TURNING THE TIDE ON SINGLE-USE PLASTIC PRODUCTS

Discussion paper

Government of South Australia
Green Industries SA

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A message from the Minister

As South Australians, we have a history of leading the nation in waste management. From our Container Deposit Scheme to the Plastic Bag ban, our state has a lot to be proud of.

As the Minister for Environment and Water, I am committed to keeping South Australia at the forefront of recycling and resource recovery while also increasing economic activity and creating jobs.

Much of what we refer to as wastes are in fact resources that we should strive to keep circulating within the economy.

South Australia is well placed to build on the success of existing legislation for beverage containers and single-use plastic bags. A similar approach could be used for a wide range of other single-use plastic products, which, like plastic bags, are largely intended for disposal after a single-use, and for many of these products there remains no feasible recycling pathway.

The Marshall Government is seeking your ideas and feedback on how we as a state can better protect our natural resources and environment from impacts associated with single-use or throwaway plastic products.

Additionally, ten years on from the last change to the popular Container Deposit Scheme (CDS), it is time to consider opportunities to further improve the scheme, including in terms of its contribution to recycling. We are seeking your feedback on the issues and opportunities to be considered in a review of the CDS.

Continuing to find innovative solutions that reduce waste, improve our environment and benefit our community is critical to ensuring South Australia continues to lead the nation in waste management.

I welcome your feedback on these important issues.

David Speirs MP
Minister for Environment and Water

Invitation to comment

The deadline for comments and submissions is 5:00pm, Friday, 22 February 2019.

What is being decided?

The government is seeking ideas on measures to better protect our environment from impacts associated with single-use plastic products.

How can your feedback influence the decision?

Views expressed in feedback will help inform government interventions on single-use plastic products.

Get involved:

Comments on this single-use plastics discussion paper can be provided in writing or online, including by undertaking a short survey, at yoursay.sa.gov.au

Written submissions must be lodged with Green Industries SA, at greenindustries@sa.gov.au

or GPO Box 1047 Adelaide SA 5001.

Important information about your submission

Submissions will be treated as public documents, unless received in confidence subject to the requirements of the *Freedom of Information Act 1991*, and may be quoted in full or part in subsequent Green Industries SA reports. If you do not want the public to read your answers, please write "confidential" on your submission.

You may agree or disagree with, or comment on, the general issues discussed in the single-use plastics discussion paper or the proposed measures identified to address single-use plastic products. Please provide reasons for your comments, supported by relevant data. You can make an important contribution by suggesting an alternative or more appropriate approach to single-use plastic products.

How will your feedback be used?

A summary of feedback will be prepared and released publicly. Subject to the outcomes of this consultation process, further detailed consultation with business, industry and other parties will be undertaken.

Tips for written submissions

Please keep in mind the following when preparing your submission:

- list points so that issues raised are clear and include a summary of your submission
- if possible, refer each point to the appropriate section, chapter or proposal in the document
- if you discuss different sections of the document, keep these distinct and separate, so there is no confusion as to which section you are considering
- attach any factual information you wish to provide and give details of the source.

Please include your name, position, organisation and contact details (telephone number, email and postal address) with your submission.

Contact:
Ian Harvey, Director Strategy and Policy, Green Industries SA – telephone 08 8204 2051.

Purpose

Single-use plastics are attracting considerable local, national and international interest and the South Australian community has increasingly been calling for action on items such as plastic bags, coffee cups and polystyrene.

This discussion paper seeks to further the public conversation around a range of single-use plastic products that are impacting our environment. It draws upon a significant amount of information from the European Union (EU) and other places to inform this conversation.

The EU announced in late October 2018 its intention to ban single-use plastic items such as plates, cutlery, straws, balloon sticks or cotton buds.[1] In relation to the consumption of several other single-use items for which no current alternative exists, and which are not banned outright, the EU intends to impose reduction targets and associated timeframes.

As a government, it's important to target our efforts where it has the greatest benefit. This discussion paper therefore seeks your views on areas of potential reform as well as any potential unintended impacts that may arise from any government intervention.

Your feedback will help to inform the government's continued efforts to maintain South Australia's national leadership in recycling and our transition to a circular economy. Questions are posed throughout the discussion paper to help guide your submission.

Questions we would like you to consider

1. Do you consider single-use plastic products are causing environmental problems?
2. What do you consider to be the most important problem associated with single-use plastic products that needs to be addressed?

Plastic bags

3. What are your views on extending South Australia's ban on lightweight single-use shopping bags to include thicker plastic bags? What would be the consequences of such action for community, businesses and the environment?
4. Should all checkout bags and produce bags (i.e. for grocery items) be made from compostable (Australian Standard 4736-2006) material? What would the impacts be for retailers, consumers and industry? Would there be demand and flow-on benefits in establishing new industry to produce compostable bags here in SA?
5. What do you do with biodegradable, degradable or compostable bags once you have finished using them? What do you think about the idea of banning lightweight single-use shopping bags even those made from biodegradable, degradable or compostable substances, as has been proposed in other Australian jurisdictions?

Straws, coffee cups and other items

6. Do you think South Australia should introduce measures to address items such as single-use plastic straws and plastic-lined takeaway coffee cups? What other single-use plastic items or single-use products would you like to be considered for possible government intervention?

Excluded items

7. What are your views on the list of items excluded (see page 30) and do you think there are others that do not require additional action or should be exempt from possible government intervention, and why? Are there exclusions that should be included? Why?

Labelling

8. Do you think that labelling describing how to recycle or dispose of a product, or parts of the product is helpful to consumers? For which products would better product labelling enable better disposal?

Business, retailers, manufacturers and importers

9. If you are a South Australian based manufacturer or importer of any of the single-use plastic products mentioned in this discussion paper, what are your views on this topic? Do you have access to alternatives? Are there cost impacts that need to be considered as part of this discussion?
10. If you are a retailer or business that sells, offers or provides single-use plastic products mentioned in this discussion paper, what are your views on this topic?

Community

11. As a consumer of single-use plastic products mentioned in this discussion paper, what are your concerns? What would you like to see done to address the problem(s) or concern(s)?
12. Do you think government intervention is required in relation to single-use plastic products or other single-use items? If so, what type and in what timeframe?
13. Do you think that restricting the sale or supply of some single-use plastic or other single-use products for which there are more sustainable alternatives available is a good idea?

Fast Facts

Plastics production has surged over the past 50 years, from 15 million tonnes in 1964 to 311 million tonnes in 2014, and is expected to double again over the next 20 years, as plastics serve increasingly many applications.

The production of plastics from fossil feedstocks has a significant carbon impact that will become even more significant with the projected surge in consumption of plastics.

Currently, packaging represents 26% of the total volume of plastics used globally.

According to UN Environment, one million plastic drinking bottles are purchased every minute, while up to 5 trillion single-use plastic bags are used worldwide every year.

In total, half of all plastic produced is designed to be used only once — and then thrown away.

Australians use around 10 million straws a day, equating to 700,000 per day in South Australia.

It's estimated that 500 billion disposable coffee cups are produced globally each year

At least 8 million tonnes of plastics leak into the ocean each year – which is equivalent to dumping the contents of one garbage truck into the ocean per minute.

Today, about 300 million tonnes of plastic waste every year are produced, nearly equivalent to the weight of the entire human population.

