates that 90% of participants reuse bags obtained from supermarkets to dispose general waste.

The 6.3% of bags that are thrown away can certainly be considered as “wasteful use of plastic bags”.

Assuming households empty their dustbins into the rubbish chutes once a day, with the occasional emergency disposal, it would be reasonable to say that a maximum of 10 bags a week may be needed for rubbish disposal. This assumption is also supported by the quantitative data wherein 44% of respondents reported reusing 6-10 bags a week.

Assuming that major grocery purchases are made at a maximum frequency of a fortnightly basis, it would therefore be fair to say that the storage of more than 20 bags in a household would be considered wasteful use of plastic bags. Out of the 44.4% of respondents who stated that they did store plastic bags at home, 60.3% respondents indicated that they had more than 20 bags stored in their homes. This works out to about 26% of the total sample size surveyed who store more than 20 bags at home.

Therefore, taking into account the percentage of users who threw away plastic bags, or stored more than 20 of them at home at a time, an approximate 33% of the 2,500 respondents polled by MEWR could be said to be wasting all or some of the plastic bags given out for free at supermarkets.

The additional 8.5% of respondents who reported recycling plastic bags after bringing them home from the supermarket also indicate a usage pattern where the plastic bags are not being reused.

These statistics show that while there is indeed a legitimate need for plastic bags in Singaporean homes, the rate of wasteful plastic bag consumption is approximately 33%, while rates of plastic bags not being reused are even higher. This warrants the introduction of active measures to reduce the wasteful use of plastic bags and encourage their reuse.

4.2 Life-cycle considerations of environmental impact

In the Singapore context, the life cycle of a plastic bag begins at the extraction of raw materials and ends in one of two ways: as the litter that ends up clogging drains and harming marine life, or as incineration ash deposited into Semakau Landfill.

Section 2.4 has shown that from a Life Cycle Analysis perspective, there are options such as non-woven bags and cotton bags that are viable material alternatives to plastic bags. Qualities of the plastic bag at the manufacturing and incineration stages of the life cycle can be considered as

inherent to the bag itself. Environmental concerns in this regard would primarily be focused on greenhouse gas emissions, and the consumption of non-renewable natural resources. This group of problems associated with plastic bags requires solutions such as technological innovation and innovative research.

On the other hand, the widespread and highly emotive depiction of plastic bags as harmful to marine animals that choke on, ingest or absorb toxic chemicals from plastic bags in waterways, must attribute blame primarily to irresponsible littering by humans, rather than the intrinsic nature of the bags themselves. This set of problems requires solutions that focus mostly on changing behavioural patterns to minimise the irresponsible disposal of plastic bags.

The wastage of plastic bags as defined in section 4.1 lies at the intersection of these two types of problems associated with plastic bags, as its consequences include lower greenhouse gas emissions and faster depletion of natural resources, but the solutions required to curb this practice focus primarily on attitude and behavioural change.

4.3 Identifying root causes of consumers continuing to accept plastic bags

From the quantitative data presented in section 3.3, it is evident that the main reasons that some consumers continue to take plastic bags from supermarkets rather than bring their own reusable bags are:

1. Plastic bags are currently provided at no cost to consumers; furthermore, many consumers feel that the cost of bags is factored into supermarket goods anyway, and hence feel entitled to them. Consumers also reported that they require the bags for waste disposal.
2. Consumers often make unplanned purchases, and do not have reusable bags with them when they do so.
3. Consumers often forget to bring the reusable bags with them when they go shopping.

From this, it is evident that the two reasons that plastic bags continue to be taken in larger quantities than they are used are:

1. **Economic motivations** – Consumers feel that in a way, they are already paying for the bags through the price of goods purchased. They also take the free plastic bags so that they do not need to purchase additional bags to dispose their general waste. Solutions to address this would need to reduce economic barriers to behavioural change.
2. **Lack of mindfulness/planning** – Consumers who forget to bring reusable bags with them when they go shopping, or take plastic bags when making unplanned purchases may intrinsically wish to reduce their use of plastic bags, but lack the mindfulness or commitment to do so. These scenarios can easily be avoided if consumers remember to carry reusable bags with them when they make planned shopping trips, or keep a small reusable bag with them at all times. Such barriers are likely to require solutions that

remind consumers of the need to reduce plastic bag use on a regular basis, and that firmly keep the negative environmental impact of excessive plastic bag use at the forefront of consumers' minds.

4.4 Identifying areas of receptiveness and resistance to potential measures to reduce plastic bag wastage

A key insight from the insights shared by consumers, experts and retailers in section 3.4.3 is that levies on plastic bag usage are not unanimously opposed in Singapore, despite anecdotal evidence to suggest otherwise. The views shared by participants in the FGDs and interviews conducted by SEC, the letters to the forums of national newspapers calling for a plastic bag levy to be implemented in Singapore, and the frequent correspondence to the National Environment Agency (NEA) and SEC expressing concerns about the negative environmental impact of plastic bags indicate that there is a group of users that is already receptive to this idea.

