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Phasing Out Plastics Best Practices and Alternatives

By Sydney Valone, B.A.'23 & Jeff Van, B.S.'24

Advised by Kikei Wong & Denita Toneva UCLA Facilities Management

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UCLA Institute of the Environment & Sustainability

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()1Introduction

In recent years, single-use plastics have become a high priority in the environmental sphere as concerns about the dangers of plastics increase. The accessibility and low cost of plastic products have led to a rising culture of convenience in which plastics are constantly used and thrown out. Because plastics are extremely easy to dispose of, the habits of consumption of plastic products has become routine and regular. Singleuse plastics have polluted oceans when runoff carries them over land and down storm drains. Plastics persist in the environment; they are slowly broken down into smaller pieces and leach out chemicals and dyes. For instance, plastic bags take approximately twenty years to deteriorate whereas a plastic water bottle or cup takes over 450 years to become microplastics and never fully decomposes1.

The recent surge of awareness toward single-use years³. The European Union has plans for 90% of its plastics has been as a result of campaigns led by plastic bottles to be recyclable by 2029⁴. Kenya and environmental organizations around the world to call Zimbabwe have strict rules that single-use plastics attention to the waste that is rapidly accumulating cannot be taken into national parks or conservation in landfills and oceans. When photos of the Great areas with costly fines to maintain these rules⁵. In Pacific Garbage Patch began to circulate, the general parallel with government action, the private sector public was horrified. These photos come from an is also addressing single-use plastics in response to area bounded by the North Pacific Subtropical Gyre, public demands for change. a system of ocean currents which have created a swirling buildup of discarded plastics². Similarly, the This research paper is an exploration of single-use iconic National Geographic magazine cover depicting plastics in the corporate world. Within this discourse, an iceberg above water and the submerged part of the there is an examination of the laws and regulations, global opinion of increased regulation, best practices iceberg as a plastic bag began much of the momentum surrounding the action for banning single-use plastics. in the corporate sphere, and alternatives to some During the past two years, the COVID-19 pandemic plastic items frequently used in the workplace. An has reinforced the global dependency on singleassessment of the single-use plastics guidelines that use plastics. In the early months of the pandemic, Sony Pictures Entertainment currently has in place disposable plastic items or products wrapped in plastic was the impetus for this work; however, in this paper were thought to be the safest method of shipping and there will be a discussion of the field as a whole. delivery, and health materials including masks and The findings of this research paper are presented tests were also predominantly plastic-based. The world with first, a definition of the term single-use plastics, followed by an explanation of laws and regulations, became reliant on single-use plastics to maintain a standard of public health, despite its negative global public opinions in certain areas of study, and consequences for the environment. the best and most widely used practices of single-use plastics in the corporate sphere. The paper will be concluded with a report of accessible and affordable The international community has taken legislative action in various locations in order to create a alternatives for replacement of single-use plastics on a corporate scale.

widespread shift towards plastic alternatives. In China, nationwide bans on single-use plastics have been proposed and put in place over the past several

O2 Definition

Single-use plastics (SUPs) are products that are made from fossil fuel-based substances, and are disposed of after one use, and cannot be recycled, sorted, or composted. These two characteristics were consistent throughout most established definitions by governments and nonprofits. The Natural Resources Defense Council (NRDC) defines SUPs as "goods that are made primarily from fossil fuel–based chemicals (petrochemicals) and are meant to be disposed of right after use—often, in mere minutes"⁶. The EU's Directive 2019/904 gives a similar definition of SUPs, "a product that is made wholly or partly from plastic and that is not conceived, designed or placed on the market to accomplish, within its life span, multiple trips or rotations by being returned to a producer for refill or re-used for the same purpose for which it was conceived"⁷.

Laws and Regulations

In recent years, increased knowledge and awareness of the environmental impacts of SUPs have compelled governments to act. Most regulations on single-use plastics have occurred within the 21st century. This research looked at jurisdictions in different geographies where Sony has operations. These jurisdictions include the US and Canada at the federal level and several US states (California, New Mexico, Georgia and Texas). Additional information on waste diversion and material requirements is also discussed for the US Federal level, California, and Los Angeles County. A digest of the information is found in Table 1. We obtained most information about regulations through online searches, local government websites, and local news outlets. Some of the best resources include CalRecycle's website, California Legislative Information, and nonprofits such as Californians Against Waste's legislation tracker⁸ and WasteDive⁹.

| Jurisdiction | Plastic bags | Straws and utensils | Expanded |
|--------------|--|--|--|
| | | | Polystyrene |
| US Federal | None | Pending bills: - Break Free From Plastic Pollution Act | Pending bills - Plastic Pellet Free Waters Act |
| California | Statewide: banned in 2016 (SB 270) | Statewide: AB 1884 and AB 1276 required straws, stirrers, utensils, condiment packages to be provided upon request only Local regulation: LA County: requires foodware to be compostable or recyclable by May 1, 2023 | Statewide: Sale of loose-fill packaging banned within the state in 2008 Locally banned in 128 jurisdictions ¹⁰ |
| New York | Statewide: banned in 2020 (Environmental Conservation Law ECL Article 27, Title 28) | Local regulation: NYC ban on plastic stirrers, straws; only on request NYC 2019 executive order for city agencies to purchase compostable/ recvclable foodware | Statewide: banned polystyrene food containers and loose- fill packaging since 2022 |
| Georgia | Pending statewide: SB 280 Locally banned: - City of South Fulton | Local regulation: City of South Fulton ban plastic cups, straws, food containers) | None |
| New Mexico | Locally banned: - Albuquerque - Bernalillo County - Deming - Las Cruces - Neming - Santa Fe - Silver City - Taos | None | None |
| Texas | Statewide preemption on plastic bag bans | None | None |

Table 1 Digest of plastic-related regulations in select areas of the United States

United States

There are no regulations on single-use plastics at the US federal level¹¹. Two bills tackling the issue have been introduced in Congress:

- The Break Free From Plastic Pollution Act would make producers fiscally responsible for managing plastic products after use, phase out certain categories of SUPs by 2023, establish minimum requirements for recycled content in beverage containers, and create programs including beverage container return and bag taxes nationally¹².
- The Plastic Pellet Free Waters Act would prohibit facilities which make and use plastic pellets from discharging them into waterways¹³.