The best research currently available estimates that there are over 150 million tonnes of plastics in the ocean today.

If current trends continue, the ocean is expected to contain 1 tonne of plastic for every 3 tonnes of fish by 2025, and by 2050, more plastics than fish by weight.

Bits of plastic have been detected in the faeces of people in Europe, Russia and Japan, according to research claiming to show for the first time the widespread presence of plastics in the human food chain.

80% of marine litter is from land based sources.

These facts are derived from a range of sources mentioned in this discussion paper.

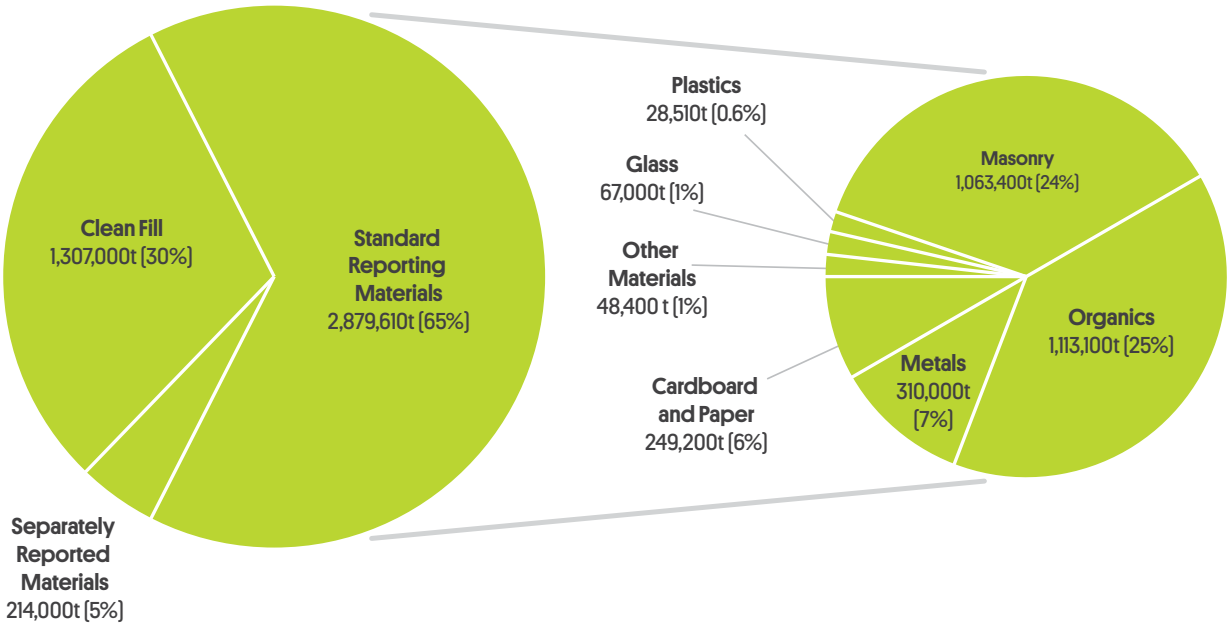
Introduction

South Australia leads recycling in Australia with 84% of its waste being redirected from landfill to better uses locally, interstate and internationally. Most of the material is recycled locally in the form of construction wastes (masonry) and organics. Construction and demolition wastes have a recovery rate of over 90%, while commercial and industrial wastes have a recovery rate of around 80%. However, municipal household waste achieves the lowest recovery rate at approximately 55%.

Recycling creates jobs – it has been estimated that approximately 9.2 jobs are created for every 10,000 tonnes recycled compared with 2.8 jobs for every 10,000 tonnes landfilled.[2] In South Australia, the recycling and waste industry has a turnover of about $1 billion and employs approximately 4,800 people directly and indirectly.

There aren't large 'step' changes left to be made in the construction and demolition, and commercial and industrial sectors. The emphasis for these remains focussed on better collection (e.g. precincts for restaurant and food waste), broader market development (new products and services based on recovered materials), government and business procurement strategies (to improve market pull through) and higher performing products and standards (to capitalise on the market opportunities to replace virgin products).

FIGURE 1 Contribution of different material categories to SA's resource recovery during 2016-2017



However, there are potential 'step' changes to be made in other sectors such as single-use plastics, including packaging. The industry-led Australian Packaging Covenant and its predecessor arrangements have been in place since 1999 and are underpinned by statutory measures in most Australian jurisdictions. While some inroads have been made on light-weighting of packaging, or material substitution (e.g. glass food or beverage container replaced by a plastic container), along with improved kerbside recycling, the overall impact on the supermarket aisle is not significant for most people, and for some their recycling bin is often full to overflowing. Many argue that packaging waste has increased as evidenced by the rise in packaged fruit and vegetable items. The reasons for this perceived increase are complex, and relate to market preferences and diversification, security and food preservation, shelf space impact on buying patterns, and brand recognition.

The proposition underpinning this *Turning the tide on single-use plastic products* discussion paper (the discussion paper) is that impacts arising from the production and consumption of single-use plastics and other single-use items on the economy, society and the environment require rapid intervention to reduce, minimise or eliminate those impacts.

Plastics

Plastics play an important role in our economy and daily lives. Light and innovative materials in cars or planes save fuel and cut CO_2 emissions and when used in packaging, plastics help ensure food safety and reduce food waste. Combined with 3D printing, bio-compatible plastic materials can save human lives by enabling medical innovation.[3]

However, too often, the way plastics are currently produced, used and discarded harms our environment. The amount of marine litter in oceans and seas is growing, to the detriment of ecosystems, biodiversity and potentially human health and is causing widespread concern. At the same time, valuable material that could be brought back into the economy is lost, once thrown away or littered. The potential economic and environmental benefits of a more resource-efficient and circular approach are not realised.[4]

The need to tackle these problems and reduce the associated environmental, economic and social harm is widely recognised.

Single-use plastics, and in particular plastic packaging is widely available, persistent, and at best prone to disposal to landfill rather than recycling and at worst prone to littering where it may enter the marine environment. Studies in the EU regard plastic as the main source of marine litter as it is hardly biodegradable and it can have toxic and other harmful impacts. Due to its persistency, these impacts are growing as each year we generate more plastic waste. It is a global problem as acknowledged by many initiatives worldwide.[5]

In addition to harming the environment (particularly wildlife impacts), marine litter damages activities such as tourism, fisheries and shipping. For instance,

in the EU it is estimated that the cost of marine litter to EU fisheries is between 1% and 5% of total revenues from catches by the EU fleet. It threatens food chains, especially seafood.[6]

Australia and South Australia are not isolated from these issues.

The decision by China to restrict or ban the import of recyclable materials, alongside television programs such as the ABC's *War on Waste*[7] have highlighted the pressing need to do something, and find local solutions.

In April 2018, Australia's Environment Ministers committed to set a substantial path for Australia's recyclable waste. Commitments at that time included an agreement to make 100% of packaging in Australia reusable, recyclable or compostable by 2025 or earlier, and for governments to work with the industry led Australian Packaging Covenant Organisation (APCO) to deliver this target.[8] The development of targets for the use of recycled content in packaging was also endorsed.