If the common sociological concept of the "Technology Adoption Life Cycle"—wherein early uptake of a technology or idea by a group ("Visionaries") paves the way for adoption by the wider majority, and eventually, even sceptics (Chasm Institute LLC, 2013)—is applied to this context, the individuals who currently do not oppose a levy for plastic bags can be seen as visionaries, whose support will eventually lead to wider social acceptance of environmentally conscious attitudes.

Their early buy-in to the cause can be capitalised on by introducing a levy for plastic bags in slow but definitive steps.

Upon closer analysis of the barriers to retailers' willingness to introduce a levy on free plastic bags, it becomes evident that resistance to imposing a mandatory levy for plastic bag use is considerably reduced if this action is taken jointly by retailers, so that no specific retailer is the target of criticism, and loses their competitive advantage. The fundamental idea of a levy is not unpalatable to retailers either.

5 Recommendations

In order to ensure that all recommendations made were economically and socially feasible to implement, and effective in addressing the issue of the wasteful use of plastic bags and achieving long-term behavioural change, SEC devised the following set of criteria that all recommendations should meet:

- 1) Recommendations should be realistic and feasible in the Singapore context, and have the potential to achieve a real environmental impact, such as a reduction in the negative environmental impact caused by plastic bags, a tangible increase in the number of shoppers bringing their own bags when they go shopping..
- 2) Recommendations should highlight clear steps that can be taken to reduce plastic bag wastage at the policy level, industry level and community level.

- 3) Recommendations should not impose an additional financial burden on low-income households, whose budgets are already under considerable pressure to cope with the high cost of living in Singapore.
- 4) In order for recommendations to be palatable to retailers, they should not compromise the competitiveness of the business, nor risk extensive damage to good customer relations.
- 5) The recommendations should be sustainable on a long-term basis.

5.1 Legislation and Policy Measures

- 1) **A nationwide “Bring Your Own Bag Everyday” programme should be initiated by the government, in collaboration with 3P stakeholders. It should be compulsory for all commercial establishments to participate in this programme.**
 - a. It should be made compulsory that on weekends, no plastic bags are given out for free at convenience stores, minimarts, supermarkets, and department stores. A very nominal fee of 10 cents should be charged per bag taken on Saturdays and Sundays.
 - b. Rather than the cumbersome donation mechanism of collecting coins in a can placed at each register, a proposed collection and accounting mechanism would be for retailers to simply add the quantum to each receipt, and account for the money collect, and transfer it to a central, independently managed fund on a quarterly or biannual basis.
 - c. To ensure that proceeds from this fund are used for no purpose other than offsetting the negative environmental impact of plastic bags, it should be administered by an independent body, with compulsory clear and transparent accounting. The funds collected from shoppers can be used for a variety of purposes, including:
 - i. Seed funding for community-led awareness initiatives or campaigns to help reduce excess plastic bag wastage in Singapore. Such initiatives include the [“Ta Pao No Plastic”](#) design initiative, or [Operation Zero Waste Da Bao](#), a ground up initiative to reduce plastic waste from hawker stalls and coffee shops, which are now being led by students, entrepreneurs and members of the community.
 - ii. Seed funding for designers, engineers and social entrepreneurs to devise creative alternatives to using plastics for disposable and convenient purposes in Singapore. Eco-friendly alternatives to plastic bags, plastic takeaway containers, cutlery and crockery, and drinking cups can all be designed and rolled out to the market with support from this scheme.

- iii. Cost offsetting grants for F&B operators who offer rebates for customers to bring their own utensils and containers, or who implement a charge.
 - d. SEC proposes that such measures should be introduced should be on Saturdays and Sundays. This is because shopping trips made on weekends are more likely to be pre-planned, rather than spontaneous errands on the way home from work. This would make it easier for shoppers to bring along a reusable bag when setting out from home, and reduce the likelihood of having to pay for plastic bags during unplanned errands.
 - e. On other days of the week, retailers could offer incentives for consumers to avoid taking plastic bags, such as rebates for customers who bring their own bags, extra rewards points, and a special express queue for customers who did not intend to take plastic bags, and discounts on reusable bags. Measures to increase customer mindfulness about plastic bag wastage – such as training cashiers to ask customers if they really needed a plastic bag, or putting up posters to remind consumers to bring their own bags. Each retailer would be free to devise an incentive scheme that is most appropriate for their customer relations and corporate values.

2) Initiatives to curb plastic bag wastage (e.g. charging, awareness initiatives, etc.) should focus more strongly on eliminating the use of bags with lower potential for secondary use, such as food bags, and smaller plastic bags given out at convenience stores and hawker stalls.

The dimensions of plastic bags that are accepted as being a legitimate household need should be pegged to average household dustbin size in Singapore. There should be more targeted efforts at encouraging consumers to avoid smaller bags. Posters on the wastefulness of taking these small bags can be put up at points of sale including hawker stalls, bakery counters and convenience store cash registers. Cashiers can also be prompted to ask customers if they need bags for small purchases more frequently.

