

Consumption of Single-use Disposable Beverage Cups in Scotland

Final Report

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Date: 13 October 2022



EUROPE & SCOTLAND
European Regional Development Fund
Investing in a Smart, Sustainable and Inclusive Future

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1 Glossary

Acronym	Definition
DRS	Deposit return scheme
EPECOM	Expert Panel on Environmental Charging and Other Measures
EPR	Extended producer responsibility
EPS	Expanded Polystyrene
EU SUPD	EU Single Use Plastics Directive
GWP	Global Warming Potential
LCA	Lifecycle assessment
NGO	Non-Governmental Organisation
PC	Polycarbonate
PE	Polyethylene
PET	Polyethylene terephthalate
PLA	Polylactic acid
POM	Placed on market
PP	Polypropylene
PS	Polystyrene
rPET	Recycled Polyethylene
XPS	Extruded polystyrene

2 Executive summary

Resource Futures was commissioned by Zero Waste Scotland to understand the level of consumption of single-use disposable beverage cups consumed in Scotland and assess the potential impact on consumption of introducing a national mandatory charge. The project was designed to first estimate current trends in single-use cup consumption to provide a baseline. This baseline was then used to model the potential impacts on single-use cup consumption of a charge. Environmental impacts and international best practice examples were sought to provide key learnings applicable to Scotland. Finally, key issues and solutions linked to a charge on single-use cups were listed.

This work used a combination of a literature review and stakeholder interviews to inform reporting on environmental, social, equality and geographical impacts, as well as international best practice. The literature review and stakeholder interviews also informed a quantitative modelling exercise to map predicted single-use cup consumption to 2035 both with and without a charge to the consumer on single-use cups. Some constraints were experienced as published data sets and stakeholder participation within some stakeholder groups were limited. Whilst every effort was put into obtaining as an extensive and diverse sample as possible, this was dependent on the willingness of interviewees to take part.

A Valpak report¹ was found to be the most recent and reliable source of information on single-use cup consumption. Information from stakeholder interviews, alongside market data provided by some key stakeholders, was used to build upon the Valpak report, introducing new assumptions about the market in 2021-22. While every effort was made to ensure the highest level of accuracy, with any such market estimates there are limitations. Firstly, only three new sets of market data were secured. This will not provide a truly representative view of the market. Secondly, where data gaps remained it was necessary to make some assumptions based upon relevant information from literature review and stakeholder insights. These assumptions have all been justified in the body of the report, but any future work in this area may benefit from further revision of these data gaps. Finally, as the Valpak report provides the foundations of this current work, any limitations of that work are transferred to this.

We estimated that 388.7 million single-use cups were placed on the market in Scotland in 2021-22, which equates to 71 single-use cups per capita per year. Of the single-use cups placed on market (POM) in Scotland, it has been estimated that 290.8 million of these were fibre composite single-use cups, which accounts for 75% of the market share. Polyethylene (PE) lined fibre composite single-use cups were the most abundant by total weight (all materials) and number of single-use cups, making up 58% of the market share by number of single-use cups. Although fibre composite single-use cups are heavier than non-fibre composite single-use cups, this is attributed to the weight of the paperboard. By weight of plastic, Polystyrene (PS) is the most abundant material, with an estimated 416 tonnes of plastic placed on the market. Annually there is an estimated 63.4 million Polylactic acid (PLA) lined single-use cups and 6 million PLA single-use cups on the market, which account for a combined 18% of the market share.

To forecast single-use cup consumption to 2035 without a charge (baseline), population projections for adults aged 16 and over were accounted for, as was the ban on single-use Expanded Polystyrene (EPS) cups and beverage containers which came into force in Scotland in 2022, which we assumed would cause a material shift to other single-use cups. Three baseline growth scenarios were modelled, accounting for different possibilities in terms of reusable cup uptake and changes in the beverage market. These growth scenarios were established to estimate a low, medium, and high baseline estimate of single-use cups and lids on the market without a mandatory charge. We estimated that the low growth scenario will lead to a 9.9% reduction in the number of single-use cups from 388.7 million to 350.4 million single-use cups in 2035. The medium growth and high growth scenarios will lead to a 16.5% and 42.9% increase in the number of single-use cups respectively. This results in an estimated

¹ The VALPAK report, published in 2021, provided an estimate of the material composition of single-use cups POM in the UK and Scotland, informed by interviews with 32 key stakeholders.

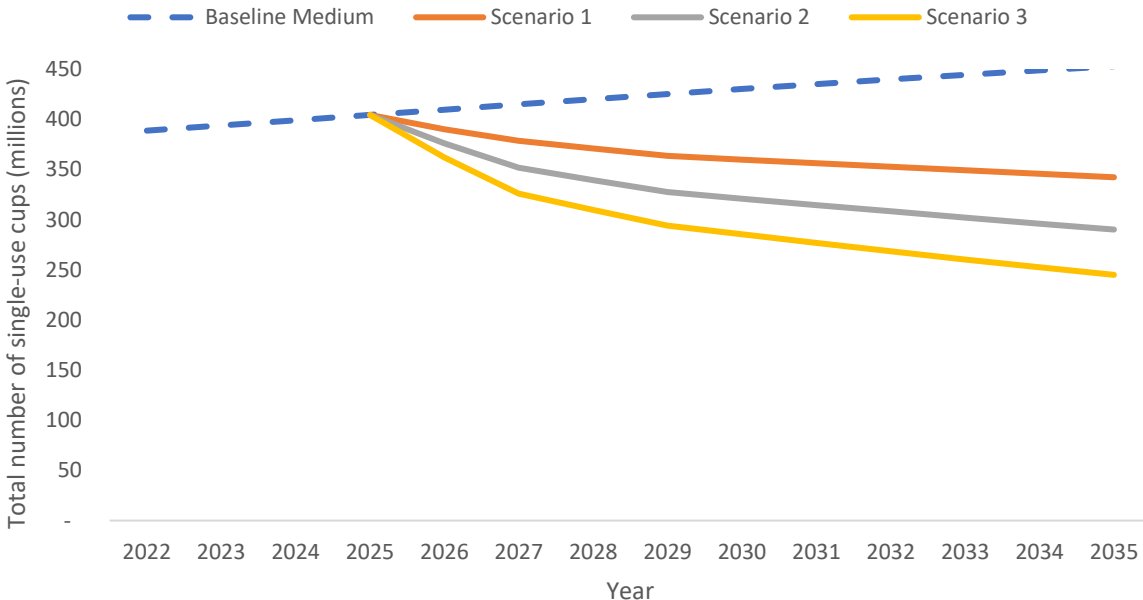
453.0 million single-use cups on the market in 2035 under the medium growth scenario, and 555.5 million under the high growth.

Previous studies reporting on the impact of trials of a charge to the consumer on single-use cups, conducted over time periods from five weeks to one year, show them to contribute to between a 4% and a 42% reduction in single-use cup consumption. Most of these studies (7 of 11, conducted over time periods from five weeks to 12 weeks) show a reduction of 15% or less. When modelling the impact of a charge on single-use cups, learning from the single-use carrier bag charge was applied, leading to assumptions that the decrease in the consumption of single-use cups will be highest in the first two years after the charge is implemented and this reduction will ultimately plateau.

The medium baseline growth scenario noted above was taken, being the middle of the three baseline scenarios modelled, this baseline medium was then used to model the three scenarios illustrated in figure ES 1 below. All three scenarios modelling the impact of a minimum charge on single-use cups led to a decrease in single-use cups placed on the market in the first 10 years of a charge to 2035, compared to the increase that is estimated if no charge is implemented (Figure ES 1). The scenarios led to the following reduction:

- Scenario 1: 15.4% reduction in the number of single-use cups placed on the market by 2035, which equates to 62.1 million single-use cups. This is 24.4% less than estimated for the same year if a charge wasn't implemented.
- Scenario 2: 28.3% reduction in the number of single-use cups placed on the market by 2035, which equates to 114.2 million single-use cups. This is 36% less than estimated for the same year if a charge wasn't implemented.
- Scenario 3: 39.4% reduction in the number of single-use cups placed on the market by 2035, which equates to 159.4 million single-use cups. This is 45.9% less than estimated for the same year if a charge wasn't implemented.

Figure ES 1: Estimated change in the number of single-use cups POM in Scotland (2022-2035) across three scenarios if a charge is implemented in 2025 compared to no charge



Due to the definition of plastic intended for use in a charge on single-use plastic cups in Scotland, there are currently no single-use cups deemed plastic-free placed on market at this time in Scotland. As such, it was not possible to differentiate between a charge on single-use plastic cups, and a charge on all single-use cups. Non-plastic single-use cups may be developed and marketed in Scotland in the future, but there is no indication of this at present.

A charge to the consumer on single-use plastic beverage cups may have environmental impacts arising primarily from potential material switches and increased reuse. Regarding potential material switches, the impact of this is limited when the charge is applied to all single-use plastic cups, including bioplastics and newer innovations such as aqueous barrier single-use cups. Regarding reuse, environmental impacts are largely impacted by consumer behaviour, particularly in terms of number of times reusable cups are used, and how efficiently they are washed. Other impacts have been identified in terms of energy, water and manufacturing impact. There are a vast number of Life Cycle Analysis (LCAs) available to compare single-use and reusable cups. Each may have different parameters and so may reach different conclusions. When reviewing LCAs it is important to be aware of these differences and their limitations.

When researching best practice, it was found that most existing examples of a charge to the consumer for single-use cups are either in the very early stages are not yet launched, or are occurring at a very small scale (e.g. on university campuses). As such, examples of best practice have been drawn from common elements employed in existing charging examples, which have drawn approval and as such are present in multiple schemes.

However, these are not necessarily quantitatively proven to affect the impact of a charge, as this data is often not yet available for the reasons mentioned earlier (eg very early stages or very small scale). Key themes were that absolute clarity must be provided to businesses and consumers in terms of what the charge includes and how it is expected to be implemented. Charges must be wide reaching to see the greatest impact, and they also benefit from the inclusion of complementary measures including consumer awareness raising, and provision of reusables. Waivers and exemptions have been applied in several cases, as has phased or delayed enforcement.

Issues linked to a charge on single-use cups can be grouped into themes of:

- Logistics - lack of alternatives to single-use for drive-through contexts without implementing a reusable cup load scheme, small business capacity to adapt to a charge alongside other impacts such as energy price increases,
- Clarity - lack of understanding around what cups are eligible for the charge, how the charge works alongside other legislation such as mandatory takeback within Packaging Extended Producer Responsibility,
- Material use - switch to either un-tested new materials, or back to cheaper plastics, and
- The current economic landscape and cost of living crisis.