On 11 September 2018, the APCO Board approved four national packaging targets and a Strategic Intent Plan. The targets are that, by 2025:

2025 Targets

- **100% of packaging will be reusable, recyclable or compostable**
- **70% of plastic packaging will be recycled or composted**
- **30% average recycled content will be included across all packaging**
- **Problematic and unnecessary single-use plastic packaging will be phased out through redesign, innovation or alternative delivery methods**

The Government of South Australia recognises that it also has a role in managing the problems associated with packaging. This includes single-use plastic packaging which affects all states and territories in Australia.

Ideally a joined up national approach is preferred, however, like looking down the wrong end of a telescope the targets are clear but appear a long way off. This discussion paper suggests that if we are to meet those targets, immediate and timely action is required and that the focus should be on single-use plastics, more broadly and not just packaging.

Other countries around the world are responding to the same pressures in relation to single-use plastics. France has banned plastic cups and plates, Italy and France are banning plastic cotton buds, the UK intends to ban straws, joined by the Brussels region recently, and other countries like Ireland and Portugal are considering similar measures.

What are single-use plastics?

The 2016-17 Australian Plastics Recycling Survey – National report commissioned by the Australian Government Department of the Environment and Energy defined a 'plastic' for the purposes of that report as:

> "A plastic material is any of a wide range of synthetic or semi-synthetic organic solids that are mouldable. Plastics are typically organic polymers of high molecular mass, but they often contain other substances. They are usually synthetic, most commonly derived from petrochemicals, but many are either partially natural or fully natural (i.e. biobased).[9]

Further information on plastics, including those marketed as 'environmentally friendly', is provided in the appendix on page 38.

Single-use plastics, refers to plastic packaging or other consumer products made of plastic that are designed to be used once, often away from home, and thrown away after a brief use. These items are particularly litter prone. Single-use plastics include small packaging, bags, disposable cups, lids, straws and cutlery.[10]

It is recognised that some single-use plastic items that are used in health related applications and procedures are also designed to be used once and then disposed. These items are not the subject of this discussion paper.

In the EU, the top 10 most commonly found single-use plastics makes up 86% of all single-use plastic in beach litter and is responsible for more than half of plastic marine litter. This list has been stable in recent years and over different regional seas within Europe. The list is very similar to lists in the US and other countries that consistently find the same single-use plastics in their marine litter.

TABLE 1: EU top 10 most commonly found single-use plastics

RANKING	ITEM
1	Drink bottles, caps and lids
2	Cigarette butts
3	Cotton bud sticks
4	Crisp packets / sweet wrappers
5	Sanitary applications (e.g. wet wipes, sanitary towels)
6	Plastic bags
7	Cutlery, straws and stirrers
8	Drinks cups and cup lids
9	Balloons and balloon sticks
10	Food containers including Fast food packaging

Whilst the dominance of this top 10 is stable, proposed legislation in the EU will have a review clause allowing for possible changes in the products or measures covered.[11]

In Australia, the National Report for the 2016-17 National Litter Index indicates that overall, cigarette butts, beverage containers and takeaway food packaging represent two-thirds (66%) of all the litter counted across the country.[12]

South Australia has consistently had less beverage containers in the litter stream than other state and territory jurisdictions and this is directly attributable to this state's container deposit legislation. South Australian litter surveys undertaken twice a year

for more than 20 years support this finding,[13] as well as marine debris surveys undertaken by the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

To provide some comparison with the EU findings presented in **Table 1,** Green Industries SA (GISA) analysed 5 years of litter count survey data for South Australia with the following exclusions:

- GISA's analysis excluded glass and metals which are relatively inert and less mobile once littered; and
- GISA's analysis excluded cigarette butts: As is the case nationally and internationally, cigarette butts are the most numerous (by number, not volume) item of litter. Waste from tobacco products, in particular cigarette filters containing plastic can persist in the environment for many years. Existing measures that can lead to a reduction in cigarette butt litter include community health measures aimed at reducing the number of smokers, litter enforcement action through the *Local Nuisance and Litter Control Act 2016*, extended product responsibility measures from tobacco manufacturers (e.g. butt litter campaigns), provision of infrastructure and education and awareness.

Considering the above exclusions, South Australia's top 10 littered items (not specifically related to marine pollution) are provided in **Table 2** and are based on total litter counts taken over a 5 year period ending November 2017. The top 10 presented in **Table 2** are expressed in relative count order with the 10th item assigned a relative frequency of 1. The counts of *Other paper (including tissues)* are 11.5 higher than those of Packing tape and straps.

TABLE 2: South Australia's top 10 littered items

ITEM	RELATIVE FREQUENCY
Other paper (including tissues)	11.5
Other plastic	5.9
Snack bags & confectionery wrappers	2.8
Cups/take away containers	2.1
Packages & boxes	2.0
Straws	1.8
Take away & cups	1.8
Plastic bottle tops	1.7
Clothing & materials	1.1
Packing tape & straps	1.0

Not surprisingly, there are similarities between the single-use plastics in both tables as many of the products containing plastic are global in their distribution, marketing and use. However, there are also some single-use plastics which may not be particularly prevalent in the litter stream but are not able to be recycled or difficult to recycle such as polystyrene packaging and plastic lined takeaway coffee cups. These products by design can only be disposed to landfill (at best) and for some, alternative recyclable, compostable or biodegradable product alternatives are available.

What is the problem?

Over the past several years, there has been a steady increase in the volume of highly reputable international literature that addresses this question. This discussion paper draws heavily from organisations such as the Ellen MacArthur Foundation, the European Commission, the United Nations Environment Program and others. Some compelling facts presented at the front of this discussion paper are derived from these organisations' investigations.

Imagining a world without plastics is nearly impossible. Plastics are increasingly used across the economy, serving as a key enabler for sectors as diverse as packaging, construction, transportation, healthcare and electronics. Modern innovations mean today's plastics make up 50% of a vehicle's volume, but only about 10% of its weight.[14] Plastics have brought massive economic benefits to these sectors, thanks to a combination of low cost, versatility, durability and high strength-to-weight ratio.[15]

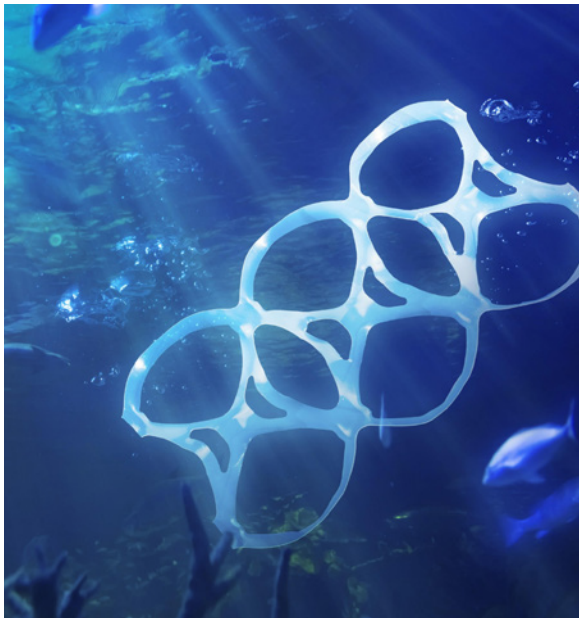
However, due to its slow decomposition, plastic accumulates in seas, oceans and on beaches worldwide, including Australia. 80% of marine litter emanates from land based sources.[16] The European Commission notes that plastic residues are found in marine species – such as sea turtles, seals, whales and birds, but also in fish and shellfish, and therefore in the human food chain. While plastics are a convenient, adaptable, useful and economically valuable material, these need to be better used, re-used and recycled. When littered, the economic impact of plastics encompasses not just the lost economic value in the material, but also the costs of cleaning up and losses for tourism, fisheries and shipping.[17]