3) Vendors at F&B outlets (e.g. hawker stalls, coffee shops and food courts) should be encouraged to offer customers a rebate for rejecting small-sized bags and disposable plates, cups and utensils in favour of their own reusable items.

As purchases from bakeries and snack shops are frequently routine affairs (e.g. buying breakfast daily), there should be incentives for consumers to bring along a lunchbox or other receptacle to carry their purchased snacks and drinks in. Many F&B retailers in Singapore also charge an additional 10 or 20 cents per takeaway box. F&B providers could apply for funding from the fund collected through “Bring Your Own Bag Everyday” to offset rebate costs, or compensate for initial dips in sales if charges are introduced.

4) Rethink current waste management infrastructure especially the convenience of rubbish chutes in every household.

It may be convenient for families to have a rubbish chute in every household or on every floor, but this may not be in the best interests of the environment. Constant and relatively effortless access to a mechanism through which waste is carried away “out of sight and out of mind” may desensitize households to the overall amount of waste generated, while perpetuating reliance on several plastic bags per household for garbage disposal. Alternative strategies worth exploring include “Pay as you Throw” models that are implemented in countries such as Korea and Taiwan, or communal bins for each block which requires more conscious effort by households to dispose their waste. A change in waste disposal processes in Singapore encourage residents to rethink the amount of household waste generated, which would then reduce the number of plastic bags needed per household.

The SEC also feels very strongly that all new households should be equipped with two bins, one for all waste and one for recyclables.

5.2 Stronger commitment by retailers to help reduce excessive plastic bag use

- 5) **Retailers should stand firm in their resolve to have cashiers ask if customers really need plastic bags, and collect the extra charge per plastic bag on weekends as part of the “Bring Your Own Bag Everyday” campaign, despite potential customer complaints.**

The mandatory and nationwide participation in the abovementioned “Bring Your Own Bag Everyday” campaign would allay retailers’ concerns that taking definitive steps to reduce excess plastic bag usage would pose a threat to the competitive advantage of individual retailers. However, feedback gathered from retailers (see section 3.4.4) shows that they remain concerned about their cashiers being confronted or abused by disgruntled customers.

Any probable anger expressed by cashiers whose job it is to charge for plastic bags (on days when it is mandatory to do so), or ask customers if they need a plastic bag could be mitigated by retailers enforcing a clear policy that safeguards their cashiers’ right to a safe, abuse-free working environment. Such policies have already been implemented in overseas chains such as TESCO (Union of Shop, Distributive and Allied Workers, 2007), and in Singapore’s buses (SBS Transit, 2007). Cashiers would be more likely to diligently ask customers if they need bags, and would be less adversely affected by the implementation of ‘Bring Your Own Bag Everyday’ if there were clear structures in place to protect them from abusive customers

- 6) **Retailers should be transparent about the number of plastic bags used per year, and the cost incurred by procuring these plastic bags.**

These figures should be available to members of the public so that they have a clear idea of how much money is saved by retailers for each plastic bag saved by consumers. In order to address the sense of entitlement felt by consumers to free plastic bags since they are “paying for it anyway”, all savings accrued by retailers should be passed on to consumers. This can be done through measures such as greater rebates, coupons, or redeemable gifts when a certain number of plastic bags have been saved by a consumer. Given that the current rebates of 10 cents per transaction are perceived as insignificant by consumers, retailers should invest in providing more attractive incentives to consumers.

5.3 Concerted effort by 3P sector to increase awareness about environmental impact of plastic bags

7) **More financial and programme support needs to be extended to ground-up initiatives targeted at reducing plastic bag wastage in Singapore.**

This can be done by channelling proceeds from the aforementioned “Bring Your Own Bag Everyday” fund to NGOs, interest groups or social entrepreneurs whose ideas have the potential to make valuable contributions to this cause, either by raising awareness or galvanising action. Members of the community can also donate their money or time to such efforts, and corporations can also extend financial support to such initiatives as a part of their CSR efforts.

8) **In order to overcome the “lack of mindfulness” barrier wherein consumers may forget to bring reusable bags on shopping trips, or not have reusable bags with them when making unplanned purchases, retailers can place bins containing second-hand reusable bags near cashier counters.**

This suggestion was relatively well received by consumers, and it was even reported that consumers had written in to retailers to suggest this before. In order to ensure that hygiene considerations are not compromised, cashiers should be trained to offer consumers this option strictly for non-food purchases – such as household cleaning supplies, appliances or toiletries – only.

5.4 Environmental education in schools

9) **To ensure that environmental education about this issue begins from a young age, all schoolchildren in Singapore can be equipped with a “no-waste toolkit”.**

This would comprise of a reusable bag, reusable cutlery and a lunch-box in which to buy takeaway food/bakery items. Rather than increasing consumption and waste generation by purchasing new kits, students could be asked to bring the various cutlery and crockery from home, and assemble or decorate the kits as part of classroom art or science activity. This initiative should be accompanied by mention of the harmful effects of plastic waste during science or National Education lessons.