As of writing, Congress has not taken action on either bill^{14,15}.

In lieu of federal action, most regulation has been left to states and local governments. The result is a patchwork of laws which varies both geographically and by the scope of products regulated. Most regulations focused on single-use plastic bags; however, governments have also taken action on plastic utensils, takeout containers, and expanded polystyrene (Styrofoam) products.





Single-use plastic bags

Of the states covered in this report, only California and New York have banned plastic bags statewide. California's 2014 law SB 270 prohibited retail and grocery stores from providing single-use plastic bags¹⁶. Instead, these stores could provide a reusable plastic bag or paper bag for at least 10 cents. The law included a compromise that allows plastic bags to be defined as reusable if they are 2.25 mm thick and able to carry 22 pounds over a distance of 175 feet¹⁷. As a result, these thicker plastic bags are still sold in stores despite the legislation.

New York has a similar law which came into effect in 2020, except its fee for paper bags is 5 cents¹⁸. In Georgia a statewide ban was introduced but has stalled. Introduced in 2019, Senate Bill 280 would have banned plastic bags in retail settings, except for bags used to package food items, or bags used for newspapers, garment bags, or trash bags, among others¹⁹. However, leadership prevented a vote²⁰.

In Georgia and New Mexico, local governments were more proactive in enacting bans than their respective state governments. While Georgia and New Mexico lack statewide bag bans, cities within these states have instituted their own bans.

- In Georgia , the City of South Fulton banned plastic bags starting March 1, 2021²¹. The ban includes "grocery, newspaper, door-hanger and laundry and dry-cleaning bags".
- In New Mexico, localities with regulations on plastic bags and polystyrene containers include Albuquerque, Bernalillo County, Deming, Las Cruces, Neming, Santa Fe, Silver City, and Taos²². Cities like Albuquerque²³ and Santa Fe²⁴ have implemented plastic bag bans. While Santa Fe requires a 10-cent fee for paper bags, Albuquerque allows retailers to provide them for free.

The state of Texas has gone so far as to prohibit bag Mayor Bill de Blasio signed an executive order bans. In 2018, the Texas Supreme Court struck down directing city agencies to stop purchasing singlea bag ban in the city of Laredo, effectively prohibiting use plastic foodware and replace it with recyclable all bag bans in Texas cities²⁵. Due to the pre-emption or compostable alternatives³⁴. Beginning May 1, on bag bans, Texas municipalities have turned to 2023, LA County will require single-use foodware educational campaigns. Corpus Christi, TX's solid to be compostable or recyclable for restaurants in waste department educates residents on the value of unincorporated areas³⁵. recycling²⁶. Similarly, Austin Resource Recovery has opted to have dialogues with retailers and provide educational resources on the benefits of reusable bags²⁷. a leader on the issue of single-use plastics, bills

Straws and other utensils

Straws, utensils, containers and other foodservice items are another common target of regulation. Some governments, especially at the local level, have implemented strict regulations banning certain foodware items. In Georgia, South Fulton's ban on plastic bags also covers plastic cups, straws, and food containers²⁸. Localities within LA County have targeted foodware including Santa Monica, which banned non-recyclable food service containers in 2008, Manhattan Beach, which banned plastic straws and utensils, and Malibu, which banned straws, stirrer and utensils²⁹.

and utensils, and Malibu, which banned straws, stirrers Some jurisdictions have regulations which focus on and utensils²⁹. expanded polystyrene materials, including loosefill packaging. Since January 1, 2022 New York has Other governments decided not to completely ban banned businesses from selling loose-fill packaging straws, instead opting for a policy to provide them and expanded polystyrene food containers³⁸. In only on request. California AB 1884 prohibits California, AB 3025 prohibits manufacturers from selling expanded polystyrene loose-fill packaging³⁹. restaurants from providing single-use straws unless requested³⁰. A 2021 law, AB 1276, expands the "upon Cities within LA County, CA, including Culver City, request" law to utensils, stirrers, and condiment Malibu, and Pasadena, have completely banned packages³¹. This law mirrored a similar City of Los expanded polystyrene for restaurants and government Angeles ordinance passed earlier in the year³². New facilities⁴⁰. More recently, in 2016, San Francisco York City has a law which banned plastic stirrers and enacted a regulation banning the sale of all expanded also required restaurants to provide single-use plastic polystyrene products⁴¹. straws only on request³³.