The United Nations Environment Program has estimated the total natural capital cost to the marine ecosystem as a result of plastic littering to be $13 billion per year globally, accounting for 17% of total lifecycle impacts on the marine ecosystem. This includes economic losses incurred by fisheries and tourism as well as time spent cleaning up beaches.[18]

Very large quantities of plastic waste leak into the environment from sources both on land and at sea, generating significant economic and environmental damage. Globally, 5 to 13 million tonnes of plastics — 1.5 to 4% of global plastics production — end up in the oceans every year.[19]

According to the World Economic Forum, in its report *The New Plastics Economy (2016)* at least 8 million tonnes of plastics leak into the ocean each year – which is equivalent to dumping the contents of one garbage truck into the ocean per minute. If no action is taken, this will increase to 2 per minute by 2030 and 4 per minute by 2050. The report suggests that packaging represents the major share of the leakage. Not only is packaging the largest application of plastics with 26% of volumes, its small size and low residual value also makes it especially prone to leakage. One indicative data point cited in the report is that plastic packaging comprises more than 62% of all items (including non-plastics) collected in international coastal clean-up operations.[20]

> "This phenomenon is exacerbated by the increasing amount of plastic waste generated each year, and is also fuelled by the growing consumption of 'single-use' plastics, i.e. packaging or other consumer products that are thrown away after one brief use, are rarely recycled and prone to being littered. These include small packaging, bags, disposable cups, lids, straws and cutlery, for which plastic is widely used due to its lightness, low cost, and practical features.[21]



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For Australia, injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris was listed as a key threatening process under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in August 2003.

A Threat Abatement Plan for the impact of marine debris on the vertebrate wildlife of Australia's coasts and oceans was subsequently developed to outline priority areas for government action at a local, state and national level. The Threat Abatement Plan was recently updated in 2018 and highlights 'limit(ing) the amount of single-use plastic material lost to the environment in Australia' as a high priority action.[22]

> Plastics are an obvious, problematic target for action. Experts say fishing gear (ropes and nets made from synthetic fibres), balloons and plastic bags are the biggest entanglement threat to marine fauna, and plastic bags and utensils are the biggest ingestion risk for seabirds, turtles and marine mammals (Wilcox et al., 2016). Plastics may also be chemically harmful in some contexts, either because of their potential toxicity or because they absorb other pollutants (Rochman et al., 2013).[23]

In 2016, the Australian Government's Senate Environment and Communications References Committee undertook an inquiry into the threat of marine plastic pollution in Australia. Its report *Toxic tide: the threat of marine plastic pollution in Australia* acknowledged that:

> Evidence clearly demonstrates that this is an issue of global concern with vast quantities of plastic entering the marine environment on a daily basis. The committee understands that calculating the exact rates of plastic pollution into the future is difficult, but is of the view that estimates of current rates of pollution are sufficiently high as to warrant immediate action. The committee also accepts that marine plastic pollution in the Australian marine environment is difficult to quantify, but that amounts recovered through clean-up activities would point to the problem being significant.[24]

The identification of the origin, pathway and type of marine debris can be difficult, as litter degrades and fragments over time.

Some plastics enter the marine environment as 'macro-plastics' and then degrade slowly into smaller fragments. Others enter directly in the form of microplastics, which are plastic particles with a diameter less than 5mm. Some of these microplastics are intentionally added to products such as scrubbing agents in cosmetics, detergents, paints (sometimes referred to as microbeads) or to serve as input for further processing (e.g. plastic resin pellets). Others originate from the abrasion of large plastic objects during manufacturing or use (e.g. tyre dust, textile fibres).[25]

Bits of plastic have even been detected in the faeces of people in Europe, Russia and Japan, according to research claiming to show for the first time the widespread presence of plastics in the human food chain.[26]

The Australian Government Department of the Environment and Energy is working with industry and state and territory governments to ensure a voluntary phase-out of microbeads from personal care and cosmetic products. It has also committed to eliminating remaining microbeads from the Australian market and will examine options to broaden the phase-out to other products.[27]

In view of the work already underway in relation to microbeads this discussion paper does not address these further. Similarly, it is recognised that there is litter emanating from marine based sources that cause impacts (e.g. fishing gear) attributable to a smaller cross-section of our society which may require a more tailored approach and is not covered here.

Although there are other materials causing impacts, there appears to be sufficient evidence for action to be taken to reduce the problem on single-use plastics, which are macro-plastics.

Questions to consider in making a submission:

1. Do you consider single-use plastic products are causing environmental problems?
2. What do you consider to be the most important problem associated with single-use plastic products that needs to be addressed?

Should South Australia act?

There are a number of considerations that need to be balanced when the community seeks leadership from government and industry.

Guiding principles

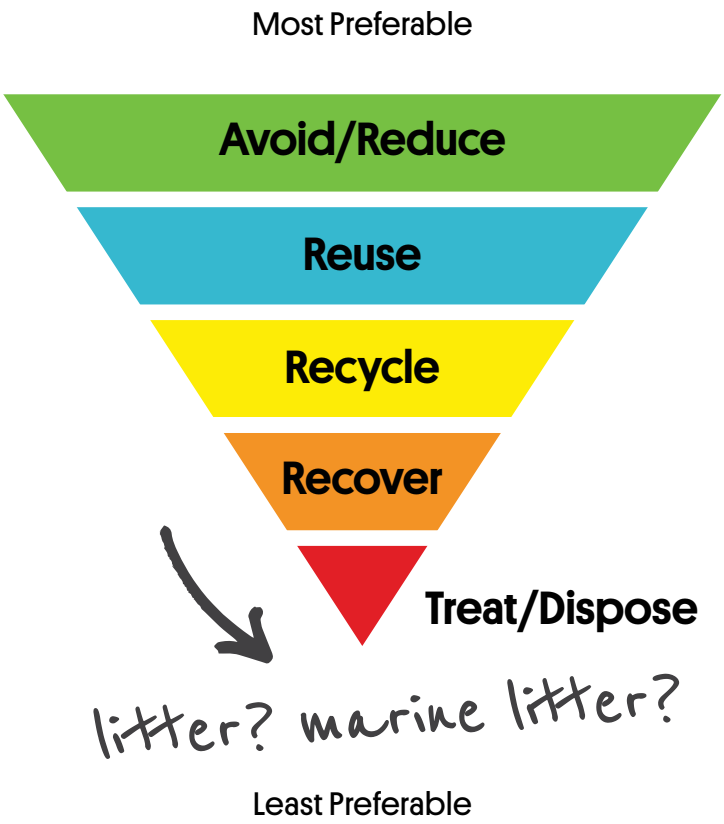
We know that wasteful consumption habits are not sustainable because of global limits to availability and accessibility of the earth's natural resources. We also know that there are limits to the amount of man-made waste and pollution that the earth can absorb or contain.