Solutions focused on providing clarity to both consumers and businesses, as well as increasing education and improving public procurement processes.

3 Introduction

Scottish Government has committed to aligning with or exceeding the EU Directive on single use plastics² (EU SUPD) where able to do so and in a manner that contributes towards maintaining and advancing standards. Article 4 of the Directive requires necessary measures to be taken to achieve an ambitious and sustained reduction in the consumption of single-use plastic cups for beverages (and food containers)³. A ban on some of the most problematic items, including single-use cups made of expanded polystyrene (EPS), came into force in Scotland in June 2022⁴. The Expert Panel on Environmental Charging and Other Measures (EPECOM) was established in May 2018 to provide advice to Scottish Ministers on charges or other measures which may be adopted to enable a circular economy in Scotland by encouraging long-term and sustainable change in consumer and producer behaviour. EPECOM's first report, published in July 2019, recommended the introduction of a national charge for single-use beverage cups while also advising that there is no single measure that will effectively tackle the issues surrounding single-use beverage cups but instead a suite of measures is required across key stakeholder groups⁵.

Having accepted EPECOM's core recommendations, Scottish Government consulted on proposals to take powers to charge for single-use items in a consultation on proposed legislation for a Circular Economy Bill in 2019; broad support was shown for these proposals⁶. Scottish Government consulted further on this matter in 2022 as part of the Delivering Scotland's circular economy - proposed Circular Economy Bill: consultation⁷.

In March 2022, following delays linked to the pandemic, Scottish Government announced the intention to move forward with a charge for single-use disposable beverage cups in order to reduce consumption of single-use items, and reduce littering. Scottish Government is being supported in this process by an Advisory Group⁸ which is comprised of sector representatives that reflect the interests across the single-use cup supply chain and beyond⁹. This group will help inform decisions about how a charge could be implemented.

To ensure the impacts of a charge are fully understood, Resource Futures was contracted by Zero Waste Scotland to research the single-use beverage cup market in Scotland and explore the impact of measures to tackle the dependence on, and environmental impact of, single-use disposable beverage cups in Scotland. This research, together with the advice from the Advisory Group, will help to inform how a national mandatory minimum price charge for single-use disposable beverage cups could be applied in Scotland, including what single-use cups it could cover and how it could be implemented alongside other measures recommended by EPECOM.

This report aims to provide an understanding of the total number of single-use cups and the market share of the various types of single-use beverage cup placed on the market in Scotland and estimate

² European Union, 2019. Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment. <https://eur-lex.europa.eu/eli/dir/2019/904/oj>

³ European Union, 2019. Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment. <https://eur-lex.europa.eu/eli/dir/2019/904/oj#d1e764-1-1>

⁴ Scottish Government, 2022. Single use plastics ban. <https://www.gov.scot/news/single-use-plastics-ban/>

⁵ EPECOM, 2019. Single-use disposable cups: EPECOM recommendations. [Link](#).

⁶ Scottish Government, 2019. <https://www.gov.scot/publications/delivering-scotlands-circular-economy-proposals-legislation/pages/4/>

⁷ Scottish Government 2022. <https://www.gov.scot/publications/delivering-scotlands-circular-economy-consultation-proposals-circular-economy-bill/pages/5/>

⁸ Scottish Government, 2022. Charges on single-use drinks cups. <https://www.gov.scot/news/charges-on-single-use-drinks-cups/>

⁹ Scottish Government, 2022. Single-use disposable cups charge advisory group: terms of references. <https://www.gov.scot/publications/single-use-disposable-cups-charge-advisory-group-terms-of-reference/>

current and projected consumption trends from 2022 to 2035. It will seek to understand the impact of a Scottish national mandatory minimum price charge for single-use disposable beverage cups, including:

- Expected change in consumption of single-use disposable plastic beverage cups;
- Expected change in consumption of non-plastic single-use disposable beverage cups; and
- Unintended environmental, social, equality, and geographical impacts.

The key objectives of this project are to:

1. Analyse the single-use cup market in Scotland
2. Assess the impact of a Scottish national mandatory minimum price charge for single-use disposable plastic beverage cups
3. Assess the impact of a Scottish national mandatory minimum price charge for all single-use disposable beverage cups
4. Collate a high-level list of any potential issues and relevant solutions that may come to light from the design of a national single-use disposable beverage cup charge for Scotland.

The outputs from this research will help to inform the design and evaluation of the planned charge on single-use disposable beverage cups in Scotland as noted above. It will also inform future impact assessments on a charge for single-use cups.

4 Methodology

4.1 Literature Review

The literature review used online sources to investigate industry and market statistics, trends in consumption of single-use disposable beverage cups and their composition both pre- and post-pandemic, and consumer demand for plastic items. Detail of search methods has been provided in [Appendix A](#). There was very little information on these topics in the public domain.

Studies were available which documented international and UK experience of implementing a charge on single-use plastic items, including best practice and impacts. Sources were also available which informed progress towards the wider recommendations from the EPECOM report. Sources were examined to gather relevant data and information, which was then assessed to determine strength of evidence and relevance to the Scottish context. Assessment criteria included publication type and source (i.e., academic vs grey literature), research age, relevance to policy measure and product type, and geographical context.

4.2 Stakeholder Engagement

Using existing knowledge, internal networks and desk-based research, a list of 94 stakeholders was identified and categorised into key industry groups. These groups were categorised as trade organisations, manufacturers, hospitality, recyclers, collectors, distributors, and non-governmental organisations (NGOs). These groups were further categorised by their operating locations, Scotland, UK, and England. Stakeholders operating in the UK had business activities based in Scotland as well as other parts of the UK. Due to the high number of potential stakeholders within each group, we prioritised the key actors within the industries and/or actors with whom we already had connections. This was to maximise the efficiency of our stakeholder engagement process to ensure the highest possible number of interviews could be conducted within the allocated timeframe.

Following the mapping exercise, the team reached out to identified stakeholders to engage them in the interview process. Sector representatives from trade organisations were contacted first to alert them to

the work, and to request their assistance in making introductions to key manufacturers and hospitality businesses. This was particularly important when it was not possible to find contact details via desk-based research. While every effort was put into obtaining an extensive and diverse sample across stakeholder groups and nations, this was dependent on the willingness of interviewees to take part. Those who did not engage in the project were either unavailable for an interview or declined the opportunity to participate.

In the pre-interim stage of the project, priority was given to trade organisations, manufacturers, distributors and the hospitality sector, as these were considered the key knowledge holders able to inform our understanding of the single-use cups market in Scotland. Collectors, recyclers, distributors, and NGOs were contacted during the post-interim report stage, to help give us an understanding of the remaining objectives of this project, i.e., the potential impacts of a cup charge – any issues and challenges that may arise – and consideration of additional measures. Table 1 outlines the number of stakeholders identified and the total number who have participated in the research. This participation may either be in the form of completing a 1-2-1 interview or providing responses via email.

4.2.1 Survey Design

An interview question template was designed, with questions tailored to reflect the project brief as well as to target specific stakeholder groups ([Appendix B](#)). Key questions we wanted to ask a particular stakeholder were established ahead of contact with the stakeholders. These questions were based on recent press, website articles, or particular business practices which we thought would be of interest to the project. Survey questionnaires were designed to address key data needs.

A shortened stakeholder interview question template was used for stakeholders who were already engaged in the project through the Advisory Group. For ease of use, survey questions were divided into categories; general information on the stakeholder, the market, alternative products, and impacts (equality, geographical, social and environmental). Steps were taken to ensure that all terminology was clear and consistent to facilitate conversations and accurate data collection. Details of individual organisations were researched before each interview took place, to ensure we understood who the stakeholder was and were able to target specific questions to the organisation. For questions that required more background research such as placed on market (POM) figures, the stakeholder was sent an email after the interview had taken place for completion and return.

After each interview had taken place, interview notes were written up into one document ready for analysis and incorporation into the report. Responses from stakeholders were anonymised, e.g., analysis will only identify which industry the stakeholder operates in. Some figures given by stakeholders will also be rounded to avoid being attributed to specific stakeholders.

4.2.2 Groups engaged

4.2.2.1 Trade Organisations

A list of 18 trade organisations was identified, all of which were contacted. One interview from this group was conducted, with a stakeholder operating within the small business sector. A second interview, while booked in, was cancelled by the stakeholder. Although only one interview was conducted, we have successfully been introduced to stakeholders operating in the manufacturing and hospitality sectors via these contacts who were given the opportunity to feed into this research. Of those contacted, one operated in manufacturing, one in facilities management, three in food and drink, one in recovery and recycling, five in hospitality, four in packaging and plastics, one in small business and two in wholesale.

4.2.2.2 Manufacturers

A list of 12 manufacturer stakeholders was identified. From this group, four stakeholders completed a 1-2-1 video call interview, and one participated in the research by supplying data. Of those identified, two manufactured fibre composite single-use cups, three manufactured plastic single-use cups and seven manufactured single-use cups of various materials. Of the stakeholders engaged, two

manufactured fibre composite single-use cups, one manufactured plastic single-use cups and two manufactured single-use cups of various materials.

4.2.2.3 Hospitality

A list of nine hospitality stakeholders was identified. From this group, three stakeholders completed a 1-2-1 video call, one stakeholder participated in the research by supplying data and one stakeholder declined to participate in the research. The Stakeholders ranged across contract catering, fast food, takeout and grocery.

4.2.2.4 Distributor / Wholesaler

A list of 18 potential distributor stakeholders was identified. From this group, one stakeholder completed a 1-2-1 video call and one participated in the research by supplying data. Both stakeholders supplied food, packaging and catering equipment to the catering and hospitality industries.

4.2.2.5 Recyclers

A list of five recyclers was identified, covering fibre composite, beverage cartons, recycled paper, and one specialised in recycling personal hygiene products. They were identified as of interest due to their involvement in the digital watermark's initiative HolyGrail¹⁰. HolyGrail aims to add a digital watermark to consumer goods. The aim being once the item enters a sorting facility, digital technology can detect the watermark and sort the item into corresponding waste streams, resulting in more accurate and efficient waste sorting. From this group, one stakeholder completed a 1-2-1 video call. The stakeholder specialised in paper recycling.

4.2.2.6 NGOs

A list of nine NGO stakeholders was identified. From this group three have completed a 1-2-1 interview. Of those identified, five operate across the UK, three are based in Scotland and one is specific to England. Three NGOs specialised in the marine environment, two in waste and littering, one in packaging, two covered cup recycling and one climate change.

4.2.2.7 Waste Collectors

A list of 22 waste collector stakeholders was identified. Of this group, four were identified as only operating in Scotland. We reached out to these four stakeholders, but none agreed to take part in our research. The remaining 18 were identified as operating in England and out of these 18, four were exclusive to London.