There are more regulations on single-use straws and foodware in the near future. In 2019, New York However, in some jurisdictions, regulations on straws and utensils have faced obstacles. Even in California, a leader on the issue of single-use plastics, bills with stricter requirements have failed in the state legislature. In 2021, SB 75 narrowly failed to pass the state Assembly. The bill would have required a 75% reduction in single-use plastic packaging, utensils, straws, containers and other foodware dumped into landfills, and also mandated these products to be recyclable or compostable by 2032³⁶. As of 2019, there are no regulations on straws³⁷ in New Mexico, Texas and Georgia, either statewide or at the local level, nor for other utensils.

s <u>Polystyrene bans</u>

Texas, Georgia, and New Mexico do not have regulations around polystyrene.

Diversion and material requirements in California

In addition to regulations prohibiting plastic products, California has also enacted laws concerned with waste diversion and content requirements. AB 939, or the California Integrated Waste Management Act, mandated that all local jurisdictions must divert 25% of all solid waste from landfills by 1995, and 50% by 2005⁴². California's Mandatory Commercial Recycling Law (2008) mandated that starting 2012, all businesses that produce more than 4 cubic yards of solid waste and multifamily buildings with more than five units are required to recycle⁴³. SB 1335 requires foodservice operations or third-party businesses in state-owned properties to use packaging that is reusable, recyclable, or compostable⁴⁴. Finally, California's Rigid Plastic Packaging Container Law mandated plastic packaging containers to meet certain criteria. The containers must have a minimum of 25% recycled materials and a minimum 45% recycling rate. However, food, drugs, cosmetics, baby formula, and medical devices are exempt from the law⁴⁵.



Canada

In contrast to the United States, Canadian cities, provinces, and the federal government are taking a holistic approach and regulating multiple categories of single-use plastics at once. At the federal level, a bill has been proposed to ban the manufacture, import, and sale of six different categories of single-use plastics (bags, cutlery, foodware, ring carriers, stir sticks, and straws)⁴⁶.

In British Columbia, municipalities are able to regulate single-use plastic items without approval from the province. The list includes plastic bags and polystyrene containers, and may soon include plastic utensils and straws⁴⁷. Within British Columbia, the city of Tofino had already regulated polystyrene containers, straws and plastic bags, and recently banned single-use plastic utensils⁴⁸. Ontario has also drafted regulations banning straws, stir sticks, utensils, grocery bags, and containers, to come into effect sometime in 2022⁴⁹.

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Public Opinion

To determine the feasibility of the reduction of single-use plastics as well as replacement with alternatives, it is first necessary to understand the willingness of local people to accept the change. Though these countries may already have governmental regulations regarding single-use plastics, this section is dedicated to the attitudes of residents toward the elimination of single-use plastics, rather than the laws already in place. The research focuses on Canada, Colombia, Mexico, Brazil, China, India, and Japan, which were chosen because of the production sites that Sony Pictures Entertainment manages in these regions.

A study from 2022 asked people around the world to rank their agreement to this phrase: "Single-use plastics should be banned as soon as possible." The countries with the highest percentage of agreement are Columbia at 89% and Mexico at 88% of the respondents. Trailing far behind are Canada, the United States, and Japan at 66%, 55%, and 37%, respectively⁵⁰. Furthermore, an additional question from the study asked participants to rank their agreement with this phrase: "I want to buy products which use as little plastic packaging as possible." Again, the countries with the highest percentages of agreement are China, Columbia, and Mexico, all at 92% agreement, whereas Canada (77%), the United States (71%), and Japan (56%) rank the lowest⁵¹. In the following subsections, attitudes within each of the countries are explored further starting with the countries which had the lowest support of plastic bans.

Japan

Japan is the second largest per-capita generator of plastic packaging waste⁵². Ultimately, the lack of enthusiasm by Japanese consumers to eliminate single-use plastics is because plastics are incorporated in food service, convenience stores, and other spaces to preserve food items⁵³. Individual items are wrapped in plastic, from a single banana to a hard boiled egg. Retailers and consumers both agree that if an item is not wrapped in plastic, the food safety standards are difficult to ensure⁵⁴. Manufacturers have noticed that consumers have now grown accustomed to the standard of cleanliness and quality in food service that plastic wrapping provides, so it is a challenge

to suddenly switch from this now ingrained cultural habit. Anthropologist Joy Hendry explained that the preference for single-use plastics to wrap food is now an embedded part of the Japanese culture of customer service⁵⁵.

Despite the preference of plastic wrap, Japanese consumers have also been beginning more extensive waste management and recycling programs. Japan has had attempts at recycling PET bottles, which have been accepted by manufacturers to some extent but not by consumers on a widespread level. A conflicting source of information states that Japan claims to recycle 84% of all end-of-life plastics⁵⁶. It is likely that recycling is not widespread among consumers yet because of a lack of education about what can be recycled. Substitution for alternatives was also studied among Japanese consumers. When asked what plastic products they thought were used excessively, 50.3% of participants chose food compartments in bento lunch boxes that are thrown away after use. Plastic bags was another top choice, at approximately 50%⁵⁷. Of these participants, 80% agreed that they would buy alternative products if its quality and price were similar to plastics⁵⁸.

Ultimately, the Japanese public is increasingly concerned about the human and environmental impact of single-use plastics. In a survey of two thousand participants, 66% agreed Japan must support a global treaty to address single-use plastic pollution⁵⁹.