These widely held views are contextualised in a range of nationally and internationally recognised principles and concepts such as ecologically sustainable development. Any discussion of waste management draws upon the same and related principles and concepts that are recognised globally as the cornerstone of waste management policy and help to guide our decision making. The following are important guiding principles for the purposes of this discussion paper:

The principles of the circular economy: It is important that society move away from the "take, make, dispose" linear consumption pathway to one which continues to return materials back into the economy. Some plastics, and in particular single-use plastic items are entering the environment rather than being returned to the economy for further utilisation.

The waste hierarchy: The waste management hierarchy is recognised internationally as an aspirational framework for sustainability.

The waste management hierarchy



The framework stresses the need to:

- operate at the highest possible level of the hierarchy, considering social, environmental and economic practicalities
- make decisions using sound knowledge and information
- conserve materials and energy by acting to avoid waste and reduce wasteful consumption
- preserve the value of materials used, through source separation and reduced contamination.

The waste hierarchy implies a closed system where waste is ultimately dealt with in one way or another, however it does not reflect 'leakage' from the system or fugitive waste that escapes as litter or marine debris. This discussion paper proposes that the hierarchy also recognises litter and marine debris as being the least preferable option in waste management – that is, waste disposed of onto land or into aquatic environments whether deliberately or otherwise.

United Nations Sustainable Development Goals[28]

On 25 September 2015, countries around the world, including Australia, adopted a set of goals to end poverty, protect the planet and ensure prosperity for all as part of a new sustainable-development agenda. The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. The goals address the global challenges we face, including those related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. Each goal has specific targets to be achieved by 2030. Sustainable Development Goal 12 is specifically focused on responsible consumption and production patterns.

> Achieving Goal 12 requires a strong national framework for sustainable consumption and production that is integrated into national and sectoral plans, sustainable business practices and consumer behaviour, together with adherence to international norms on the management of hazardous chemicals and wastes.

Targets associated with Sustainable Development Goal 12 include, but are not limited to:

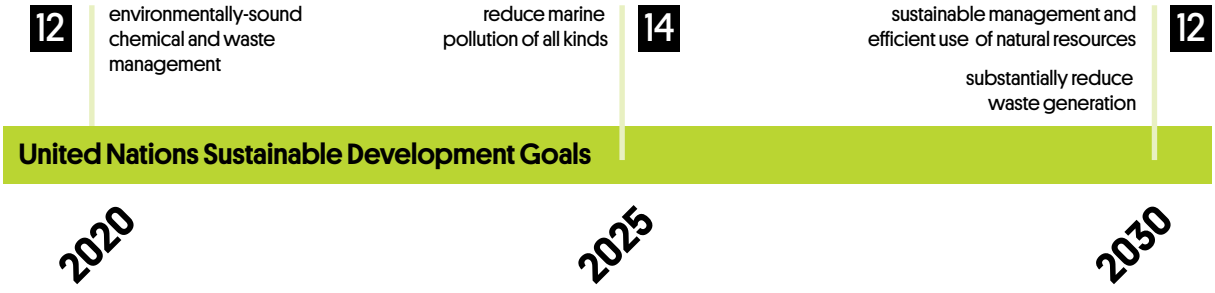
- By 2020, achieve the environmentally-sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimise their adverse impacts on human health and the environment
- By 2030, achieve the sustainable management and efficient use of natural resources
- By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

Sustainable Development Goal 14 is focussed on "life below water" and includes a specific target: "by 2025 prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution."[29] As part of this target, the United Nations has announced a major global Clean Seas campaign aimed at ending plastic marine litter, particularly from single-use plastics.[30]

Community concern

Recent community interest following television programs such as the ABC's *War on Waste*[31] and documentaries such as *Blue Planet II*[32] suggest that single-use plastics are of concern. South Australia has shown leadership in measures such as a ban on single-use plastic bags, container deposit legislation and high performing kerbside recycling systems, including kitchen food waste recycling in some council areas.

The Australian Government's Environment and Communications Senate Committee in its June 2018 Inquiry report, *Never waste a crisis: the waste and recycling industry in Australia* recommended that the Australian and state and territory governments agree to phase out petroleum-based single-use plastics by 2023.[33]



Existing policy settings

This discussion paper outlines some of the economic, social and environmental problems of single-use plastics. A report by Circle Economy suggests the challenges associated with increasing plastic production, low levels of recycling and leakage to the environment is a powerful example that demonstrates the urgent need to overhaul waste management policy to tackle the root causes of excessive material use, significantly increase recovery and recycling rates, and promote high-value loops such as re-use, remanufacturing, refurbishment and lastly material recycling.[34]

The report considers that policy is required to extend along the entire value chain, including tackling excessive consumption, for example with the phase out of single-use and non-recyclable plastics.

South Australia has a strong track record in taking action in relation to a range of waste types with many already banned from disposal to landfill. As stated in the UN Habitat's 2010 publication Solid Waste Management in the World's Cities:[35]

> "South Australia has demonstrated a high level of political commitment and willingness to 'stick its neck out' and implement some policies and legislation upon which other administrations take a more conservative position. The Zero Waste Act [now Green Industries SA Act] and Plastic Bag Ban are two excellent samples of South Australia's Government showing leadership by putting in place arrangements to support a major drive towards the 3Rs (reduce, reuse, recycle).

South Australia already has two product-focussed legal instruments that specifically tackle single-use plastic and other items.

Container Deposit Scheme (CDS)

Introduced in 1977 to reduce beverage containers in the litter stream, CDS continues to have a high level of community support and has a strong impact on the recycling of beverage containers covered under the scheme. The CDS includes some beverages provided in single-use plastic bottles or containers.

In 2017–18, almost 603 million containers (42,913 tonnes) were recovered by collection depots for recycling. This means that over $60 million was refunded to the community during that period. The CDS also provides a financial benefit to individuals, community groups, sporting clubs and charities that collect empty containers for refund.

The scope of the CDS was expanded to products such as flavoured milk, juice and waters in 2003 and the deposit lifted from 5 cents to 10 cents in 2008.

Several Australian jurisdictions have more recently introduced container deposit schemes or intend to introduce one in the near future.

The Environment Protection Authority (EPA) is the regulator of the South Australian CDS, and intends to work in partnership with the key sectors who participate in the scheme to identify opportunities for improving CDS in the state. The EPA has released a scoping paper seeking views and feedback to inform issues to be considered in the review and the research required to inform the review.

Further information can be found in the CDS scoping paper - *Improving South Australia's recycling makes cents* - at epa.sa.gov.au

The Plastic Shopping Bag (Waste Avoidance) Act 2008

South Australia was the first state in Australia to ban lightweight checkout style plastic bags. *The Plastic Shopping Bags (Waste Avoidance) Act 2008* came into effect on 1 January 2009, with the ban on shopping bags taking effect from 4 May 2009.

South Australia's plastic shopping bags ban was adopted in recognition of the environmental issues associated with single-use, lightweight, checkout-style, plastic bag use, including harm to marine life and harm to the environment through litter and less attractive public places. Similar bans are now in place or being considered in other parts of Australia.

The Plastic Shopping Bags Act allows the use of alternative compostable/biodegradable plastic bags provided they comply with Australian Standard 4736-2006 - Biodegradable plastics - Biodegradable plastics suitable for composting and other microbial treatment.