4.2.2.8 Other

We placed one stakeholder in 'other' as we deemed the other categories inappropriate based on their involvement in the single-use cups market. A 1-2-1 interview has been completed with this stakeholder.

¹⁰ AIM – European Brands Association. Digital Watermarks Initiative.
<https://www.digitalwatermarks.eu/>

Table 1: Stakeholder Engagement Summary

Stakeholder Group		Stakeholders Identified	Participating in Research
Trade Organisations	Total	18	1
	England	1	0
	UK	10	1
	Scotland	7	0
Manufacturers	Total	12	5
	England	8	3
	UK	3	1
	Scotland	1	1
Hospitality	Total	9	4
	UK	6	4
	Scotland	3	0
Recyclers	Total	5	1
	England	5	1
Distributor	Total	18	2
	England	14	1
	UK	3	1
	Scotland	1	0
Collector	Total	22	0
	England	14	0
	London	4	0
	Scotland	4	0
NGO	Total	9	3
	England	1	0
	UK	5	2
	Scotland	3	1
Other	Total	1	1
	UK	1	1

5 Cup types

5.1 Plastic definition

In this work, we have counted any single-use cup containing any amount of plastic, including bioplastic, as a plastic cup. This follows the precedent laid out in the guidance relating to the implementation of the Environmental Protection (Single-use Plastic Products) (Scotland) Regulations 2021, which covers products “made wholly or partly from plastic”¹¹.

The EU SUPD definition is more complicated. Plastic is defined as:

- “Polymeric materials to which additives may have been added”, excluding “unmodified natural polymers”, but including “plastics manufactured with modified natural polymers, or plastics manufactured from bio-based, fossil or synthetic starting substances” which are not naturally occurring. This includes “polymer-based rubber items and bio-based and biodegradable plastics regardless of whether they are derived from biomass or are intended to biodegrade over time”¹².

Article 3 of the EU SUPD also states that plastics which function as a main structural component are included. Single-use cups with an aqueous barrier, which are not eligible under the EU SUPD, are considered a plastic cup within this work and definition of plastic as noted above.

5.2 Cup materials

A wide range of plastics are used to create the variety of single-use cups required for the hot and cold drink market. The plastics, uses and qualities in single-use beverage cups are outlined in Table 2. These qualities also apply to lids, which are generally made of either PET (polyethylene terephthalate), PS (polystyrene), PP (polypropylene) or PLA (polylactic acid). PET lids are generally only for cold beverages, while PS lids can be used for hot or cold drinks. Single-use cups made of EPS have now been banned in Scotland, and there has been some debate on whether single-use cups made of extruded polystyrene (XPS) will now replace these. This has also been debated regarding the EU SUPD. It has not been possible to gain clarification on this topic as part of this research, and previous clarifications¹³ have now been refuted. Throughout this research, there was no indication found that XPS single-use cups would be coming to market following the ban on EPS single-use cups.

¹¹ Scottish Government, 2022. Environmental Protection (Single-use Plastic Products) (Scotland) Regulations 2021: guidance. <https://www.gov.scot/publications/environmental-protection-single-use-plastic-products-scotland-regulations-2021-guidance/pages/5/>

¹² European Parliament, 2019. Single Use Plastics Directive. [Link](#).

¹³ Resource Futures, 2019. Preliminary research to assess the impacts of a ban or restrictions in sale in Wales of Items in the EU’s Single Use Plastics Directive. <https://gov.wales/sites/default/files/statistics-and-research/2020-05/impacts-of-a-ban-or-restrictions-in-sale-of-items-in-the-eus-single-use-plastics-directive-summary.pdf>

Table 2: Plastic single-use cup types and qualities

Material	Hot / Cold	Qualities
Non fibre composite single-use cups		
PET	Cold	Lightweight, recyclable, high hardness, high stiffness, good chemical resistance, low price, clear
PP	Hot/Cold	Low price, semi-transparent, flexible, crack-resistant, high melting point
PS	Cold	Rigid, brittle, can be coloured
EPS	Hot	Thermal insulation, lightweight, low price
PLA	Cold	High stiffness, high price, transparent, shatter-proof
Fibre composite single-use cups		
PLA Lining	Hot/Cold	Waterproof, thermal insulation, high price, sturdy, lightweight, compostable
PE Lining	Hot/Cold	Waterproof, thermal insulation
Aqueous barrier lined	Hot/Cold	Ineligible under the EU SUPD, but considered plastic in Scotland (for the purposes of this report)

Due to the definition of plastic in the EU SUPD (section 5.1), cellulosic film is not considered a plastic, whereas cellulose acetate is¹⁴. This material is already being trialled for food packaging in Finland¹⁵, and so could provide a substitute for PE/PLA (polylactic acid) liners for hot single-use cups.

Single-use cups with an aqueous barrier are classed as plastic-free under the EU SUPD, but still contain a small proportion of plastic (approximately 0.75% to 8%)¹⁶. Aqueous barrier technology has been presented as ineligible under the EU SUPD as the barrier is not a structure giving or separable plastic layer¹⁷ - the barrier is applied to the paperboard¹⁸. However, other sources argue that the barrier is integral to the structure of the cup as it forms a watertight seal along the cup seam¹⁹.

Manufacturers state that the aqueous barrier is a non-toxic, chemically adjusted material, of various composition – the exact composition is unknown as manufacturers do not want to lose their competitive advantage by revealing the breakdown of their product²⁰. There are multiple brands of aqueous barrier single-use cups which have been certified under EU food safety regulations for food

¹⁴ Lexology, 2021. New EU Restrictions on Single-Use Plastic Products to Enter into Force. [Link](#).

¹⁵ NS Packaging, 2022. VTT develops transparent cellulose film for food packaging. [Link](#).

¹⁶ Biopak, 2022. Aqueous or “plastic free” cups: why we are proceeding with caution. [Link](#).

¹⁷ Mitsubishi HiTec Paper, 2021. Mitsubishi HiTec Paper comments on the SUPD.

https://www.mitsubishi-paper.com/en/hitec-paper/news/single-news/?tx_news_pi1%5Bnews%5D=516&tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=a2ed1069d2b2397133afa921408d50c6

¹⁸ Verive, 2022. Factsheet: Aqueous Lining, water-based coating.

<https://verive.eu/en/articles/factsheet-aqueous-lining-factsheet-en>

¹⁹ BioPak, 2021. Understanding aqueous/water-based coating.

<https://drive.google.com/file/d/1kIA6S0EJRuOfIBFptmHQJbCQZ2wPpQB/view?usp=sharing>

²⁰ Verive, 2022. Factsheet: Aqueous Lining, water-based coating.

<https://verive.eu/en/articles/factsheet-aqueous-lining-factsheet-en>

contact products, including Verive²¹, Lecta EraCup Natural²² and DeliPac²³. These products are available and being used in Scotland. As these single-use cups do contain plastic, they would be eligible for a national mandatory minimum charge on single-use plastic beverage cups using the Scottish definition of plastic, regardless of the outcome of debates on eligibility (outlined above) at a European level.

Stakeholders were asked about aqueous barrier single-use cups during interviews. One comment was made that aqueous barrier single-use cups are more expensive²⁴. Another comment was that they had not yet been tested for use, but that there were concerns surrounding microplastics and chemical composition²⁵. The recycler interviewed commented that aqueous barrier single-use cups can be recycled, however, there is a risk that microplastics contaminate the recycled paper as well as enter water sources²⁶.

There are very few truly plastic free single-use cups in production. There have been some innovations around single-use edible coffee cups²⁷ and single-use gourd cups²⁸, however these do not have the mass market potential required to provide an alternative to plastic single-use cups, and neither are currently available in Scotland.

As there are currently no plastic free single-use beverage cups being placed on the market in Scotland, and no indication that this will change in the near future, this work has been unable to differentiate the impacts of a charge placed on all single-use cups compared to a charge placed only on single-use plastic cups, when using the definition of plastic intended by Scottish Government.

A charge on single-use plastic cups using the EU SUPD definition could lead to a switch to plastic products and materials with similar impacts but that are technically classified outside the policy definitions, or to non-plastic materials that have other significant environmental impacts (i.e., burden shifting), and unintentionally lead to investment and innovation in the wrong direction. A charge on single-use plastic cups using the Scottish Government definition of plastic as used by the Environmental Protection (Single-use Plastic Products) (Scotland) Regulations 2021 (as noted above) mitigates the first risk but provides no protection against risk from moving to non-plastic single-use cups. However, as one stakeholder indicated that plastic in some form was the only way to ensure the structural integrity of a cup holding a liquid²⁹, this is not seen to be a large risk given current understanding. Stakeholder views on the impact of a charge on single-use plastic cups including on innovation and material switching are outlined in section 7.2.

A charge on all single-use cups would mitigate the risk of material switching to any other single-use product and support the goals of pushing material up the waste hierarchy by further supporting reuse. However, it then may miss opportunities for beneficial non-plastic single-use innovation that does have suitable environmental benefits and convenience.

²¹ Verive, 2022. Factsheet: Aqueous Lining, water-based coating. <https://verive.eu/en/articles/factsheet-aqueous-lining-factsheet-en>

²² Lecta. EraCup Natural. <https://www.lecta.com/en/products/food-service-board/eracup-natural>

²³ DeliPac. Delipac Cup. <https://www.delipac.com/delipac-cup>

²⁴ Interview with Distributor, August 2022

²⁵ Interview with Manufacturer, August 2022

²⁶ Interview with Manufacturer, August 2022

²⁷ Twiice. Edible Cups. <https://twiice.co.nz/>

²⁸ Colossal, 2020. Gourds Grown in Vessel-Shaped Molds Become Reusable Cups and Flasks. <https://www.thisiscolossal.com/2020/04/jun-aizaki-gourd-cups/>

²⁹ Interview with hospitality business, August 2022.

6 Market analysis of single-use beverage cups and lids in Scotland

6.1 Estimate of single-use cups and lids POM

6.1.1 Estimates in the literature

Estimates of single-use cups placed on the market annually in Scotland range from 200 million to 478 million³⁰. In some cases, the year these figures relate to is unclear. The lower estimate of 200 million single-use cups appears to be derived from a *Which?* Consumer report from 2011 which calculated that 2.5 billion single-use coffee cups are used in the UK annually³¹. This figure is frequently quoted by the UK Government³² and in the media, yet the report is no longer available online. It is therefore unclear how this figure was calculated, and it is likely outdated, as more recent estimates are higher. Estimates of single-use cup usage in the UK have been reported as high as 5 billion for single-use coffee cups and 10 billion for all single-use cups, however, it is also unclear how these figures were derived.³³

Only one report, published by VALPAK in 2021,³⁴ provided an estimate of the material composition of single-use cups POM in the UK and Scotland. They interviewed 32 key stakeholders between December 2020 and January 2021 to gather information on the number of single-use cups and lids placed on the market in the UK. These figures were cross-checked using a bottom-up approach from two databases which hold information on packaging direct from suppliers and information held internally. The UK figure was then split by nation proportionate with population, with Scotland accounting for 8% of all single-use plastic cups and lids. It was estimated that 400 million ($\pm 12\%$) single-use cups and 200 million ($\pm 12\%$) single-use lids were POM in Scotland.