Canada

In a recent study, approximately two thirds of Canadians supported a federal ban on single-use plastics and favored the inclusion of several additional plastic products within the ban⁶⁰. The majority of respondents want the government to include more harmful products such as hot and cold drink cups, cigarette filters, and all forms of polystyrene⁶¹. Additionally, recent data from Abacus commissioned by Oceana Canada emphasized that 97% of Canadians believe that it is the responsibility of the government to reduce single-use plastic pollution⁶². Furthermore, in a study of one thousand participants, 93% responded that they were personally motivated to reduce their usage of single-use plastics; however, they were far less willing to pay more for plastic alternatives⁶³. The study also found that Canadians would be more receptive to plastic alternatives rather than to outright ban products such as plastic bags. Canadians also responded favorably to discounts or incentives for supporting alternative plastic products, though more educated consumers were less likely to prefer these discounts⁶⁴. Ultimately, the support from environmental non-governmental organizations as well as local governments has been positive, but there is not a complete dedication on the part of the average consumer or various industry stakeholders⁶⁵.

While there has been progress in Canadians advocating for new plastics regulations, there is also

a majority of the public who think that these bans should be put in effect after the pandemic ends. The war on single-use plastics became a lower priority during the COVID-19 pandemic, and the public opinion in favor of single-use plastics regulation fell 21% from its original 79% agreement⁶⁶. Currently, only 9% of the plastics in Canada are recycled, so there is a clear need for education of Canadian consumers to further develop an understanding of plastic waste management as well as available and affordable alternatives⁶⁷. Nearly 90% of Canadians feel surprised, angry, guilty, or helpless to learn this statistic⁶⁸. As a result, it is possible that change can be enacted soon as there is public support for plastic alternatives.

Brazil

There have been conflicting opinions from the general public in Brazil regarding the elimination of singleuse plastics. Brazil consistently has the second highest levels at around 80% of respondents in agreement with banning single-use plastics⁶⁹. Brazil is also one of five countries where 90% of citizens support manufacturers and retailers taking responsibility for reducing, reusing, and recycling plastic packaging⁷⁰. Consumer demand has spurred engagement from the private sector and nonprofits. For example, iFood, a market leader in food delivery, has significantly reduced plastics given to customers, and Oceana and the United Nations Environment Program both have advocacy campaigns supporting the implementation of replacements for single-use plastics as a result of demands from consumers⁷¹. Furthermore, the cultural habit of carrying cloth bags or using pull carts at produce markets is natural for a majority of Brazilians, so it was generally assumed that a transition to plastic alternatives and bans on plastics would be accepted⁷².

However, bans on single-use plastics as well as the masks became some of the most important ways to attempt to integrate alternatives have been widely stay healthy⁷⁷. Waste management companies have rejected by Brazilians. Brazil currently has one of also reported a rise in plastics from consumer goods the lowest recycling rates in the world, and various and ecommerce, whereas plastic waste from utensils regulations in smaller cities are in place to ban which is used in large gatherings has decreased⁷⁸. single-use plastics⁷³. Approximately, only 54% of the population thinks that an international treaty to combat The rise in use is balanced by a significant increase plastic pollution is essential, despite 90% of Brazilians in awareness from both the general public as well as saying they understand the problems the environment large corporations about single-use plastics and the faces⁷⁴. A major issue explained by one citizen is that damage that threatens the environment as a result⁷⁹. the government does not offer alternatives, and the Roughly 72% of participants in a study responded that few that are available are not affordable. Sao Paulo they are aware and concerned about the consequences is a perfect case study of these sentiments in action; of single-use plastics, but nearly 80% of these a state law eliminating free plastic grocery bags was respondents say there is little public information overturned within two weeks due to an influx of public on how to reduce packaging waste⁸⁰. However, complaints centering around how the grocers were despite this promising information, there may be cheating customers⁷⁵. While there is a significant part fundamental knowledge barriers on the topic; 57% of of the population that does not care to change their consumers consider plastic bags as single-use plastics, habits, the government is also at fault for the lack of 26% of respondents think that packaging material awareness and education on how plastic alternatives is a single-use plastic, and only 20% think water can be better for the environment⁷⁶. bottles are single-use plastics⁸¹. The high-income respondents tended to have less awareness of single-



India

Prior to the pandemic, India was working toward
change, however, the lockdown from COVID-19 was
a significant setback in the progress that had been
achieved by local and state governments. Singleuse plastics that were previously not condoned by
the government were suddenly the only solution
for health and safety; disposable cups or single-use
masks became some of the most important ways to
stay healthy⁷⁷. Waste management companies have
also reported a rise in plastics from consumer goods
and ecommerce, whereas plastic waste from utensils
which is used in large gatherings has decreased⁷⁸.

use plastics, which can be explained by the changing lifestyles in India to accommodate greater mobility and convenience⁸². Overall, India requires greater single-use plastic awareness for the public while also furthering progress toward the elimination of plastics as there can be alternatives found for the pandemic's plastic waste.

China

China has had significant progress in the bans and nationwide rollout of single-use plastic regulations. An important proposal from the National Development and Reform Commission and the Ministry of Ecology and Environment would ban all single-use plastics across the entirety of China⁸³. However, a main challenge in China is the public acceptance of the progressive regulations the government has produced. Currently, plastic bags in China cost approximately five cents, so there is little incentive for consumers to avoid taking a plastic bag⁸⁴. Furthermore, even where complete plastic bans are in place, it is difficult to enforce the rules; for example, in Beijing, 96% of food markets continue to use plastic bags for produce despite the current ban⁸⁵.