This ban on lightweight plastic shopping bags, and provision of comprehensive recycling options, has effectively removed from circulation around 400 million single-use plastic bags each year in South Australia, while reducing related environmental impacts and stimulating reuse and alternative product development e.g. multiple-use bags.

Switching from lightweight, single-use shopping bags to multiple-use bags uses comparatively fewer resources and energy use across its life cycle and was an important factor that supported the introduction of the ban on single-use plastic bags.

A 2013 review on South Australia's plastic bag legislation concluded that:

> "The ban on lightweight single-use plastic bags has been highly effective at reducing the supply of lightweight single-use plastic bags from South Australia and changing consumer behaviour to alternatives to plastic shopping bags. Moving forward, consideration should be given to extending the ban to address the new alternatives including thick and heavy plastic bags as well as providing further education and advocacy to promote greener overall behaviour of consumers.

The review considered potential legislative amendments to improve the operation of the Act.

- Amend the definition of a plastic shopping bag to make it clear that the minimum thickness requirement applies across all parts of a bag
- Require biodegradable / compostable bags to be approved by the Environment Protection Authority
- Introduce an offence to provide bags different from those tested and approved by the Environment Protection Authority.

It is timely (10 years on) to review the current Plastic Shopping Bags Act. A review will identify opportunities to improve compliance with the Plastic Shopping Bags Act and explore whether the ban on lightweight singe-use plastic bags should be expanded to include other thicker plastic bags. Consideration will be given to other jurisdictions' bans, including those that consider products that are marketed as 'degradable', 'bio' and 'oxo' degradable, and national targets for packaging (page 18).

> "According to the United Nations Environment Programme (UNEP) there is little evidence to suggest that products labelled as biodegradable will significantly decrease the volume of plastic entering the ocean, or the physical and chemical risks that plastics pose to the marine environment. The Australian Bioplastics Association also stated that "biodegradable plastics were not designed to be a solution for marine litter".

There are more sustainable alternatives to single-use plastic bags. A trial using compostable bags in place of plastic 'barrier bags' for fruit and vegetables is being undertaken at two South Australian supermarkets and is receiving strong support from the community.

Questions to consider in making a submission:

3 What are your views on extending South Australia's ban on lightweight single-use shopping bags to include thicker plastic bags? What would be the consequences of such action for community, businesses and the environment?

4 Should all checkout bags and produce bags (i.e. for grocery items) be made from compostable (Australian Standard 4736-2006) material? What would the impacts be for retailers, consumers and industry? Would there be demand and flow-on benefits in establishing new industry to produce compostable bags here in SA?

Note: Produce bags and other shopping bags made from compostable (Australian Standard 4736-2006) material enables them to be re-used for household food waste disposal into the household green organics bin, and reduces costs to councils by not having to provide compostable bags as is currently the case for those councils that provide a food waste collection service to residents.

5 What do you do with biodegradable, degradable or compostable bags once you have finished using them? What do you think about the idea of banning lightweight single-use shopping bags even those made from biodegradable, degradable or compostable substances?

Which items could we focus on?

This discussion paper does not purport to rely on detailed analysis on the prevalence and impacts (economic, social and environmental) associated with the incidence of single-use plastics in the South Australian litter stream or the impacts on the economy. Detailed information and analysis has not been undertaken regarding the suitability of available alternatives to some single-use plastics identified in this paper, noting only that some alternatives exist.

Information, evidence and data from various credible sources refer to the negative impacts that some plastics and in particular some single-use plastic products can have.

These impacts are likely to be exacerbated by the growing consumption of single-use plastics which are cheap to manufacture and widely used due to low cost and other practical features (e.g. lightness), and in the absence of some form of intervention may only get worse.

International and local evidence referenced in this discussion paper suggests that for some single use plastic products that **are intended and/or designed to be disposed of after one brief use,**[36] are rarely recycled, cannot be recycled and in some cases are prone to being littered, that government intervention and action is required.

The state government is interested in your views about this and what single-use plastic and other single-use items you think are important.

Recent community attention in Australia and internationally has focussed on single-use plastic straws and plastic-lined takeaway coffee cups, and some discussion on these specific items is provided below.

Single-use plastic straws and cutlery

Although the subject of some uncertainty, estimates suggest that Australian's use around 10 million straws a day and that this may even be an underestimation.[37]

South Australia represents about 7% of the population of Australia and based on this simple analysis our State's usage could be around 700,000 straws per day or 255,500,000 million straws per year.

20 minutes is the average time a straw is used before being discarded.[38]

Single-use plastic straws are most commonly made from type 5 plastic, or polypropylene and are in the top 10 items littering the marine environment where these can be ingested by marine life such as turtles and seabirds. Plastic cutlery is most commonly made from polypropylene and polystyrene and is also in the top 10 items littering the marine environment.

In February 2018, Scotland announced its intention to ban plastic straws by the end of 2019 as a means of tackling marine pollution. Taiwan has announced similar measures and a number of United States cities have already banned plastic straws, including Malibu, Santa Monica, Manhattan Beach and Seattle. In October 2018, members of the European Parliament (comprising 28 member states) announced ambitious legislation to ban single-use cutlery, cotton buds, straws and stirrers from 2021.[39]

Individual businesses are also responding. Woolworths announced it will stop selling plastic straws by the end of 2018.[40]

The Last Straw is a campaign to reduce the use of the plastic straws in venues around Australia. It aims to tackle the issue from both sides - encouraging consumers to use less plastic straws and encouraging businesses to give out less straws through staff training and information.[41]

Campaigns such as *refuse the straw* (out of the United Kingdom) and *straws suck* (an initiative of the ACT Government) attest to the growing community interest and concern regarding this single-use plastic product.

Some South Australian businesses are taking their own action by replacing plastic straws with more sustainable alternatives. Festival and event organisers around Adelaide are also making changes by supplying compostable cutlery and tableware instead of single-use plastic items.

Plastic-lined takeaway cups (coffee cups)

Estimates of Australians' annual use of disposable coffee cups vary from between 1 billion disposable coffee cups each year,[42] with *Choice* (a leading consumer advocacy group in Australia) estimating that this figure could be as high as 3 billion coffee cups disposed each year.[43]

Based on a simple analysis our state's usage could be around 191,000 to 575,000 per day or 70 million to 210 million disposable coffee cups used each year.

> *The well-intentioned caffeine lover who tries to do the right thing and recycle their cup may be doing more harm than good. The plastic waterproof lining of many paper coffee cups means they can't be recycled with collections of paper and cardboard and may actually contaminate a load, causing the whole lot to be sent to landfill.*[44]

Takeaway cups are primarily constructed of virgin (non-recycled) paperboard with a polyethylene plastic (PE) coating or polylactic acid coating on the cup to prevent leaking of liquids (e.g. coffee) and maintain the structural integrity of the cup during use. These cups are generally used for a short period of time (minutes) between purchase and disposal. PE is a plastic made from fossil petrochemical resources whereas polylactide is a bioplastic made from plant starches - with the PE lined takeaway coffee cups representing approximately 90% of coffee cups produced.

France has recently committed to ban disposable cups and plates by 2020 - except those that are completely compostable.

Some South Australian retailers are already moving from plastic-lined takeaway cups, with compostable alternatives and offering discounts for 'keep cups'.