6.1.2 Approach to estimating POM figures

As the VALPAK³⁵ report provided the most detailed data to date, this was used as a starting point for calculating POM figures for single-use cups and lids in Scotland. As outlined in Table 3, it was assumed that Scotland accounts for 9% of the UK figure for single-use cups POM provided in the VALPAK report.

Market data was provided by one manufacturer, one distributor and one hospitality outlet that provided further insight into the material composition of single-use cups POM in the Scotland.

Interviewees from other distributors and manufacturers also estimated the market share of different single-use cups by material. These figures were used to cross-check those provided in the VALPAK report and new estimates were made where new insight was given.

Data in the public domain and from stakeholder interviews conducted during this project largely supported figures reported in the VALPAK report. For this report, their estimates on the number of PP, PS, EPS and non-PE (polyethylene) lined single-use cups POM in the UK were used.

³⁰ Keep Scotland Beautiful, 2020. *Glasgow Cup Movement: Phase One Overview* https://www.keepsotlandbeautiful.org/media/1566638/cup-movement-phase-one-overview_final-161020.pdf

³¹ UK Parliament, 2017 *Coffee cup waste in the UK*.

<https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/65705.htm>

³² House of Commons Environmental Audit Committee, 2017 *Disposable Packaging: Coffee Cups* <https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/657.pdf>

³³ Parliament (2017) *Written evidence submitted by Eunomia Research & Consulting Ltd*.

http://data.parliament.uk/WrittenEvidence/CommitteeEvidence.svc/EvidenceDocument/Environmental%20Audit/Packaging/written/49826.html#_ftn20

³⁴ VALPAK, 2021. *Single-use Cups and On-the-Go Fibre-composite Food Packaging*

<https://wrap.org.uk/sites/default/files/2022-02/WRAP-fibre%20composite%20packaging%20report.pdf>

³⁵ VALPAK, 2021. *Single-use Cups and On-the-Go Fibre-composite Food Packaging*

<https://wrap.org.uk/sites/default/files/2022-02/WRAP-fibre%20composite%20packaging%20report.pdf>

Data from stakeholders showed that the number of single-use PET cups POM in Scotland is likely to be higher than that estimated in the VALPAK report. Between the three organisations who shared market data, 5.1 million single-use PET cups were POM in Scotland in 2021-22. As outlined in Table 3, the organisations' estimates of their market share were used to scale these figures to a national estimate.

The market data shared as part of this report also provided numbers of PLA, PLA lined and aqueous barrier single-use cups POM by these organisations. The previous VALPAK report referenced the availability of these products but was unable to quantify the market share of these materials with their data. The interviews with stakeholders were used make assumptions on the number of single-use cups made from these materials, as outlined in Table 3. A new dataset was acquired as part of this work which provides estimated market data for aqueous barrier single-use cups in Scotland, putting the figure around 2 million.

The average weight of eight types of single-use cups commercially available on the market were taken to inform assumptions of the weight of fibre composite and non-fibre composite single-use cups as outlined in Table 3. Assumptions on the weight of the lining was taken from estimates in the literature. Total weight and plastic weight of single-use cups were then estimated from the number of single-use cups POM.

The number of single-use lids POM were estimated as a proportion of single-use cups placed on the market, as outlined in Table 3. These estimates were informed from stakeholder interviews. It was assumed that single-use cups made from PLA would most likely have single-use lids made from PLA. Assumptions made on the material composition of the other single-use lids are outlined in Table 3.

Table 3: Summary of assumptions which inform estimates of single-use cups and lids POM in Scotland

Assumption	Rationale
All single-use cups	
9% of single-use cups POM in the UK were POM in Scotland	Whilst 8% of the UK's population lives in Scotland, the Scottish regional gross value-added contribution of the UK hospitality sector has been estimated to be between 7-9% ³⁶ . This was cross-checked with the proportion of retail stores for the largest coffee and fast-food chains, approximately 10% of which are based in Scotland ³⁷ .
Non-fibre composite single-use cups	
6 million PLA single-use cups were POM	Market data provided by one stakeholder outlined that they placed approximately 24 million PLA and PLA lined fibre composite single-use cups on the market in 2021-22 and approximately 11% of these were cold single-use cups, which were assumed to be made wholly of PLA. This number was scaled up to account for other manufacturers of PLA single-use cups.

³⁶ VALPAK, 2021. *Single-use Cups and On-the-Go Fibre-composite Food Packaging* <https://wrap.org.uk/sites/default/files/2022-02/WRAP-fibre%20composite%20packaging%20report.pdf>

³⁷ Scrape Hero, 2022 *Reports on location data*. https://www.scrapehero.com/location-reports/?country=UK&reports=location_report&toggle=uk-report

Assumption	Rationale
8.2 million PET single-use cups were POM	Market data provided by three stakeholders ³⁸ outlined that approximately 5 million PET single-use cups were placed on the market in 2021-22. One of these stakeholders indicated that they have approximately 40% of the share for informal eating out and fast-food restaurants. It was also assumed that 97% of single-use cups POM are in the hospitality industry with the remaining 3% being consumer purchases from other retail eg self-serve machines ³⁹ . The number of PET single-use cups and market share estimates from each stakeholder were used to estimate the total number POM in Scotland.
That estimates of PS, PP and EPS single-use cup POM in the UK by VALPAK are correct	Interviews and market data from stakeholders, supported the estimates made by VALPAK in their 2021 report. For this report, the UK estimates were used and a 9% nation split for Scotland was applied as stated above.
Non-fibre composite cup weighs 11g	The average weight of eight non-fibre composite plastic single-use cups commercially available on the market were taken to inform this assumption. ⁴⁰
Fibre composite single-use cups	
225.4 million PE lined single-use cups were POM	Market data provided by three stakeholders ⁴¹ outlined that approximately 97 million PE lined single-use cups were placed on the market in 2021-22. The number of PE lined single-use cups were estimated in the same way as PET single-use cups (see above). During interviews, manufacturers and distributors of single-use cups stated that the majority available commercially are PE lined fibre composite single-use cups.
2 million aqueous barrier lined single-use cups were POM	Market data provided by one stakeholder ⁴² outlined that approximately 2 million aqueous barrier cups were placed on the market in Scotland in 2021-22. Other stakeholders interviewed indicated that they were aware of aqueous barrier single-use cups, but that they thought their market share was minimal. It was therefore assumed that the number of aqueous barrier single-use cups POM was not higher than 2 million
Estimates of non-PE lined single-use cups POM in the VALPAK report were assumed to be lined with PLA	The VALPAK report estimated that fibre composite single-use cups were made of 91% paper, 7% PE and 2% non-PE plastic lining. This assumption assumes that all fibre composite single-use cups are lined with plastic. For the purpose of this report, it was assumed that all non-PE lined fibre composite single-use cups were lined with PLA.
A fibre composite cup weighs 12g and its lining weighs 0.9g	The average weight of eight single-use fibre composite cups commercially available on the market were taken to estimate the weight of an average fibre composite cup ^{43,44} . It has been estimated that between 5% ⁴⁵ and 10% ⁴⁶ of the cup weight is made from plastic, the mid-point of which (7.5%) was taken to inform the assumption of the lining's weight.

³⁸ Interviews with one manufacturer, one distributor and one hospitality outlet, July and August 2022

³⁹ VALPAK, 2021. *Single-use Cups and On-the-Go Fibre-composite Food Packaging* <https://wrap.org.uk/sites/default/files/2022-02/WRAP-fibre%20composite%20packaging%20report.pdf>

⁴⁰ Nisbets (accessed 5 August 2022) <http://www.nisbets.co.uk/>

⁴¹ Interviews with one manufacturer, one distributor and one hospitality outlet, July and August 2022

⁴² Interview with distributor August 2022

⁴³ Nisbets (accessed 5 August 2022) <http://www.nisbets.co.uk>

⁴⁴ Advanced Disposables (accessed 5 August 2022) <https://www.advanceddisposables.co.uk/>

⁴⁵ Cropper J., (Undated) *Cup Cycling* <https://media.jamescropper.com/web-assets/CupCycling.pdf>

⁴⁶ VALPAK, 2021. *Single-use Cups and On-the-Go Fibre-composite Food Packaging* <https://wrap.org.uk/sites/default/files/2022-02/WRAP-fibre%20composite%20packaging%20report.pdf>

Assumption	Rationale
Lids	
Half the number of lids as cups are placed on the market	It has been estimated that there are between 33% ⁴⁷ and 66% ⁴⁸ the number of lids to cups POM (mid-point estimate 50%).
72% of lids are made of PS, 18% are made from PLA, 9% are made from PET and 1% are made from PP.	Data in the public domain and interviews with stakeholders estimate that lids for fibre composite cups and single-use cups for hot beverages are predominately ⁴⁹ or wholly ⁵⁰ made from PS, whilst single-use lids for cold beverages are predominately made from PET, with a small proportion made from PP ⁵¹ . Stakeholders were asked for an approximate split between single-use cups POM designed for hot and cold beverages. Answers ranged from 40-90% of single-use cups were designed to hold hot beverages ⁵² . However, our scoping report and stakeholder engagement highlighted that PLA lids are available on the market. Data supplied at this stage has been used to estimate the proportion of the market share made up by PLA lids ⁵³ .
Lid weighs 3g	The average weight of six single-use cup lids available commercially on the market were taken. ⁵⁴

6.1.3 Results

An estimated 388.7 million single-use cups were placed on the market in Scotland in 2021-22, which equates to 71 single-use cups per capita per year (Table 4). In comparison, estimates of single-use cup usage worldwide range between 65⁵⁵ and 85⁵⁶ per capita. In country per capita single-use cup usage has been estimated at 23 single-use coffee cups in Germany,⁵⁷ 40 single-use coffee cups in Ireland⁵⁸ and 70 single-use coffee cups in France.⁵⁹ These estimates are likely to be based on partial data or estimated from coffee sales. Some of these figures were also estimated over ten years ago, and the market is likely to have changed since then. Our POM estimates are on the higher end of what has been estimated in other countries. Of the single-use cups estimated as POM in Scotland, it has

⁴⁷ Interview with Manufacturer, July 2022.