5.5 Sequence of Implementation

10) **The Bring Your Own Bag Everyday campaign should kick off with an immediate education and awareness campaign, followed by the mandatory charge on weekends six months after the campaign is formally launched.**

The six months between the announcement of the campaign and the enforcement of the 10 cents charge for plastic bags would offer adequate time for rolling out education and outreach initiatives to raise awareness about the negative environmental impact of plastic bags, and increase public acceptance of the idea of having to pay for plastic bags on weekends.

SEC is happy to work with stakeholders from the public, private and people sectors to make these recommendations a reality by collaborating on research and planning initiatives related to Bring Your Own Bag Everyday, outreach and education campaigns by retailers and community groups, and content development for workshops to train cashiers and other advocates for minimising plastic bag use in Singapore.

6 Conclusion

6.1 Summary of Position Paper

SEC embarked on this research project with the intention of gaining a better understanding of the issue of plastic bag use in Singapore, and proposing a set of recommendations to help eliminate the wasteful use of plastic bags in Singapore. We found that firstly, there is a certain proportion of plastic bag acquisition, use and storage that can be classified as wasteful, and therefore needs to be curbed. Secondly, the two main root causes for consumers to continue taking plastic bags are a sense of entitlement to free bags because their cost is perceived to be factored into supermarket goods anyway, and a lack of mindfulness and planning, causing consumers to forget to bring along reusable bags when shopping. Lastly, while the idea of paying for plastic bags does not have universal appeal and acceptance yet, there were pockets of receptiveness to this solution, especially when this measure was teamed with inventive schemes for shoppers who did bring their own bags.

Based on these findings, SEC put forth recommendations that called for action in the legislative and policymaking arena, proactive steps by retailers to introduce schemes to encourage shoppers to refuse plastic bags in favour of their own reusable bags, and initiatives by government agencies, environmental NGOs and community groups to step up education efforts on the environmental harm that arises from wasteful plastic bag use.

6.2 Limitations of research and scope for further examination

While it is difficult to generalise the views of Singapore's entire population from the views of the FGD and interview participants, SEC has sought to garner views from a diverse range of people, in terms of gender, nationality and profession. Further avenues to explore could include seeking views from members of low-income households and foreign policymakers who have been involved in introducing plastic bag taxes in their respective countries.

This study has focused primarily on plastic bags given out at the point of sale in supermarkets and other retail establishments. While substantial mention has been made regarding plastic bags given out to people buying takeaway food from hawker centres, SEC acknowledges that the factors affecting whether or not individuals take plastic bags in such scenarios might be different from supermarket settings. Food temperatures, likelihood of spillage and hygiene considerations are some examples. While SEC believes that all the recommendations proposed in section 5 are salient to hawker centres, this is an area of research that bears closer examination.

SEC also acknowledges that the lack of views opposing a levy on plastic bags could be caused by a disproportionate inclination towards environmental stewardship amongst the individuals who responded to the call for research participants, despite attempts to recruit participants from diverse backgrounds. The inherently environmental nature of the subject matter would also be more likely to catch the interest of environmentally conscious participants who may not be opposed to a plastic bag levy. To offset this, SEC has ensured that common arguments against a levy – such as an added financial burden on low-income household and concerns about how the money collected through such a levy might be used – are factored into our analysis.

6.3 Beyond Plastic Bags

The problem of unsustainable consumption patterns surrounding plastic products extends far beyond just plastic bags. In fact plastics account for 11% of the total waste generated in Singapore – the 4th highest waste type (Tay, 2013).

As shared by the FGD and interview participants, concerns about the unsustainable use of plastic disposables extends to items such as product packaging and disposable crockery, cutlery and takeaway containers.

While the scope of this paper has focused primarily on plastic carrier bags, many of the recommendations made here are applicable to reducing wastage across the spectrum of plastic waste in Singapore. SEC encourages fellow environmental groups, retailers, F&B operators and individuals to make a strong commitment to reducing these other types of plastic waste as well, and approaching the issue from the perspective of prioritising environmental protection and stewardship over convenience and consumption.

6.4 From research to action

The findings in this paper have shown that plastic bag use in Singapore is a complex and multi-faceted issue for which there is no catch-all solution. Economic considerations have to be balanced with environmental ones, hygiene concerns have to be balanced with practical limitations, and commercial interests such as customer service cannot be compromised even as companies are urged to take strong and firm action on this issue. SEC hopes that the recommendations made in this paper help resolve some of the dilemmas faced by various stakeholders, and that they will be implemented by the various parties.