Questions to consider in making a submission:

6 Do you think South Australia should introduce measures to address items such as single-use plastic straws and plastic-lined takeaway coffee cups? What other single-use plastic items or single-use products would you like to be considered for possible government intervention?

Excluded items

There are some single-use plastics for which existing efforts to tackle them are in place or that require more information to determine the best approach. For this reason, it is suggested that the following materials, items or products should be excluded from further specific consideration at this time.

Microplastics / microbeads – specifically those intentionally added to a product are not in scope as they are being addressed through other processes – refer page 20, and the national approach to eliminating microbeads.

Debris emanating from sea-based sources (e.g. lost or discarded fishing gear) – it is difficult to estimate the scale of this problem in the South Australian context. A more tailored response may be required and this form of debris is not examined further, although it may be the subject of future investigation and action.

Non-plastic single-use disposable items (e.g. packaging) – packaging comprising exclusively fibre will degrade and littered items comprising glass and metals are mostly inert and with relatively low environmental damage and less mobile once littered. The exclusion of these materials does not imply that leakage to the environment is acceptable, and it is recognised that visual amenity remains an important issue.

Single-use plastic beverage containers – many are already addressed through existing legislation (CDS). The EPA intends to review South Australia's CDS legislation and could consider single-use plastic beverage containers alongside other beverage containers not currently subject to the legislation - as such these products are not examined further in this discussion paper.

Sanitary applications (wet wipes, sanitary towels) – These products are routinely flushed down toilets and wastewater treatment facility operators face significant problems when non-suitable products are flushed down the toilet as these contribute to blockages in household and municipal sewerage systems.

In April 2018, a manufacturer of sanitary wipes was ordered to pay penalties for making false and misleading representations about its 'flushable' toilet and bathroom cleaning wipes.[45]

It is suggested that their presence and associated impacts could be reduced through appropriate and accurate packaging labelling that provides advice to consumers on responsible disposal option(s).

Absorbent hygiene products – Single-use absorbent hygiene products (AHP) such as nappies represent a significant waste stream. A 2013 report estimated that South Australia could generate in the order of 35,000 tonnes annually with the majority of the waste arising from residential use (primarily nappies for children).[46]

However, the 2013 report also indicated that the majority of the AHP waste generated in South Australia is currently disposed to landfill and for this reason is not likely to be littered or disposed to the environment. Solutions to better utilise waste AHP are technically available but most are not commercially viable and would generally rely on segregation and separate collection infrastructure and systems at the household level which is not yet available.

It should be noted that the Australian Packaging Covenant Organisation (APCO), with Planet Ark and PREP Design, have launched a labelling scheme that will help consumers better understand how to recycle products effectively.[47] This is being voluntarily phased in by many Australian companies but imported goods may not feature such labelling.

Questions to consider in making a submission:

7. What are your views on the list of items excluded and do you think there are others that do not require additional action or should be exempt from possible government intervention, and why? Are there exclusions that should be included? Why?

8. Do you think that labelling describing how to recycle or dispose of a product, or parts of the product is helpful to consumers? For which products would better product labelling enable better disposal?

Community and business impacts

Further work will be undertaken to evaluate how many South Australian based manufacturers or importers of single-use plastic products could be impacted by potential intervention measures from government. Impact assessments will also be undertaken for retailers and consumers.

However, in developing its proposal for a *Directive of the European Parliament and of the Council on the reduction of the impact of certain plastic products on the environment*, the European Commission undertook various impact assessments and relevant information is provided below to aid discussion and facilitate feedback on this important issue.

> "In the context of generally buoyant and increasing demand for plastic products, producers (plastics converters) are likely to be negatively affected by any reduction in demand for single use products but they have an opportunity to redirect production to reusable and recyclable items.
>
> For food and drink related items (food containers, cups and cup lids, cutlery, straws and stirrers), the food service industry and retailers pay for the single use plastic items that they provide to customers 'free of charge'. Although the cost might not be evident to customers, the consumer will normally cover it in the overall price. With a shift to reusable items, a single upfront purchase by the retailer will avoid future regular costs of purchasing the single use items, and thus may lead to a saving.
>
> There will be a cost to providing reusable items for consumption on site, but savings from not providing single-use items. The balance of the costs and savings will vary for different retailers and determine whether a switch away from single-use plastics can 'pay for itself' over time. However, the shift to non-plastic single use alternatives may lead to an increase in costs to retailers if these are more expensive, and if they do not to pass these costs on to consumers.
>
> For other single-use items such as wet wipes, sanitary towels, and cotton buds, that retailers sell on directly to customers (rather than use to contain the food or drink they are selling), the impacts will vary based on the difference between the wholesale price and the retail price of the non-plastic single-use alternative. Where retailers sell multi-use alternatives, while the number of sales will be lower, the effect on profits will depend on the per item margin that the retailer makes versus the margin on the current single-use plastic items."[48]

"Many retailers, especially in food service retail, are SMEs. They may be positively impacted where they avoid the need to purchase single use items that accompany or contain the food or drink they sell. Whilst reduced consumer spending will translate almost into reduce retail sales, there will be rebalancing as consumers spend their money on alternatives, and favour innovative responses. New business models will develop for making available multi use items to consumers and this could reduce costs, especially as options are scaled up.[49]

The European Commission's impact analysis suggests that for individual consumers, the impacts will vary depending on their consumption habits and their own pre-existing preferences in respect of using reusable items.[50]

In a world where convenience is highly valued, alternative more sustainable approaches even where these have reduced levels of convenience can and do enter the market. The increase in reusable coffee cups indicates that some consumers are willing to adopt more sustainable (reusable) packaging which incur less convenience and higher financial costs. When consumers use their own reusable cup it will need washing in order to keep the cup clean and usable.

> "Therefore, there may be some additional costs from washing the items. However, as they are no longer purchasing many single-use plastic items, the overall cost is likely to fall.[51]

In addition, alternative business models evolve to respond to and support consumer concerns and preferences, and *Responsible cafes*[52] is a good example where many participating cafes offer a price discount when a consumer brings a refillable coffee cup. *Responsible cafes* currently has 344 cafes registered in South Australia with participating cafes saving approximately 35.2 cups per day from landfill. Over the year that equates to approximately 12,800 cups per cafe.

In June 2018, Australia's supermarket giants Woolworths and Coles announced they will be reducing the level of plastic packaging in their stores. In addition to action in relation to the sale of straws (refer page 29) Woolworths announced they will remove plastic packaging from 80 fruit and vegetable lines. Coles also announced a set of commitments on packaging and recycling, including removing plastic wrapping from Coles brand bananas.

Business opportunities may also arise through the emergence of new companies that can produce suitable alternatives to single-use disposal plastic products or that can provide improved recycling outcomes for existing products that keep the materials circulating within our economy.

South Australia's plastic bag ban demonstrates that the large majority of consumers will accept measures that support the reduction in environmental impacts especially to marine animals, and in particular when alternatives are available (e.g. reusable shopping bags).

Negative impacts on state-based businesses that support South Australian jobs should be avoided or minimised where possible. Similarly, increased cost pressures facing the community are to be avoided or minimised.

It is also preferable for voluntary approaches or collaborative measures or policies over regulatory measures where business and industry has the foresight and willingness to act in a timely manner and where the alternative measures or policies achieve a tangible reduction in the impact of single-use plastics on the economy, environment, and society.