⁴⁸ Interview with Hospitality Outlet, August 2022

⁴⁹ VALPAK, 2021. *Single-use Cups and On-the-Go Fibre-composite Food Packaging* <https://wrap.org.uk/sites/default/files/2022-02/WRAP-fibre%20composite%20packaging%20report.pdf>

⁵⁰ Interview with Manufacturer, July 2022.

⁵¹ Interview with Manufacturer, July 2022.

⁵² Interview with one manufacturer, two distributors and a hospitality outlet, July and August 2022.

⁵³ Interview with Manufacturer, August 2022

⁵⁴ Nisbets (accessed 5 August 2022) <http://www.nisbets.co.uk/>

⁵⁵ UNEP (2021) *Single-use beverage cups and their alternatives* https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-_LCA-Beverage-Cups-Report_Web.pdf

⁵⁶ International coffee organisation (2011) *Press release: International Coffee Agreement 2007 comes into force.* <http://www.ico.org/documents/pr-274e-ica2007.pdf>

⁵⁷ Umwelt Bundesamt (2019) *Go for the reusable cup, not the disposable, when it comes to coffee cups et al.* <https://www.umweltbundesamt.de/en/press/pressinformation/go-for-the-reusable-not-the-disposable-when-it#:~:text=Use%20of%20disposable%20cups%20could,too%20often%20in%20the%20environment.&ext=German%20consumers%20use%202.8%20billion,of%2023%20cups%20per%20person.>

⁵⁸ My Waste (2018) *22,000 coffee cups disposed of in Ireland every hour.*

<https://www.mywaste.ie/news/22-000-coffee-cups-disposed-of-in-ireland-every-hour/>

⁵⁹ CNN (2016) *France becomes first country to ban plastic cups and plates* <https://edition.cnn.com/2016/09/19/europe/france-bans-plastic-cups-plates/index.html>

been estimated that 290.8 million of these were fibre composite single-use cups, which accounts for 75% of market share (Figure 1).

PE lined single-use cups were the most abundant by total weight (all materials) and number of single-use cups, making up 58% of the market share by number of single-use cups (Figure 1). Although fibre composite single-use cups are heavier than non-fibre composite single-use cups, this is attributed to the weight of the paperboard. By weight of plastic, PS was the most abundant material, with an estimated 416 tonnes of plastic placed on the market.

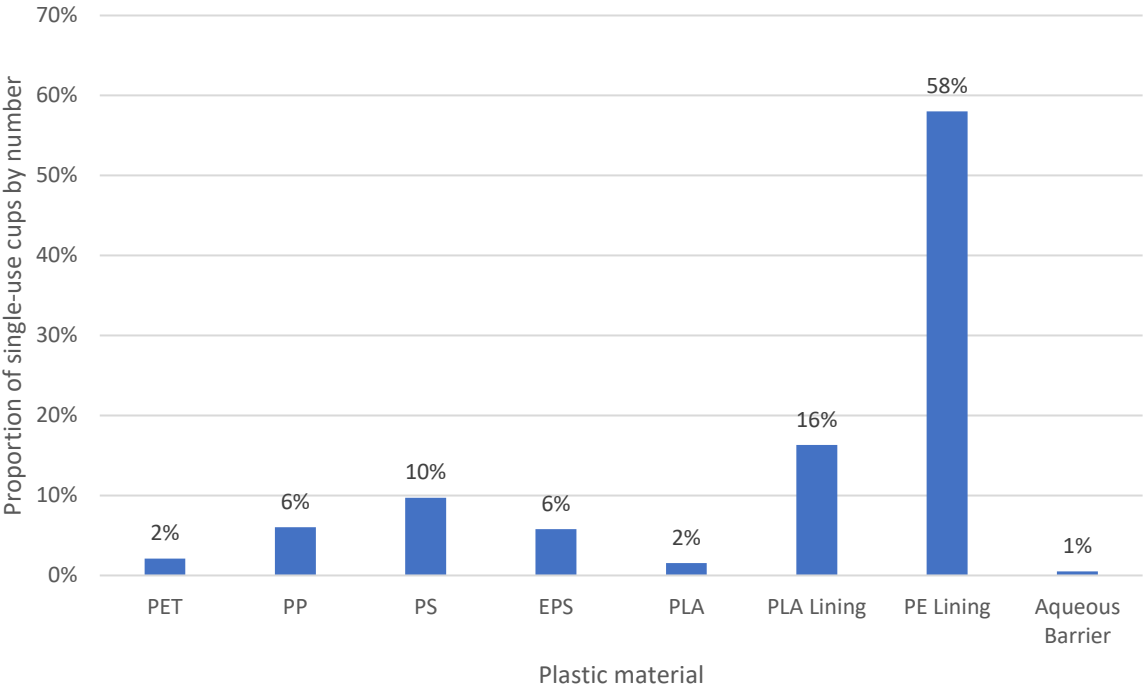
There were an estimated 63.4 million PLA lined single-use cups and 6 million PLA single-use cups on the market, which account for a combined 18% of the market share. Previous estimates by VALPAK acknowledged that PLA was commercially available, however VALPAK were unable to quantify its presence on the market in the UK. PLA and PLA lined single-use cups were on the market in Scotland at the time the VALPAK report was published, however, there has also been an increase in these materials in recent years⁶⁰. One stakeholder mentioned they had seen an increase on demand for PLA single-use cups. They estimated that there was a 15-20% annual increase in these single-use cups prior to the pandemic and since the VALPAK report was published. During the interview it was not mentioned what was driving the increased demand.

Table 4: Estimate of number and weight of single-use cups placed on the market in Scotland in 2021-22

Material	Number (million)	Total weight (T)	Weight of Plastic (T)
Non fibre composite single-use cups			
PS	37.8	415.8	415.8
PP	23.4	257.4	257.4
EPS	22.5	247.5	247.5
PET	8.2	90.4	90.4
PLA	6.0	66.0	66.0
Fibre composite single-use cups			
PE Lining	225.4	2,705.2	202.9
PLA Lining	63.4	760.3	57.0
Aqueous Barrier	2.0	24.0	1.8
Total	388.7	4,566.6	1,338.8

⁶⁰ Interview with two manufacturers, August 2022

Figure 1: Estimated proportion of single-use cups (by number) placed on the market in Scotland (2021/22) by plastic material



An estimated 194.4 million lids were placed on the market in 2021-22, which were predominately made from PS (Table 5). PS is a stiff material and therefore provides good functionality by holding the cup better, making them popular for hot drinks.⁶¹ The VALPAK report estimated that most lids were made of PET or PS; and acknowledged that PP is another material lids could be made from. One stakeholder said there is an interest in moving to PP lids as they are more easily recyclable, however, they are more flexible, and accidents are more likely to happen. This provides concerns over liability for accidents and customer value.⁶² PET and PP lids are more popular for cold drinks, which make a smaller percentage of the market share (Table 5).⁶³

The number of PLA lids has not been previously quantified in the literature; however, it is likely that their usage has increased in line with demand for compostable single-use cups as manufacturers of PLA single-use cups also manufacture PLA lids. It has been estimated that 18% of all lids are made from PLA.

Table 5: Estimate of number and weight of single-use lids placed on the market in Scotland in 2022

Material	Number (million)	Total weight (T)
PS	139.9	419.8
PLA	35.0	105.0
PET	17.5	52.5
PP	1.9	5.8

⁶¹ Interview with Manufacturer, July 2022.

⁶² Interview with Manufacturer, July 2022.

⁶³ Interview with Manufacturer, July 2022.

Total	194.4	583.1
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The assumptions used to estimate the number and weight of single-use cups POM in Scotland were chosen to give a conservative estimate. It should be acknowledged that there is uncertainty in these figures. The number of single-use plastic cups POM was partly estimated from market data shared by three stakeholders and their estimated market share. The other estimates were taken from the 2021 VALPAK report, which gave a $\pm 9\%$ uncertainty in their POM figures. Although these figures have been cross-checked, data available in the public domain is limited. There is also a variation in the weight of these products as a result of the size of the cup and no data on the split of single-use cup sizes was collected.

6.2 Market trends without a minimum mandatory charge

6.2.1 Background

To our knowledge, there are no existing models on the trends of single-use cups and lids placed on the market. However, there is data in the public domain that indicates how variables affecting the consumption of single-use cups (for example uptake in reusables) have impacted trends in the past and can be used to inform future modelling. Stakeholders interviewed were also asked about previous trends they have seen in the consumption of single-use cups and material composition and how this could change in the coming years.

Data in the public domain and interviews with stakeholders show that currently 8%⁶⁴ - 12%⁶⁵ of people use reusable cups and this accounts for 1%⁶⁶ - 4%⁶⁷ of all drink sales. Use of reusable cups could be attributed to implementation of environmental messaging, increased environmental awareness, discounts on coffee sales and removal of single-use coffee cups from some businesses.⁶⁸ However, reusable cups are often marketed for hot beverages and there was a perception among those interviewed that there are not suitable on the go alternatives for cold beverages.⁶⁹

There is evidence that there has been a growth in the number of coffee shops⁷⁰ and revenue⁷¹ from these establishments over the past decade, with growth estimated to be up to 10% in the five years preceding the pandemic. However, the methodology from these studies could not be validated. The number and revenue of fast-food outlets have also experienced a similar growth, with revenue estimated to have increased by around 8% in the five years preceding the pandemic.⁷² There has also

⁶⁴ Footprint, 2022. *Foodservice packaging: the pandemic, changing perceptions and future progress.* <https://www.foodservicefootprint.com/wp-content/uploads/2022/03/KP-Packaging-Report-Spreads2.pdf>

⁶⁵ DS Smith, 2019. *DS Smith comes out boxing against coffee cup waste* <https://www.dssmith.com/recycling/about/media-centre/2019/9/ds-smith-comes-out-boxing-against-coffee-cup-waste>

⁶⁶ House of Commons Environmental Audit Committee, 2017 *Disposable Packaging: Coffee Cups* <https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/657.pdf>

⁶⁷ Interview with Hospitality Outlet, August 2022

⁶⁸ Ferreira J, Undated, *Rise of the reusables: steps towards sustainability in coffee cup use* <https://blogs.coventry.ac.uk/researchblog/rise-of-the-reusables-steps-towards-sustainability-in-coffee-cup-use/>

⁶⁹ Interview with two Manufacturers, July and August 2022.