The SEC intends for the findings and recommendations shared in this paper to be the catalyst for definitive action by individuals, retailers and the government, but also the starting point for a wider national discourse on how to reduce the wasteful use of plastic bags and other disposable products in Singapore. We also intend to incorporate these findings into developing our own programme to help reduce plastic bag wastage in Singapore, in collaboration with government agencies and retailers. We invite all concerned parties to share their thoughts by using the #lessplasticsg hashtag on Facebook and Twitter, or log on to www.facebook.com/singaporeenvironmentcouncil to contribute your ideas and support to this project.

end

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Appendix A: Focus Group and Interview Questionnaires

The objectives of this *qualitative study* are to understand plastic bag users' behaviours, awareness and perception towards plastic bag usage. Based on the findings, SEC aims to identify the root causes of excess plastic bag wastage, and present a set of recommendations to curb this wastage.

In-depth Interview Questions

A. Environmental & Economic Experts

1. What do you think about the plastic bags consumption situation in Singapore? Could you relate it to any other developed country?
2. Describe your understanding the local consumers' behaviors & perception of using plastic bags? How about local retailers?
3. In your opinion, what are the adverse environmental and economic impact of plastic bag usage?
4. Do you think local people (consumers/retailers) are aware of plastic bags' adverse impact? Why? And how could we raise their awareness further?
5. Do you think it's feasible to stop supplying free plastic bags altogether in Singapore? Why? What do you think are the barriers for people to stop using plastic bags?
6. What are the roles of Consumers, Retailers and Government in mitigating the problem of overusing plastic bags in Singapore?
7. Let's consider the following possible regulations/campaigns on plastic bag distribution at retail level in Singapore:
 - a. Impose environmental levy on consumers for each plastic bag?
 - b. Impose environmental levy on plastic bag, but provide shoppers with free second-hand reusable bag from a bin as an option at check-out points.
 - c. Oblige retailers to give certain rebate/incentives to consumers if they bring along reusable bags.What is your opinion about them? How would you recommend these regulations to be

implemented, and what quantum of financial incentives and disincentives would you suggest as the optimal amount?

8. What else do you think need to be done to address the problem of excess plastic bags usage in Singapore? **[PROMPT]**

- Any policy?
- Any public campaigns?
- Any corporate initiatives?

9. If any, could you share the lessons that you've learnt from other countries which are applicable to Singapore context?

10. Is there anything about this topic that we didn't ask but you would like to talk about?

B. CONSUMERS

1. What is your usual shopping routine like? **[PROMPT]**

- How often do you shop for everyday items such as groceries, clothes, etc.?
- Where do you do most of your shopping? (e.g. close to home, workplace, or other locations such as Orchard Road)
- What days of the week, and what times of the day do you do the majority of the shopping?

2. From your shopping activities, what are the main sources of plastic bags that you obtain?

- Describe what you normally do after receiving the plastic bags (by different sizes and/or types).

3. From your opinion, what are the major adverse impact of plastic bag consumption?

- How can we raise awareness of these impact in Singapore?

4. To what extent do you feel we need to reduce plastic bag use in Singapore?

- How do you feel we should go about doing so, so as to minimize inconvenience to shoppers?

5. Have you heard of or seen any creative alternatives to conventional plastic bag use in other

parts of the world?

- How would these alternatives be effective in encouraging you to reduce your use of plastic bags?
- How applicable are these alternatives to Singapore context?

6. Let's talk about the reusable bags. *[Show samples of non-woven bags, paper bags, cotton totes and folding nylon shopping bags to interviewee]?*

- How useful are reusable bags to your shopping activities?
- If you don't use them as often as you would like, what are your barriers to using them for your shopping needs?
- What ideas would you recommend for encouraging people to obtain and then bring along reusable bags when they go for shopping?

7. In your opinion, what are the roles of retailers in controlling plastic bag consumption?

8. Let's consider the following possible regulations/campaigns on plastic bag distribution at retail level in Singapore:

- a. Impose environmental levy on consumers for each plastic bag?
- b. Impose environmental levy on plastic bag, but provide shoppers with free second-hand reusable bag from a bin as an option at check-out points.
- c. Oblige retailers to give certain rebate/incentives to consumers if they bring along reusable bags.

What is your opinion about them? How would you recommend these regulations to be implemented, and what quantum of financial incentives and disincentives would you suggest as the optimal amount?

9. What else do you think need to be done to address the problem of overusing plastic bags in Singapore? **[PROMPT]**

- Any policy?
- Any public campaign?
- Any corporate initiative?

10. Is there anything about this topic that we didn't ask but you would like to talk about?

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C. RETAILERS

1. From your opinion, what are the major adverse impact of plastic bag consumption?
 - How can we raise awareness of these impact in Singapore?
2. What do you think about the plastic bags distribution in Singapore retail sector? How do you compare it with other developed countries?
 - In your experience, is the willingness to forgo the free plastic bags is linked to the demographic profile of shoppers? If so, how?
3. What is your organizations' policy towards plastic bag distribution and procurement, if any?
4. What would be the impact on your business if a policy to restrict/stop plastic bag distribution were implemented at the retail level?
5. What are the factors you would consider when planning a policy or campaign to promote reductions in plastic bag use?
6. Has your organization ever tried any way to reduce/replace plastic bags at the point of sales?
 - If yes, elaborate how effective they were? What was the reaction of shoppers to this initiative? Did you notice a difference in profits for the duration this initiative was in effect?
 - If no, would you have any recommendation?
7. Let's consider the following possible regulations/campaigns on plastic bag distribution at retail level in Singapore:
 - a. Impose environmental levy on consumers for each plastic bag?
 - b. Impose environmental levy on plastic bag, but provide shoppers with free second-hand reusable bag from a bin as an option at check-out points.
 - c. Oblige retailers to give certain rebate/incentives to consumers if they bring along reusable bags.