The next challenge that China is facing with regards to single-use plastics is food delivery. With the rise of food delivery services, single-use plastics, bags and utensils in particular, have become widespread and widely unused. A study found that approximately half of all takeout orders originate in the home or a residential location, where reusable utensils should dominate⁸⁶. A main hindrance to this idea is that the growing middle class has an increasing demand for high-quality plastics⁸⁷. Even when reusables are available, people still tend to favor plastic materials, which is a significant issue in the attempts to eliminate single-use plastics in China. The main issue is the ability of the general public to accept and widely use alternatives to single-use plastics, as the government

already has legislation in place and is working toward large-scale change for the future.

Mexico

Mexico has made great strides in the past decades toward the elimination of single-use plastics. One of Mexico's many environmental organizations, Mexico Without Plastic Alliance, advocates for a change in cultural consumption habits of single-use plastics⁸⁸. The public has repeatedly demanded change from the government, and groups such as the Mexico Without Plastic Alliance as well as individuals have called for efforts to implement regulations to reduce the production and consumption of plastic waste⁸⁹. With the COVID-19 pandemic, governmental regulation of single-use plastics became a lower priority, and despite existing bans such as that on single-use plastic bags, there was no enforcement of these bans⁹⁰.

While there is widespread momentum among the public for change, there are concerns about who will be burdened by the increased cost of alternatives. Business owners fear that their customers will leave them if prices are raised, so these businesses have absorbed the cost to maintain the satisfaction of their clientele⁹¹. There has also been resistance from customers to the plastic alternatives; some customers insist on plastic wrap or bags, and business owners feel forced to comply to not lose the sale⁹². On the other hand, some vendors or stores are resistant to customers bringing reusable containers.

In certain areas, public opinion is influenced by employment in plastic bag manufacturing; the industry has over 4,300 companies employing 300,000 people⁹³. A national ban on plastics would devastate this segment of the population. Though this is a small proportion of the Mexican population, the elimination of jobs would cause severe unemployment and force integration into other areas of the workforce.

Colombia

Colombia has some of the highest rates of people demanding change and acknowledging the environmental harm from single-use plastics. Of Colombians, 94% believe that a treaty to combat plastic pollution is important, and 55% believe that it is essential⁹⁴. Furthermore, 89% of markets favor a complete ban of single-use plastics, and 92% of Colombians have a preference for products that use a minimal amount of plastic in packaging⁹⁵.

Although Colombia is a leader in the single-use plastic space, the country also faced major setbacks during the COVID-19 pandemic. The government of Colombia issued new regulations that products must be covered in plastic bags to reduce cases of COVID-19%. The government also ordered restaurants to use two plastic bags for home deliveries, which further increased the use of single-use plastics⁹⁷. Before the pandemic, there was legislation in place that banned small plastic bags and required larger bags to meet strength standards to reduce double bagging⁹⁸. Additionally, plastic laws and bans were backed by the National Federation of Merchants, the Plastic Producers Guild, and the Ministry of Industry, Commerce and Tourism, which are crucial players to facilitate and support new regulation for single-use plastics⁹⁹. Because there was significant progress in the past, there are hopes that Colombia will continue to enact change for single-use plastics now that the pandemic has become a lower priority.





Trends Observed in Corporate Practice

In order to understand how best to advance a company toward sustainable goals, inspiration can be drawn from others in the corporate world that have created initiatives to address single-use plastics themselves. This research paper draws on interviews conducted with representatives from several large corporations in May 2022 for the purpose of gaining broader knowledge of corporate single-use plastics policies and practices. These conversations were often conducted with the intent to convey responses without attribution which is why a full interviewee list is not provided and several examples do not state a particular company name.

The section below outlines key takeaways from the interviews which can help a company shape its single-use plastics approach, no matter what stage of development it is in. The discussion is organized chronologically from inspiration and technical support to goal setting and finally to particular implementation challenges.

Inspirations and Technical Support

Companies look for guidance in their single-use plastics regulations from specialized coalitions and associations. Several companies emphasized organizations within the United States that already have established widespread support for the replacement of single-use plastics with alternatives as well as guides to encourage change in companies.

One such example is the Sustainable Packaging Coalition. This group champions sustainable packaging by engaging the entire supply chain of a corporation, which challenges and supports a company on all scales of production. A spokesperson for a retail company that was interviewed explained that the Sustainable Packaging Coalition served as a model to define single-use plastics; this organization prioritizes using renewable or recycled materials that are safe and healthy for individuals throughout the lifecycle, and are "effectively recovered and utilized" in closed-loop cycles¹⁰⁰. This in turn allowed the company to have a better understanding of the products that needed to be replaced.

The Ellen MacArthur Foundation and its commitment to a circular economy has also inspired several of the companies. The Ellen MacArthur Foundation works to enact change by providing key information for both private companies as well as the public; this institution also inspires companies by organizing resources in a toolkit to allow others to follow the Foundation's actions while simultaneously making their own

change¹⁰¹. Several of the interviewed companies referenced The Ellen MacArthur Foundation as a motivation for their single-use plastics policy as well as a source of education for employees of the company. These corporations placed an emphasis on awareness in order for their plastics initiatives to be accepted and utilized by employees.

The United Nation Environment Programme works to rally governments, corporations, and citizens alike to reduce their consumption of plastics while also teaching ways to avoid plastics altogether. Since its launch in 2017, the #CleanSeas campaign has transformed habits of the public, standards for plastics, and policies around the world; sixty three countries have joined¹⁰². The immense support from governments around the world has contributed to the Clean Seas campaign becoming one of the most powerful coalitions against plastic, which has in turn created much inspiration for corporations to make change both internally and throughout their supply chains.