⁷⁰ Statista, 2020. *Number of coffee shops in the United Kingdom (UK) from 2009 to 2019, by type of outlet* <https://www.statista.com/statistics/863362/coffee-shop-numbers-by-outlet-type-united-kingdom-uk/>

⁷¹ IBISworld, 2022. *Cafes & Coffee Shops in the UK – Market Size, 2010 – 2028* <https://www.ibisworld.com/united-kingdom/market-size/cafes-coffee-shops/>

⁷² IBISWorld, 2022 *Takeaway and Fast Food Restaurants in the UK – Market Size 2011-2029* <https://www.ibisworld.com/united-kingdom/market-size/takeaway-fast-food-restaurants/>

been an estimated 28% increase in the number of takeaway businesses in Scotland between 2010 and 2018.⁷³

The COVID-19 pandemic impacted the consumption of single-use cups because of the temporary closure of the hospitality sector during lockdown as well as permanent closure of establishments as a result of the loss of business.⁷⁴ An increase in working from home is also likely to change consumption patterns. It is unclear at the time of writing this report how this industry will recover or permanently change as a result of the pandemic. However, some estimates have predicted that revenue will recover to pre-pandemic levels within a couple of years.⁷⁵

Although more hospitality outlets were closed during the pandemic, there was also a decrease in the usage of reusable cups⁷⁶. Whilst cups in general were shown to be poor transmitters of the virus, many takeaway outlets did not allow reusable cups and it is unclear the long-term effects this will have on behaviour^{77, 78}.

Interviews with stakeholders also indicated that there has been an increased demand for single-use cups and lids made from compostable materials and that this demand is likely to continue to increase.⁷⁹ One manufacturer said PLA cup sales prior to the pandemic were increasing, but this demand increased even more during the pandemic as a result of the reduction of reusable cup usage.

The use of single-use cups could also be different among different demographics. Understanding of this behaviour is limited⁸⁰, however, it is thought that tourists are less likely to bring a reusable cup due to space in their luggage or different cultural practices. In 2019, Scotland received 3,460 thousand international visitors⁸¹. Although this was a 7% decrease on the previous year, Scotland has seen a 35% growth in international visitors between 2009 and 2019.

6.2.2 Approach to estimating market trends

The POM figures estimated, which are presented in section 6.1.3, were used as a baseline for 2022. A model was developed to estimate the number, weight, and composition of single-use cups POM over the next 13 years, to 2035. This time period was chosen to compare POM figures over ten years if a minimum charge were to be introduced in 2025 (see section 7.1.2). Three scenarios were established to estimate a low, medium, and high baseline estimate of single-use cups and lids on the market without a mandatory charge. As outlined in Table 6, it was assumed that in all scenarios, single-use cup consumption would change at the same rate as the population. It was also assumed that the implementation of a ban on expanded polystyrene single-use cups in June 2022 would lead to a material shift to fibre composite single-use cups (Table 6).

⁷³ SPICe Spotlight, 2019. *Fast food booming – a cause for concern?* <https://spice-spotlight.scot/2019/08/07/fast-food-booming-a-cause-for-concern/#:~:text=Scotland%20had%20over%203%2C500%20takeaway,per%20100%2C000%20people%20was%2052>.

⁷⁴ Interview with two manufacturers, July and August 2022.

⁷⁵ IBISWorld, 2022. *Cafes & Coffee Shops in the UK – Market Size, 2010 – 2028* <https://www.ibisworld.com/united-kingdom/market-size/cafes-coffee-shops/>

⁷⁶ British Coffee Association (accessed August 2022) *Reusable vs Disposable Cups During COVID-19* <https://britishcoffeeassociation.org/reusable-vs-disposable-cups-during-covid-19/>

⁷⁷ Keep Cup (accessed September 2022) *Health Expert Statement Addressing Safety of Reusables and COVID-19* <https://storage.googleapis.com/planet4-international-stateless/2020/06/26618dd6-health-expert-statement-reusables-safety.pdf>

⁷⁸ Keep Cup (accessed August 2022) *Clean Hands. Clean Keep Cup.* <https://uk.keepcup.com/cleankeepcup>

⁷⁹ Interview with one manufacturer and one distributor, August 2022.

⁸⁰ Nicolau J. L., Stadthanner K. A., Andreu L., Font X. (2022) *Explaining the willingness of consumers to bring their own reusable coffee cups under the condition of monetary incentives.* <https://www.sciencedirect.com/science/article/pii/S0969698922000017>

⁸¹ VisitScotland [Last Accessed September 2022] *International Visitors.* <https://www.visitscotland.org/research-insights/about-our-visitors/international>

Table 6: General assumptions for estimates of single-use cups and lids POM in Scotland (2023-2035), without the implementation of a minimum charge.

Assumption	Rationale
Single-use cup consumption is relative to population of individuals aged 16+	The principal projection from the 2020-based population projections for Scotland were used to account for change in cup usage across all scenarios ⁸² . It was assumed that most single-use cups were consumed by adults (aged 16 and over) and therefore the number POM would be relative to the adult population.
Banning of EPS single use cups will cause a shift to purchasing single-use cups made from other materials, but will not produce a decrease in demand for single-use cups in general	EPS single-use cups on the market prior to the single-use plastics ban in June 2022, were used for hot beverages. It will be assumed that the same number of single-use cups will be purchased, but they will all be plastic lined fibre composite single-use cups. It is assumed that 78% of these will be lined with PE and 22% will be lined with PLA. This composition split was derived from the VALPAK ⁸³ report as outlined in Table 3.

Table 7 outlines the different assumptions across the low, medium, and high baseline scenarios. These scenarios were chosen to model possible single-use cup and lid usage that could arise as the result of market changes and a material shift away from non-compostable materials to PLA and PLA lined single-use cups.

As outlined in Table 3 above, the same assumptions on the number of single-use lids and the weight of single-use cups and lids were made in modelling the trends. It was assumed that there are half the number of lids placed on the market as single-use cups; 72% of which were made of PS, 18% of PLA, 9% of PET and 1% of PP (Table 3, above). It was also assumed that each fibre composite cup weighs 12g, each plastic lining weighs 0.9g, each non-fibre composite single-use cups weighs 11g and each lid weighs 3g (Table 3, above).

⁸² National Records of Scotland (2022) *Projected population of Scotland (2020-based)* <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-projections/population-projections-scotland/2020-based>

⁸³ VALPAK, 2021. *Single-use Cups and On-the-Go Fibre-composite Food Packaging* <https://wrap.org.uk/sites/default/files/2022-02/WRAP-fibre%20composite%20packaging%20report.pdf>

Table 7: Assumptions for low, medium and high estimates of single-use cups and lids POM in Scotland from 2023 to 2035, without the implementation of a minimum charge.

Assumption	Low	Medium	High
Single-use cup consumption will change as the result of changes in reusable cup uptake and changes in the beverage market (for example, opening/closing of hospitality outlets, change in behaviours that lead to increased/decreased consumption of beverages or increase/decrease in the number of tourists).	-1% of base year POM linear increase per annum Rationale: There is no increase in reusable cup usage and there is a decrease in hot and cold beverage consumption as the result of lifestyle changes attributed to the pandemic (such as increased home working)	1% of base year POM linear increase per annum Rationale: There is a small increase in reusable cup usage and there is slow recovery of the beverage market from the pandemic.	3% of base year POM linear increase per annum Rationale: there is an increase in reusable cup usage and the cold and hot beverage market has returned to pre-pandemic levels.
Increase in PLA single-use cups	No change	1% linear increase of base year POM figures per annum	5% linear increase of base year POM figures per annum
Increase in PLA lined single-use cups	No change	1% linear increase of base year POM figures per annum	5% linear increase of base year POM figures per annum

When developing the assumptions for the baseline projections in the beverage market, the change in market share of the fast food⁸⁴ and coffee shop⁸⁵ industries seen in previous years was used to predict potential future changes accounting, where possible, for potential anomalies during pandemic years. These calculations were combined with learnings from stakeholder interviews to reach the assumptions for the low, medium and high baseline scenarios outlined in Table 7.

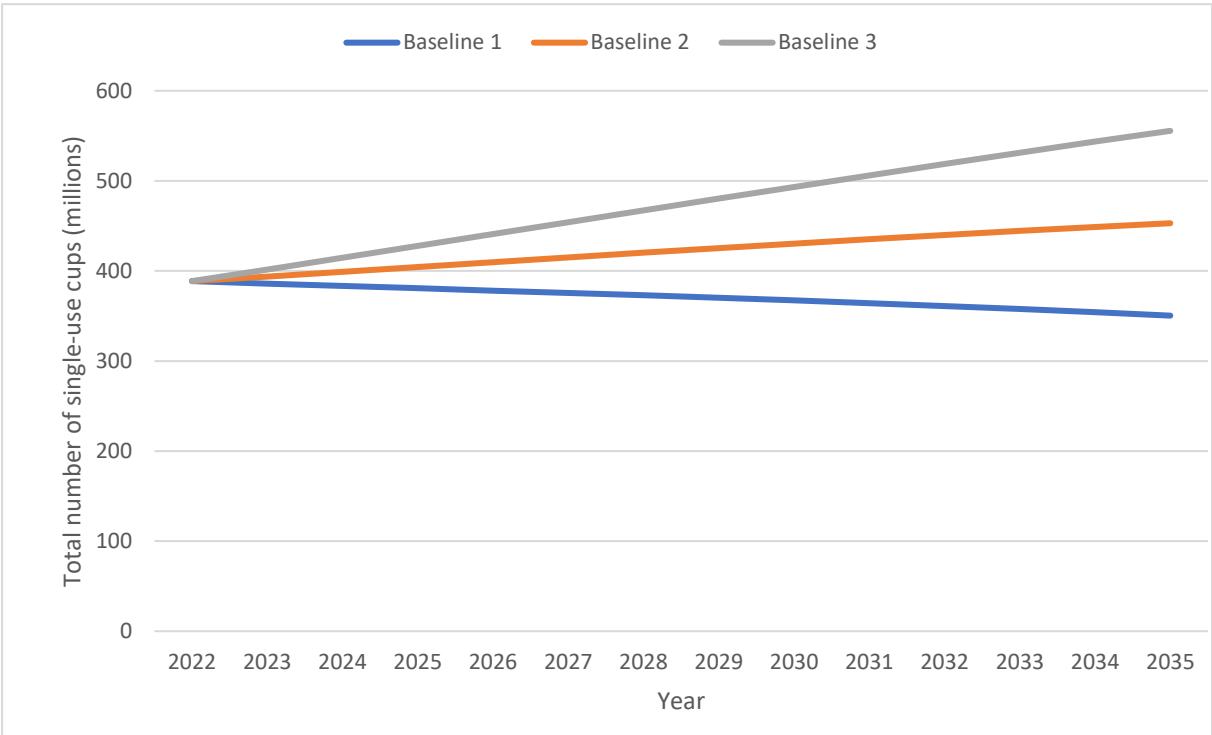
6.2.3 Results

It has been estimated that the low growth scenario will lead to a 9.9% reduction in the number of single-use cups from 388.7 million in 2022 to 350.4 million single-use cups in 2035 (Figure 2). The medium growth and high growth scenarios will lead to a 16.5% and 42.9% increase in the number of single-use cups respectively. This results in an estimated 453.0 million single-use cups on the market in 2035 under the medium growth scenario, and 555.5 million under the high growth (Figure 2).