What is your opinion about them? How would you recommend these regulations to be implemented, and what quantum of financial incentives and disincentives would you suggest as the optimal amount?

8. Are there any other measures – policy, public campaigns or corporate initiatives – that you would like to see implemented widely to address the problem of excess plastic bag use in Singapore?

9. What are the global best practices for minimizing the usage of plastic bags in your industry?

- Do you think they would be effective if implemented in Singapore? If so, why? If not, why?

10. Is there anything about this topic that I didn't ask but you would like to talk about?

Focus Group Discussion Guide & Questions

1. Welcome and thank you for participating.

Food and refreshments are provided, please feel free to have while the discussion is on-going.

2. Purpose of the session

To provide input to the Singapore Environment Council as they try to understand plastic bag usage situation in Singapore, and recommend practical solutions to curb the wastage. We are gathering input from both users and retailers; and will seriously consider everyone's ideas.

3. Introductions

- Please tell us your name, professional and company (for retailers), and where you live?
- Kindly note that when compiling your remarks into a report; we would need to record down your details and demographic profile. However, when your views are integrated into SEC's report for publication, they will be made anonymous.

4. Ground Rules

- Kindly note that your individual comments will remain confidential but will be compiled into a report.
- We will be recording the session in order to write a report but will not share the tape with anyone.
- Please stay on the subject.
- Please participate actively and make it open and interactive discussion.

5. Discussion Questions

A. <u>FGD 1- CONSUMERS</u>	
1.	<p>What is your usual shopping routine like? [PROMPT]</p> <ul style="list-style-type: none">• How often do you shop for everyday items such as groceries, clothes, etc.?• Where do you do most of your shopping? (e.g. near workplace/home/along daily commute/ or central locations such as Orchard Road)• What days of the week, and what times of the day do you do the majority of the shopping?
2.	<p>From your shopping activities, what are the main sources of plastic bags that you obtain?</p> <ul style="list-style-type: none">• Describe what you normally do after receiving the plastic bags (by different sizes and/or types).
3.	<p>What do you think are the major adverse impact of plastic bags consumption?</p> <ul style="list-style-type: none">• How can we raise the awareness of these impact in Singapore?
4.	<p>To what extent do you feel we need to reduce plastic bag use in Singapore?</p> <ul style="list-style-type: none">• How do you feel we should go about doing so, so as to minimize inconvenience to

shoppers?

5. Let's talk about plastic bags distribution at retail outlets.
 - What do you think about the way Singapore retailers are giving out plastic bags?
 - How would you feel if there were no free plastic bags given out at retail outlets?
 - What would you think if retail outlets just stopped giving out small sized bags that couldn't be reused to dispose general household waste (e.g. smaller than A4 size)?
6. Have you heard of or seen any creative alternatives to conventional plastic bag use in other parts of the world?
 - How would these alternatives be effective in encouraging you to reduce your use of plastic bags?
 - How applicable are these alternatives to Singapore context?
7. Let's talk about the reusable bags. *[Show samples of non-woven bags, paper bags, cotton totes and folding nylon shopping bags to interviewee]*
 - How useful are reusable bags to your shopping activities?
 - If you don't use them as often as you would like, what are your barriers to using them for your shopping needs?
 - What ideas would you recommend for encouraging people to obtain and then bring along reusable bags when they go for shopping?
8. Let's consider the following possible regulations/campaigns on plastic bag distribution at retail level in Singapore:
 - a. Impose environmental levy on consumers for each plastic bag?
 - b. Impose environmental levy on plastic bag, but provide shoppers with free second-hand reusable bag from a bin as an option at check-out points.
 - c. Oblige retailers to give certain rebate/incentives to consumers if they bring along reusable bags.

What is your opinion about them? How would you recommend these regulations to be implemented, and what quantum of financial incentives and disincentives would you suggest as the optimal amount?
9. What else do you think need to be done to address the problem of overusing plastic bags in

Singapore? [PROMPT]

- Any policy?
- Any public campaigns?
- Any corporate initiatives?

10. Is there anything about this topic I didn't ask but you would like to discuss?

B. FGD 2 - RETAILERS

1. From your opinion, what are the major adverse impact of plastic bag consumption?

- How can we raise awareness of these impact in Singapore?