Clear Goals with Timelines

To move towards elimination of single-use plastics, companies have established clear deadlines to target specific categories of single-use plastics. Publicly available information shows that most deadlines for goals were set within the next decade. These ranged from smaller steps, such as phasing out straws, to larger-scale campaigns to eliminate single-use plastic packaging. A few examples of each are provided in the following table.

| Table 2 | Examples | of clear | goals from | companies | on single use | plastic alimination |
|---------|----------|----------|------------|-----------|---------------|----------------------|
| | Examples | or crear | goals nom | companies | on single-use | plastic ciliniation. |

| Straws | Packaging | Other |
|--|--|---|
| and a second sec | | |
| Aramark had set a goal for a 60% decrease in plastic straws by 2020. | Flipkart, an Indian e-commerce company, which was able to achieve its goal of eliminating 100% of SUP packaging materials by 2021. | Toyota (Thailand) established a target of zero single-use plastic waste at offices by 2022. ¹⁰³ |
| Starbucks established a goal to eliminate plastic straws by 2020 by replacing them with strawless lids and alternative materials ¹⁰⁴ . | Seventh Generation has a goal for 100% of its "packaging will be reusable and reused, recyclable and recycled, or biodegradable and degraded" ¹⁰⁵ . | |
| American Airlines started eliminating straws, utensils within lounges in July 2018, and started eliminating straws on flights in November 2018; there is no clear timeline on when completion will occur ¹⁰⁶ . | McDonalds has a goal to source all of its guest packaging from renewable, recycled, or certified sources, and to recycle guest packaging in 100% of its restaurants in 2025 ¹⁰⁷ . | |
| United Airlines has banned plastic straws and cocktail picks on their flights, and beginning in November 2019, they'll have a biodegradable bamboo alternative ¹⁰⁸ . | | |
| Hyatt eliminated SUP straws and drink picks in 2018 ¹⁰⁹ , while Marriott did the same in 2019 ¹¹⁰ . | | |

Instead of setting a single goal, the Walt Disney Company exemplifies a phased approach to execution of a set of goals. It has developed a set of goals which are all to be achieved by 2030, including zero waste to landfill; ensuring 30% recycled plastic in products and packaging; and designing packaging for reuse, recycling or composting¹¹¹. The company explained that a single timeline accelerates the process and provides an extended runway for these replacements to occur. Decisions today impact products released in several years, so it is important for a company like this one to have the advantage of time.

Be Transparent Currently, competition is occurring not only in the business world, but also in the environmental sphere. In this new plastics economy, brands are encouraged to publicly share their plastic footprint. This inspires competition among the corporations who are now seeking to meet the high environmental standards of consumers.

While companies overall may be reluctant to publish data on their plastics consumption due to the negative connotation, some were willing to share information about progress towards their goals. McDonald's in particular has highlighted data points: 80% of guest packaging sourced for McDonald's restaurants was made of fiber sources; 80% of guest packaging came from renewable, recycled or certified sources; and Happy Meal toy innovations in the UK, Ireland, and France resulted in a 30% reduction in plastic use¹¹². Marriott is also transparent about their progress; they acknowledge in their 2021 CSR report that their goal of 45% waste-to-landfill (and 50% food waste) reduction was behind schedule¹¹³.

When progress is shared, or even something more rudimentary like ambitious goals, it can inspire competition and replication. A perfect example of this was seen within the academic community. The California State University system was the first to develop a system-wide policy for single-use plastics; this has spurred change throughout the United States to modify rules on university campuses. Students have taken note and factor campus sustainability performance in their decision to enroll¹¹⁴.

Start with Replacement

It is no surprise that when tackling plastics, a company should start with those objectives which are the easiest, or the "low hanging fruit". In the world of plastics management, this is the replacement of single-use items. Replacing single-use utensils, offering reusable products and services, and banning the sale of plastic water bottles are all examples of ways to encourage replacement. The majority of the interviewees agreed that it was crucial to start the replacement of single-use plastics with more simple products before gradually moving toward a more large-scale supply chain shift.

One interviewed company described how it had two tiers of plastics initiatives. The second phase included high volume items where alternatives are expensive, such as cups and bottles. Plastic cups are lightweight and easily procured, whereas paper cups typically have a polypropylene liner which is not recyclable or a fossil fuel based liner which is a different environmental concern. Bagasse and bamboo are viable replacements that are 100% fiber-based alternatives, although they tend to be expensive¹¹⁵.

The feasibility of finding affordable and accessible alternatives was a frequent refrain from the organizations interviewed. Existing suppliers do not always have the alternatives that are needed, so companies are increasingly demanding their suppliers to innovate for more sustainable solutions. One company described the example of trash bags as a difficult product to replace; in this case, they are trying to influence their suppliers to innovate, rather than finding an alternative themselves. If existing vendors fail, companies turn to other channels. One said it was working with universities and consultants to understand the alternatives, as well as, with recyclers to see which products can be recycled and will have a market value after. Another company leveraged suppliers in other, more progressive parts of the world like the EU. A third turned to coalitions like Closed Loop Partners and organizations like the Next Generation Cup Tournament. Finally, major companies may invest in a startup company which manufactures paper cups without plastic lining.

These new avenues may take a tax on a company as they require additional work, or they may not be possible at all. One of the companies is a unique case as its contracts with current vendors present a hurdle to implementation. Since all third parties working with the company are under contract, the company cannot require them to comply with their plastic policy until the contract terms are up for renegotiation. Then, during the renegotiation period, they must make sure any renewed contracts are compliant.