⁸⁴ Ibis World, 2022. Takeaway & Fast-Food Restaurants in the UK – Market Size 2011–2029. <https://www.ibisworld.com/united-kingdom/market-size/takeaway-fast-food-restaurants/>

⁸⁵ Ibis World, 2022. Cafes & Coffee Shops in the UK – Market Size 2011–2029. <https://www.ibisworld.com/united-kingdom/market-size/cafes-coffee-shops/>

Figure 2: Estimated change in the number of single-use cups placed on market in Scotland (2022-2035) if no charge is implemented.



There will be a change in the materials of single-use cups placed on the market by 2035 (Table 8). Due to the ban on EPS single-use cups, there will be a shift to other materials. It has also been estimated that there will be an increase in PLA and PLA lined single-use cups, however, PLA single-use cups still make up a small proportion of the market by 2035. PE lined single-use cups remain the most common material on the market across all of the scenarios. PS single-use cups will still be the most abundant material by weight of plastic across all three scenarios.

Table 8: Estimate of number and weight of single-use cups placed on the market in Scotland in 2035

Material	Numbers (million)			Weight of Plastic (T)		
	Low	Medium	High	Low	Medium	High
Non-fibre composite single-use cups						
PS	34.1	43.8	52.7	374.8	481.6	579.3
PP	21.1	27.0	32.1	232.0	297.0	352.9
PET	7.4	9.3	10.4	81.5	102.4	114.3
PLA	5.4	7.8	12.7	59.5	85.7	139.2
EPS	0	0	0	0	0	0
Fibre composite single-use cups						
PE Lining	219.0	274.1	300.9	197.1	246.7	270.8
PLA Lining	61.6	88.7	144.0	55.4	79.8	129.6
Aqueous Barrier	1.8	2.3	2.9	1.6	2.1	2.6
Total	353.3	450.0	546.6	1,003.0	1,290.6	1,578.1

It is estimated that there could be between 176.7 million and 273.3 million lids placed on the market in 2035 (Table 9). As the same assumptions were used on the material composition of lids in 2035 as in 2022, it has been estimated that there is not a change in material composition. One stakeholder indicated that there may be a shift to lids made from PP as it is more recyclable, however, more data is needed to understand this potential shift.⁸⁶

Table 9: Estimate of number and weight of single-use lids placed on the market in Scotland in 2035

Material	Number (million)			Weight of Plastic (T)		
	Low	Medium	High	Low	Medium	High
PS	127.2	162.0	196.8	381.6	486.0	590.4
PLA	31.8	40.5	49.2	95.4	121.5	147.6
PET	15.9	20.3	24.6	47.7	60.7	73.8
PP	1.8	2.3	2.7	5.3	6.7	8.2
Total	176.7	225.0	273.3	530.0	675.0	820.0

⁸⁶ Interview with Manufacturer, August 2022.

6.3 Scottish supply chain

There has been little published data or information forthcoming on the Scottish supply chain for single-use cups. The information gathered from interviews with distributors and manufacturers has shown that single-use cups are mainly manufactured in the UK in Wales and England, and internationally in Germany, Ireland, Taiwan, China, Cambodia, Indonesia, India and Spain⁸⁷. Recycled plastic content to manufacture single-use cups is also being sourced from Germany and Belgium⁸⁸. It is clear that this is an international supply chain.

7 Impact of a Scottish national mandatory minimum price charge for single-use disposable plastic beverage cups

7.1 Impact of a minimum charge on single-use cup consumption

7.1.1 Data on minimum charges

The medium baseline growth scenario described in section 6.2.3 will be used as a baseline against which to model the impacts of a minimum charge to 2035, as this was the most representative of the three scenarios. Previous studies have shown that the implementation of a charge leads to an increase in the uptake of reusable cups.

Several studies have looked at how a charge could impact the consumption of single-use plastic cups. A summary of these can be found in Table 10. Charges for these trials ranged from 5p⁸⁹ to 25p.⁹⁰ All of these trials led to an increase in the usage of reusable cups with an average of a 19% decrease in single-use cup sales over the trial period.⁹¹ It should be noted that these trials are short, with all lasting 1 year or less and many taking place on university campuses which are likely to have different consumer habits than the general public. It should also be noted that these trials predominately focused on cafes and hot beverages. Whilst reusable alternatives exist for cold beverages, most reusable cups are currently marketed for hot beverages and this could impact the uptake of reusables for cold beverages.⁹² For example, when the term 'reusable cup' is searched for on Google, all but one of the results on the first page refers to 'coffee cups' and of more than 40 images on the first page, less than 10 appear designed for cold beverages (i.e. they have visible straws and are not thermally insulated).⁹³ Across the stakeholders interviewed as part of this work, the average split between hot and cold single-use cups sold was 62% hot single-use cups and 38% single-use cold cups, but this ranged from 75% to 29% hot single-use cups, and considerable seasonal variation is seen.

There are few examples of long-term trials or charges being implemented. Edinburgh University implemented a 25p charge which resulted in a 37% decrease in disposable single-use cup usage over the first year (Table 10). This decrease is higher than those seen in other trials. Stakeholders interviewed were asked what they thought the impact a charge would have on reusable cup usage, and one said they thought it would be a challenge to achieve 15% of consumers using reusable cups.⁹⁴

⁸⁷ Interviews with Hospitality sector and manufacturers, August 2022.

⁸⁸ Interview with Distributor, August 2022

⁸⁹ Hubbub, 2018. *Starbucks rolls out 5p paper cup charge to all stores across Britain.*

<https://www.hubbub.org.uk/Blog/starbucks-rolls-out-5p-paper-cup-charge-to-all-stores-across-britain>

⁹⁰ Poortinga W, 2017. *Results of a field experiment to reduce coffee cup waste.*

<https://orca.cardiff.ac.uk/id/eprint/99366/>

⁹¹ Lenaghan M., Clark W., Middlemass T. 2019 *Cups sold separately: Field trial and evidence review of disposable cup charges* <https://www.zerowastescotland.org.uk/research-evaluation/cups-sold-separately>

⁹² Interview with Manufacturer and Hospitality, August 2022.

⁹³ Google search 'reusable cup', conducted 7 October 2022.

⁹⁴ Interview with Hospitality, August 2022

Table 10 Summary of studies which have trialled a charge on single-use cups

Study	Charge	Trial Length	% of sales made with single-use cups		
			Before Trial	End of Trial	Decrease
Starbucks ⁹⁵	5p	12 weeks	98%	94%	-4%
Zero Waste Scotland (Organisation 2) ⁹⁶	10p	5 weeks	99%	95%	-4%
Fisher ⁹⁷	25 cents (22p)	6 weeks	97%	92%	-5%
Latimer ⁹⁸	15 cents (11p)	5 weeks	99%	94%	-5%
Poortinga ⁹⁹	25p	12 weeks	95%	83%	-13%
Poortinga and Whitaker (2018) ¹⁰⁰	25p	12 weeks	95%	83%	-13%
Poortinga and Whitaker (2017) ¹⁰¹	25p	5 weeks	79%	67%	-15%
Sidhu et al. ¹⁰²	25 cents (22p)	1 year	95%	76%	-20%

⁹⁵ Hubbub (2018) *Starbucks rolls out 5p paper cup charge to all stores across Britain*. <https://www.hubbub.org.uk/Blog/starbucks-rolls-out-5p-paper-cup-charge-to-all-stores-across-britain> [Accessed 27 June 2022]

⁹⁶ Lenaghan M., Clark W., Middlemass T. (2019) *Cups sold separately: Field trial and evidence review of disposable cup charges*, Zero Waste Scotland. <https://www.zerowastescotland.org.uk/sites/default/files/Cups%20Sold%20Separately%20-%20final2.pdf>

⁹⁷ Fisher (2008) *Signalling change: Studying the effect of price signals on disposable hot beverage cup consumption*, Thesis. Tufts University https://kipdf.com/signaling-change-studying-the-effect-of-price-signals-on-disposable-hot-beverage_5acc6ea67f8b9a74588b464e.html

⁹⁸ Latimer (2016) *Paying the price of disposable cups at caffe strada*. <https://serc.berkeley.edu/paying-the-price-of-disposable-cups-at-caffe-strada>

⁹⁹ Poortinga (2017) *Results of a field experiment to reduce coffee cup waste*. <https://orca.cardiff.ac.uk/id/eprint/99366/1/Coffee%20cup%20summary%20report%20-%20Poortinga%20%28FINAL%29.pdf>

¹⁰⁰ Poortinga and Whitaker (2018) *Promoting the Use of Reusable Coffee Cups through Environmental Messaging, the Provision of Alternatives and Financial Incentives* <https://www.mdpi.com/2071-1050/10/3/873>

¹⁰¹ Lenaghan M., Clark W., Middlemass T. (2019) *Cups sold separately: Field trial and evidence review of disposable cup charges*, Zero Waste Scotland. <https://www.zerowastescotland.org.uk/sites/default/files/Cups%20Sold%20Separately%20-%20final2.pdf>

¹⁰² Sidhu M., Mehrotra, K., Hu K. (2018) *Single-use items reduction: Disposable cups* <https://open.library.ubc.ca/soa/cIRcle/collections/undergraduateresearch/18861/items/1.0387025>

Study	Charge	Trial Length	% of sales made with single-use cups		
			Before Trial	End of Trial	Decrease
Zero Waste Scotland (Organisation 1) ¹⁰³	5p	5 weeks	30%	10%	-20%
University of Edinburgh ¹⁰⁴	25p	1 year	73%	54%	-26%
Crosshouse University Hospital ¹⁰⁵	10p	5 weeks	99%	57%	-42%

Although there are few examples of charges on single-use cups that we can draw on, there are learnings that we can take from charges that have been implemented on single-use carrier bags. In the UK, these charges were introduced in 2015 and have led to a 75% reduction in the number of bags consumed.¹⁰⁶ The rate of decrease more than halved between 2018-19 and 2019-20 (44% reduction), and 2019-20 and 2021-22¹⁰⁷ (21% reduction).¹⁰⁸ There are multiple factors this could be attributed to:

- COVID
- Natural tailing off in the additional behaviour change effect the bag charge creates each year
- Reporting changes: for example, the types of bags reported has changed over the time period.