2. What do you think about the plastic bags distribution in Singapore retail sector? How do you compare it with other developed countries?

- In your experience, is the willingness to forgo the free plastic bags is linked to the demographic profile of shoppers? If so, how?

3. What is your organizations' policy towards plastic bag distribution and procurement, if any?

4. What would be the impact on your business if a policy to restrict/stop plastic bag distribution were implemented at the retail level?

5. What are the factors you would consider when planning a policy or campaign to promote reductions in plastic bag use?

6. Has your organization ever tried any way to reduce/replace plastic bags at the point of sales?

- If yes, elaborate how effective they were? What was the reaction of shoppers to this initiative? Did you notice a difference in profits for the duration this initiative was in effect?
- If no, would you have any recommendation?

7. Let's consider the following possible regulations/campaigns on plastic bag distribution at

retail level in Singapore:

- a. Impose environmental levy on consumers for each plastic bag?
- b. Impose environmental levy on plastic bag, but provide shoppers with free second-hand reusable bag from a bin as an option at check-out points.
- c. Oblige retailers to give certain rebate/incentives to consumers if they bring along reusable bags.

What is your opinion about them? How would you recommend these regulations to be implemented, and what quantum of financial incentives and disincentives would you suggest as the optimal amount?

8. Are there any other measures – policy, public campaigns or corporate initiatives – that you would like to see implemented widely to address the problem of excess plastic bag use in Singapore?
9. What are the global best practices for minimizing the usage of plastic bags in your industry?
 - Do you think they would be effective if implemented in Singapore? If so, why? If not, why?
10. Is there anything about this topic that I didn't ask but you would like to talk about?