Questions to consider in making a submission:

9. If you are a South Australian based manufacturer or importer of any of the single-use plastic products mentioned in this discussion paper, what are your views on this topic? Do you have access to alternatives? Are there cost impacts that need to be considered as part of this discussion?

10. If you are a retailer or business that sells, offers or provides single-use plastic products mentioned in this discussion paper, what are your views on this topic?

11. As a consumer of single-use plastic products mentioned in this discussion paper what are your concerns? What would you like to see done to address the problem(s) or concern(s)?

What is the best approach?

There are a range of approaches and options that could be adopted to tackle single-use plastic products. Some options are more suited to a national approach (e.g. import restrictions, taxes, labelling, product accreditation), while others can be state-based (e.g. legislation, education, and incentives).

Options can range from industry-led approaches that rely upon industry to voluntarily transition to more sustainable alternatives through to fully-mandated legislative approaches such as bans. The EU has announced its intention to develop legislation to ban single-use cutlery, cotton buds, straws and stirrers from 2021.

For some single-use plastic items improved product labelling may be the best approach e.g. sanitary wipes, and for other products improved education and awareness of consumers may encourage a shift toward more sustainable product choices.

The EU approach also intends to use national reduction targets for plastics not directly 'captured' through banning and for which no alternative product exists including single-use burger boxes, sandwich boxes or food containers for fruits, vegetables, desserts or ice creams. These items will have to be reduced by EU member states by at least 25% by 2025. The EU Member States also agreed that reduction measures should also cover waste from tobacco products, in particular cigarette filters containing plastic which would have to be reduced by 50% by 2015 and 80% by 2030.[53] The mechanism(s) intended to achieve the required reduction targets are not identified.

Ideally, the preferred approach for South Australia should deliver environmental, economic and social benefits, be publicly acceptable and contribute to improved use of materials and resources.

It may be appropriate to restrict market access for some single-use plastic and other single-use products where suitable substitutes or alternatives exist with lower impacts. The use of legislation in South Australia is a mechanism that has already been used to restrict market access, for example in relation to the provision of single-use plastic bags as discussed above.

Similar legislation could be developed to restrict market access for individual single-use plastics or a more flexible and complete policy approach could be to develop framework legislation that enables bans and exclusions to be adopted for various single-use plastics and other single-use products with suitable time frames and after appropriate consultation.

A dedicated legislative instrument could be considered to address all single-use plastic and other single-use products targeted in one Act of Parliament by defining specific objectives and measures with a view to preventing and reducing their impact on the environment, society and the economy. The legislation could:

- Regulate (prohibit) the sale and supply of single-use products and materials in South Australia particularly those with a single-use applications such as identified above.
- Provide an ongoing legislative mechanism to manage products and materials which will be especially important as the complexity of waste types are changing and could become more problematic to manage into the future.

Such legislation would need to be informed by targeted consultation with affected parties and interest groups and consider a range of business and other impacts.

Any initiative should be seen in the broader context of the transition to a circular economy. It should support business innovation in the development of multi-use (longer lasting) alternatives and more sustainable single-use products. It could also promote compostable and other bio-based alternatives and introduce an innovative bio-economy, bringing new opportunities for businesses.

The framework legislation could also enable a staged approach whereby some of the more impactful single-use plastic or other single-use products could be addressed before others. This would also send a powerful message to the single-use plastic producers, importers and the packaging industry, brand owners and consumers that South Australia is serious, and will again lead on these aspects. Businesses would be more mindful of the downstream impacts before introducing new single use products.

Questions to consider in making a submission:

12 Do you think government intervention is required in relation to single-use plastic products or other single-use items? If so, what type and in what timeframe?

13 Do you think that restricting the sale or supply of some single-use plastic or other single-use products for which there are more sustainable alternatives available is a good idea?

For example, early product bans could be imposed where there are readily available alternatives on the market e.g. non-biodegradable single-use plastic straws in favour of straws made with biodegradable materials (e.g. paper) or reusable alternatives.

In Australia, the *Mutual Recognition Act 1992 (Cth)* requires that a product, which is sold in one state or territory, must be allowed to be sold in other Australian states or territories. It is possible for jurisdictions to ban the sale or production of products in its own jurisdiction through an exemption under the Mutual Recognition Act.

Where to from here?

Views and thoughts expressed in submissions on this challenging and important issue will help inform government policy to **turn the tide** on single-use plastic products.

Subject to the outcomes of this discussion paper consultation process, further detailed consultation with business, industry and other parties will be undertaken.

See page 7 for information on how you can contribute to the discussion on this important issue.

Appendix

Definition of plastic

There are two types of polymers: synthetic and natural. Synthetic polymers are derived from petroleum oil, and made by scientists and engineers. Examples of synthetic polymers include nylon, polyethylene, polyester, Teflon, and epoxy. Natural polymers occur in nature and can be extracted. They are often water-based. Examples of naturally occurring polymers are silk, wool, DNA, cellulose and proteins.[54]

Environmentally friendly plastic?

The Victorian government published a discussion paper on *Reducing the impacts of plastics on the Victorian environment*,[55] refers to the 'environmentally friendly' plastic alternatives to plastic items like bags, coffee cups and cutlery that are becoming increasingly common. The paper suggests that 'environmentally friendly' plastic products are often labelled as degradable, biodegradable and compostable and that these alternatives are not always as environmentally friendly as they appear. They can present similar entanglement and ingestion risks to marine animals as typical plastic items and, if sent to landfill, can produce methane, a potent greenhouse gas.

The terminology and explanation describing the difference between biodegradable, compostable and degradable varies but in general terms can be described as follows:[56]

Biodegradable: something is biodegradable when living things, like fungi or bacteria can break it down. Biodegradable plastics are made from plant-based materials like corn and wheat starch rather than petroleum and break down into organic material and water over time and under certain conditions (e.g. temperatures above 50°C).

Compostable: A subset of biodegradable plastic, compostable plastics are generally made from plant material that return to base organic components when processed under certain conditions such as those provided in a commercial composting environment operating in accordance with Australian Standards (AS 4736- 2006).

Degradable or 'oxo-degradable': Chemical additives used in the plastic allow the product to break down quicker than a standard plastic product usually would. The additives are designed to promote the oxidation of the material to the point where it embrittles and fragments into tinier and tinier pieces of plastic (microplastic). This may then be followed by biodegradation by bacteria and fungi at varying rates depending upon the environment. A recent study for the European Commission (EC) casts doubt on whether in practice these plastics biodegradable fully or within reasonable time periods.[57] A clear find from the EC study was these plastics were prohibited from biodegradation if the plastic is not first exposed to UV radiation (and, to a certain extent, heat). In these circumstances biodegradation will either not take place (it will behave as a conventional plastic) or it will be slowed significantly.[58]

Compostable bags are becoming increasingly useful for collecting food scraps. Confusingly however, many products labelled as 'compostable', including bags, only decompose fully in commercial composting facilities, and cannot be effectively composted at home.

Biodegradable, degradable and compostable plastics can contaminate other plastic waste collected for recycling, and vice versa, as these are not always easily identifiable or easy to separate out.

The Western Australian (WA) government concluded that consumers, recyclers, composters and local governments are unable to distinguish biodegradable plastics from conventional plastics[59] and has banned all single-use plastic bags up to a thickness of 35 microns.[60]

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