Flexibility and piloting in more receptive geographies underpin how some replacements are rolled out. McDonald's is an illustrative example of this. It has switched to strawless lids in France, China, and Latin America, tested wood and paper alternatives for utensils in Australia and Europe, and partnered with Loop to pilot reusable cups in the UK¹¹⁶. Marriott hotels in the Asia/Pacific region have installed water refill systems¹¹⁷.



Challenges with Replacement

In these interviews, companies shared insights into the challenges and deliberations they face when finding more sustainable alternatives to plastic products. They discussed the difficulty in sourcing alternatives that are cost-neutral or have a similar function to the current products. Moreover, when choosing alternatives, they must consider the tradeoffs involved, including whether a switch to another material will result in increased carbon emissions or greater environmental impacts throughout its lifecycle.

<u>Compostables</u>

Compostable bioplastics are seemingly a feasible and affordable alternative for single-use plastics. However, waste service or compost facilities may not be able to accept and properly dispose of compostables. The main concern is polylactic acid (PLA) material, which is marketed as biodegradable; however, these PLA products are problematic as they are too thick to break down quickly. There are also chemicals called per- and polyfluoroalkyl substances (PFAS) in the PLA lining used to waterproof a product, which can potentially leak into the contents of the product. PFAS are not only an environmental issue, but also can pose a risk to human health as they can cause liver damage and increased cholesterol levels¹¹⁸. Compost requires specialized facilities, and most of these establishments cannot process "compostable" or bioplastics¹¹⁹. Several companies have made their decisions surrounding compostable plastics as a result of the lack of waste infrastructure available to support them; these establishments reject bioplastics as these products tend to contaminate organics loads as a result of the PFAS content or because bioplastics require more time to break down¹²⁰.

Truly compostable materials are 100% fiber-based. Alternatives sourced from bagasse and bamboo have been proving to be significantly more feasible in terms of disposal than compostable plastics. Bagasse is the dry fibrous material sourced from sugarcane pulp, with a durability higher than traditional paper. Sugarcane can regrow in ten to eighteen months, which makes it a better alternative to paper or wood¹²¹. Bagasse is biodegradable in thirty to ninety days, and it can also be composted in a home or commercial setting¹²². Some companies have expressed concerns with bagasse because it is expensive and it is primarily sourced from China, which can pose a supply chain issue if trade or imports slow or stop entirely.

Bamboo is another popular alternative. It is also 100% fiberbased and has low production costs. Bamboo can grow up to three feet per day, and it will regenerate to a full grown adult plant in three to five years¹²³. Bamboo has become an

widely used alternative to plastics in various corporate settings as a result of its lower cost and accessibility.

Scalable alternatives to shipping and packaging products

The companies discussed the need to balance their single-use plastic reduction goals with the need to safely ship and package products. They found it difficult to source alternatives with the same utility of plastic packaging products, including packaging peanuts, plastic containers and bags used to hold products, and the products themselves. In addition, plastics are lighter and may actually have a smaller carbon footprint than some alternatives. Plastic products were viewed by most of these companies as vital to protecting items during transit and in stores. For example, poly bags are frequently used to protect products during their global transit; they are easy to manufacture and significantly less costly than cloth and paper alternatives¹²⁴. Other packing materials like bubble wrap and Styrofoam peanuts are crucial for safely transporting fragile items, but there are few alternatives commercially available or in development. The biggest complaint is that alternatives lack performance equivalence to the plastic-based standard products.

For several companies, the light weight of plastic was

useful for conserving fuel during shipping. For one company, products need to be lightweight in order to save fuel while transporting them on planes. The company views fuel burn as a high priority consideration when looking at third-party life-cycle analyses.

In addition, multiple companies mentioned that replacing plastic products with heavier alternatives, such as aluminum, may actually result in an increased carbon footprint, from the manufacturing stage to the shipping and transport of the product.

Flipkart was able to find scalable replacements for packaging materials in meeting its 2021 goal. They used eco-friendly paper shreds, recycled paper bags in place of poly pouches, and carton waste shredded material and 2 Ply rolls instead of bubble wrap. In addition, they were able to ship close to 15% of products without a second layer of packaging¹²⁵.

Concerns around higher costs of alternatives

As companies have implemented their plastics policies, they have found that replacement materials are often more costly. Some examples include bagasse, a fiber-based material used in compostable bowls, and aluminum, an alternative material for plastic water bottles. However, the companies' response to the price tag varies.

One particular company stood out since it was more willing to switch to alternative products despite their expense. The interviewee mentioned that in conversations regarding the extra expenses, the company returned to their mindset of "people over profit" and decided to "do the right thing" for customers, in terms of finding more environmentally friendly products. They adopted a strategy of going all in and replacing as much as possible, with the reasoning that if they only replaced a few types of products, this would only draw negative attention to the remaining products. This company framed the investment in alternative products as a "brand-builder". The interviewee cautioned that while the company is supportive of the financial investments needed, other companies who prioritize profits and are concerned about "bottom lines" may be more concerned or hesitant to take similar steps.