Appendix B: Commonly used plastic bags in Singapore

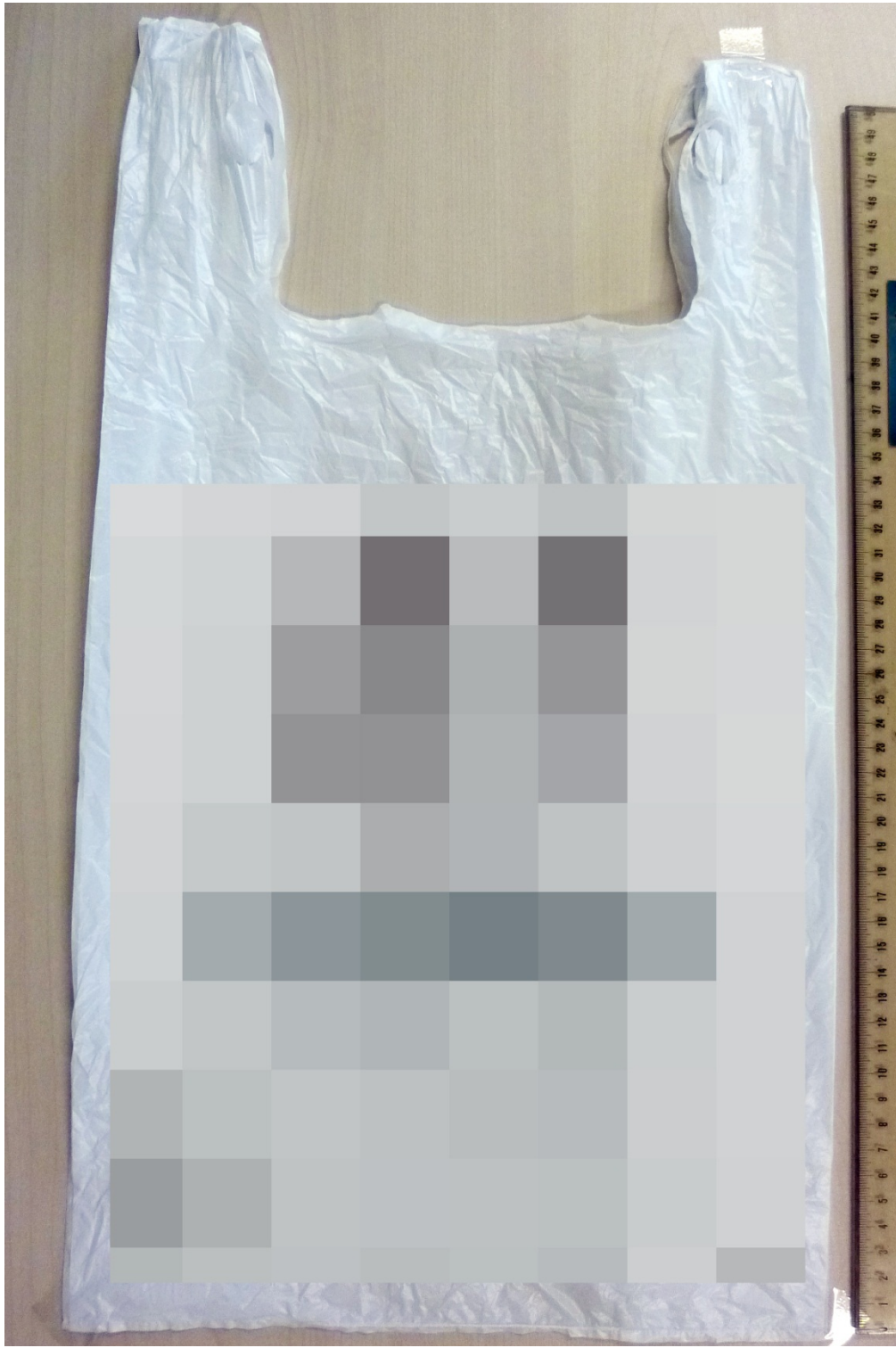


FIGURE 5: SUPERMARKET CARRIER BAG. APPROX SIZE: 52.5cm (L) x 29.5cm (w)



FIGURE 6: CONVENIENCE STORE CARRIER BAG. APPROX SIZE: 43.5CM (L) x 28CM (W)



FIGURE 7: FOOD TAKEAWAY CARRIER BAG. APPROX SIZE: 37CM(L) x 21.1CM (W)

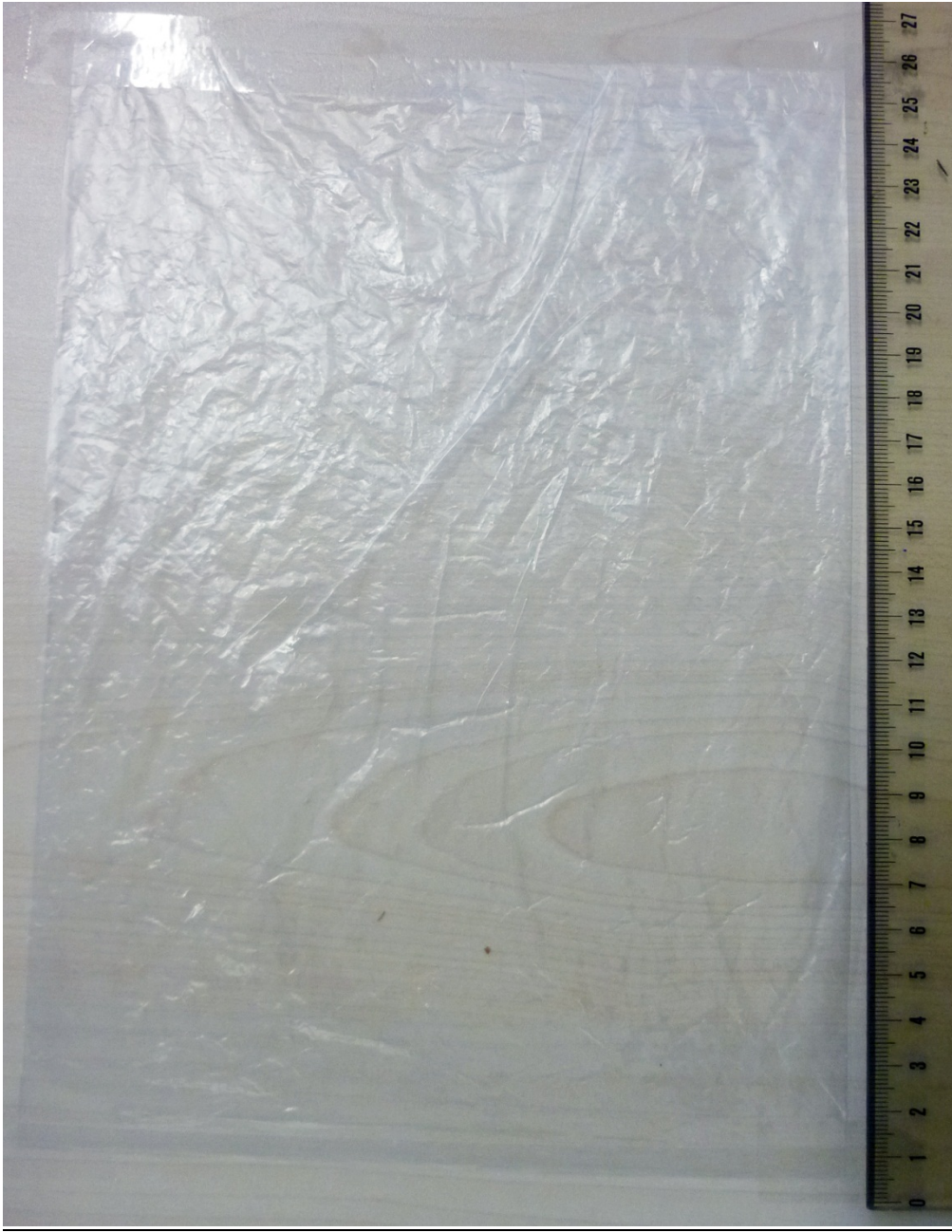


FIGURE 8: FOOD/BAKERY CARRIER BAG. APPROX SIZE: 25.5CM (L) X 18.2CM (W)



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