In general, companies were willing to switch to alternatives as long as the costs were not significantly higher than the current product used. Some companies used a broader suite of analysis when thinking about 'cost'; one looked at cost in terms of full life-cycle analyses and has been able to find alternatives in a net, cost-neutral way. Cost is often not only looked at as a price, but it can also be thought of in terms



of environmental costs, such as carbon emissions or water usage. Although fiber-based paper alternatives are often the most sustainable with regard to its afterlife in the landfill, the production of a paper cup consumes thirty six times as much energy and twice as much cooling water as it takes to form a polystyrene foam cup¹²⁶. Additionally, aluminum, glass, and plastics are effective when their reuse is maximized, but because these were all extracted from non-renewable sources, a single use is not ideal for the environment. More energy is needed to manufacture aluminum and glass from raw materials than it is for plastic¹²⁷. In addition to the landfill afterlife of a product, the climate impact that occurs as a result of

> the extraction and creation of the item is also a significant cost that must be taken into consideration. It is important to assess which alternatives can be best used to minimize both environmental and monetary costs.

Education is Key

Social awareness has also become a trend among corporations. As corporations are becoming more socially responsible, one of the first steps is often to educate the employees of the company. Employees of

companies are taught methods of recycling as well as the significance of reducing single-use plastics¹²⁸. Several companies interviewed emphasized that training can prove effective in the participation of employees in a recycling or alternative disposal method.

Toyota's global operations include educational campaigns to raise awareness of single-use plastics. Internally, the company relies on educational videos, posters, and peer-to-peer education, while some locations have encouraged reusable cups as well¹²⁹.

606 Alternatives to Single-Use Plastic Items

In response to recent single-use plastic legislation, shifts in public attitudes, and sustainability goals set by corporations, manufacturers have stepped forward to meet the demand for plastic-free alternatives to common items. In order to allow Sony and other companies to comply with single-use plastics regulations as well as their own policies, we have compiled a list of some of these options.

Sony Pictures Entertainment started replacing their commonly used plastic items with more sustainable alternatives. They have made progress in phasing out easier-to-replace items, including plastic bottles and bags. However, they encountered some difficulty with other items. Knowing that other companies may face similar challenges, we researched commercially available alternatives to 9 different product categories. Products fell into these categories:

- Billboard vinyl
- Cardboard cutouts
- Glossy paper movie posters
- Step and repeat banners
- Packaging for swag items
- Coffee cups
- Cold cups and lids
- Packaged snacks
- Soup containers and lids

Some of these items, including glossy posters and step and repeat banners, were more specific to the needs of the entertainment industry, and as such, may not be as applicable to the overall corporate sphere.

Alternatives to coffee cups, cold cups, and soup containers were quite common. This may be due to demand driven by government regulations on single-use plastic foodware. As mentioned previously, most laws and regulations have focused on foodservice items, including cups and containers, and the high quantity of these alternatives may be one reason why companies have targeted foodservice items first in their single-use policies. However, even these alternatives are not entirely sustainable, as they are made of PLA bioplastic, which is not compostable in all jurisdictions.

The items that were the most difficult to find plastic-free alternatives for are gift items and packaged snacks. Small company vendors were more likely to provide packaging which are labeled compostable; however, we are unable to verify if this label applies to all jurisdictions where Sony has operations. This mirrors what corporations discussed about the benefits of plastic for shipping.

For a full list of selected alternative products, see Appendix 1. <u>CPP Alternatives</u>

Conclusion

The global public is demanding a shift towards alternatives to singleuse plastics. Countries in Central and South America have illustrated the greatest willingness to reduce plastic consumption, whereas people from the United States, Canada, and Japan display minimal enthusiasm when asked to convert to plastic alternatives. With varying levels of governmental support, citizens in various regions are taking it upon themselves to create plastics initiatives whereas the public in other areas is vehemently rejecting plastics regulations. However, in global surveys, people have responded positively to replacing single-use plastics to alternatives that are similar in both cost and feel. The public pressure for a shift toward sustainable alternatives to plastic has resulted in some governments passing laws at all jurisdictional levels, though other governments have prevented such action. Some governments have also begun to take actions to regulate single-use plastic products; however, the scope of the regulations vary. In Canada, some cities, provinces, and the federal government are working on regulations to target plastics across the board: shopping bags, foodware items, and expanded polystyrene. The picture is more complicated in the United States. There are no regulations at the federal level, and most action has been left to state and local governments. While many cities and some states (e.g. California and New York) were more proactive in regulating plastic bags and other products, state governments in Georgia, New Mexico, and Texas have not taken these actions. Moreover, regulations on polystyrene products and plastic foodware were more sparse compared to more common regulations on plastic bags. While there is more work to be done in this area, currently existing regulations are an important first step.

Simultaneous to actions being taken by the government, major corporations have also been driven by increased sustainability awareness both internally from employees as well as from consumers. In the corporate sphere, some of the best practices have been drawn from nonprofit environmental organizations and campaigns, which have inspired these companies to create strategies to attack their goals. Companies have also been successfully converting to alternatives such

as 100% fiber-based compostables, which are both cost-efficient as well as widely accessible. While there have been challenges with both cost and shipping, corporations are learning from other companies through both competition and collaboration to better their sustainability initiatives. With a holistic supply chain reform, the amount of single-use plastics can be considerably reduced, which will force competitors to follow this lead. The spotlight on single-use plastics has primarily been centered on a narrow set of plastic items; single-use plastic straws and plastic bags have been the common target in both government regulations and company actions. While these changes are important, a larger scale of implementation is needed for lasting impact.

Expansion requires tradeoffs for governments and businesses alike. For governments, there are political considerations to take into account, such as industry opposition and what level of jurisdiction should lead. Companies face a different suite of considerations; the benefits and utility of plastics are not easily replicated, alternatives often cost more, and consumer expectations may constrain change. Sustainable alternatives still remain an elusive target, but the current strategies for replacement and reduction of consumption provide hope for the future of single-use plastics.



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