We assume that the rate of change will show a similar profile for single-use plastic cups, however the impact is likely to be much lower due to the on-the-go nature of beverage purchasing¹⁰⁹. One stakeholder in the cup manufacturing industry highlighted a surcharge for single-use cups will not be prohibitive to purchasing. This stakeholder suggested that whilst carrier bag charges have driven a behaviour change, there is a small nuance in the likelihood that charges on single-use cups will simply be viewed as "part of the cost" rather than an additional charge, and as such, accepted by the public as a price increase. A stakeholder in the hospitality sector said a financial incentive wasn't the primary driver it was convenience. Even when consumers are environmentally minded, they still don't change their behaviour because they need convenience.

¹⁰³ Lenaghan M., Clark W., Middlemass T. (2019) *Cups sold separately: Field trial and evidence review of disposable cup charges*, Zero Waste Scotland.

<https://www.zerowastescotland.org.uk/sites/default/files/Cups%20Sold%20Separately%20-%20final2.pdf>

¹⁰⁴ Edinburgh University (2020) *Disposable cup charged raised from 25p to 30p on campus*.

[Accessed 27 June 2022] <https://www.ed.ac.uk/sustainability/news/2019/cup-charge-30p>

¹⁰⁵ Lenaghan M., Clark W., Middlemass T. (2019) *Cups sold separately: Field trial and evidence review of disposable cup charges*, Zero Waste Scotland.

<https://www.zerowastescotland.org.uk/sites/default/files/Cups%20Sold%20Separately%20-%20final2.pdf>

¹⁰⁶ Data.gov.uk, 2022. *Single-use plastic carrier bags charge data for England*.

<https://www.data.gov.uk/dataset/682843a8-168c-4056-b6fe-741161a39f60/single-use-plastic-carrier-bags-charge-data-for-england>

¹⁰⁷ 2020-21 is not comparable to previous years due to reporting changes linked to the pandemic

¹⁰⁸ Data.gov.uk, 2022. *Single-use plastic carrier bags charge data for England*.

<https://www.data.gov.uk/dataset/682843a8-168c-4056-b6fe-741161a39f60/single-use-plastic-carrier-bags-charge-data-for-england>

¹⁰⁹

It was therefore assumed that there would be a higher decrease in the number of single-use cups placed on the market when the charge is first introduced compared to subsequent years (Table 11).

7.1.2 Approach to estimating the impact of a minimum charge

Scottish Government plans to introduce a minimum charge on single-use disposable beverage cups by 2025. The medium baseline scenario will be used as a baseline against which to model the impacts of a minimum charge over ten years to 2035. The medium baseline scenario was chosen as it is the middle of the three baseline scenarios modelled. Taking learnings from the plastic bag charge, it is assumed that decrease in the consumption of single-use cups will be highest in the first two years after the charge is implemented and this reduction will ultimately plateau. The annual reductions in cup consumption modelled to illustrate the potential impact of a charge on single-use cups are outlined in Table 11. The assumptions outlined in Table 3 (above) were used to estimate the number of lids on the market if a minimum charge is introduced.

Table 11: Modelled annual reduction in single-use cups POM in Scotland over the next ten years if a minimum charge and no other measures are implemented (2025-2035)

	Scenario 1	Scenario 2	Scenario 3
Decrease in single-use cups POM in 2026 and 2027	3%	6.5%	10%
Decrease in single-use cups POM in 2028 and 2029	2%	3.5%	5%
Decrease in single-use cups POM in 2030-2035	1%	2%	3%

The modelled annual reductions in cup consumption (Table 11) are built from estimates based on results from short-term pilots of cup charges, five-year trends following the introduction of the single-use plastic carrier bag charge in England, and stakeholder insights on the potential impacts of a charge. Scenario 2 provides a central estimate, and scenarios 1 and 3 bracket this estimate to represent plausible variations in projected impacts, reflecting uncertainty in the central assumptions. Scenario modelling is based on best available data to represent a charge without supporting measures such as a reusable cup deposit schemes to improve convenience.

7.1.3 Results

All three scenarios modelling the impact of a minimum charge on single-use cups led to a decrease in single-use cups placed on the market in the first 10 years of a charge to 2035, compared to the increase that is estimated if no charge is implemented. The scenarios led to the following reduction:

- Scenario 1: 15.4% reduction in the number of single-use cups placed on the market by 2035, which is equal to 62.1 million single-use cups. This is 24.4% less than estimated for the same year (medium baseline estimate) if a charge wasn't implemented.
- Scenario 2: 28.3% reduction in the number of single-use cups placed on the market by 2035, which is equal to 114.2 million single-use cups. This is 36% less than estimated for the same year (medium baseline estimate) if a charge wasn't implemented.
- Scenario 3: 39.4% reduction in the number of single-use cups placed on the market by 2035, which is equal to 159.4 million single-use cups. This is 45.9% less than estimated for the same year (medium baseline estimate) if a charge wasn't implemented.

Figure 3: Estimated change in the number of single-use cups POM in Scotland (2022-2035) across three scenarios if a charge is implemented, compared to no charge

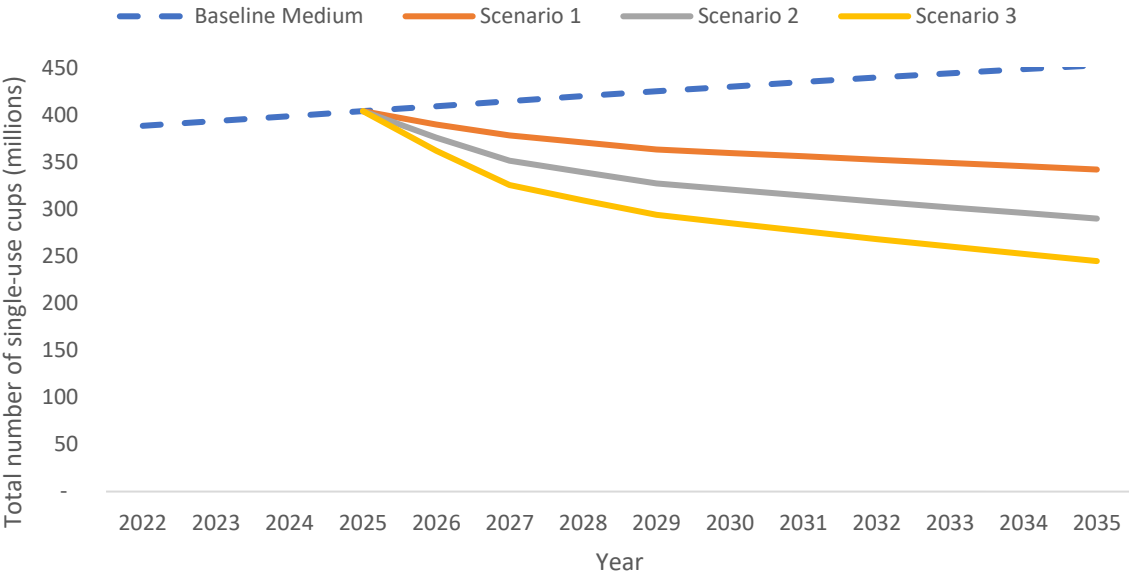


Table 12 shows the impact of a minimum charge on the material composition of single-use cups POM in 2035. There will be more fibre composite single-use cups POM than non-fibre composite single-use cups. Single-use cups made with PE lining will still be the most abundant by number of single-use cups and whole cup weight and single-use cups made from PS will still be the most abundant by weight of plastic.

Table 12: Estimate of number and weight of single-use cups placed on the market in Scotland in 2035, after 10 years of a minimum charge

Material	Numbers (million)			Weight of Plastic (T)		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
Non-fibre composite single-use cups						
PS	33.4	28.3	23.9	367.4	311.4	263.0
PP	20.7	17.5	14.8	227.2	192.6	162.6
PET	7.2	6.1	5.2	79.5	67.4	56.9
PLA	5.5	4.6	3.9	60.1	51.0	43.0
EPS	0	0	0	0	0	0
Fibre composite single-use cups						
PE Lining	213.3	180.8	152.6	191.9	162.7	137.4
PLA Lining	62.2	52.7	44.5	56.0	47.5	40.1
Aqueous Barrier	1.8	1.5	1.3	1.6	1.4	1.1
Total	342.2	290.1	245.0	983.7	833.9	704.1
Reduction from Baseline (medium projection)	24%	36%	46%	24%	36%	46%

Table 13 shows the impact of a minimum charge on the material composition of single-use lids POM in 2035. PS lids will still be the most abundant by number and weight of plastic.

Table 13: Estimate of number and weight of single-use lids placed on the market in Scotland in 2035, after 10 years of a minimum charge

Material	Number (million)			Weight of Plastic (T)		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
PS	123.0	108.8	88.0	369.0	326.3	264.1
PLA	30.7	27.2	22.0	30.5	81.6	66.0
PET	15.4	13.6	11.0	46.1	40.8	33.0
PP	1.7	1.5	1.2	5.1	4.5	3.7
Total	170.8	151.0	122.3	450.7	453.1	366.8
Reduction from Baseline (medium projection)	24%	36%	46%	24%	36%	46%

7.2 Expected consumption change of single-use disposable non-plastic cups

As discussed in section 5.2, there are no plastic free single-use cups known to be placed on the market in Scotland. There was no indication from stakeholders that this would change with the introduction of a charge on single-use plastic cups, with one stakeholder indicating that plastic in some form was the only way to ensure the structural integrity of a cup holding a liquid¹¹⁰.

Two hospitality businesses expressed confusion as to what would be allowed and what would not be allowed under the introduction of a charge on single-use cups. It is apparent among all stakeholders that there is confusion about what can be classed as a non-plastic single-use cup and what is classed as a single-use plastic cup. Aqueous barrier single-use cups were one of the main options posited as an alternative, as these are not eligible under the EU SUPD (see section 5.2), however these would still be charged under Scotland's charge for single-use plastic beverage cups. When this was explained to stakeholders, there were concerns that this would stifle innovation and development. One stakeholder¹¹¹ mentioned that a charge on single-use plastic cups would push the development of new technologies compared to if there were no charge. However, the same stakeholder expressed concern that a charge on all single-use cups regardless of technology (i.e., material) would inhibit development and not allow customers to know the difference between good and bad technologies.

While innovation around single-use plastic cup development may be stifled by a charge, there remains significant opportunities for innovation with a broader focus – such as reuse-return schemes and ensuring efficiencies and convenience in new systems, as opposed to material innovations.

One manufacturer mentioned that the introduction of the charge would decrease the incentive for retailers to invest in materially better products. Instead, brands will buy cheap single-use cups from abroad to make more margin on their products, especially if the consumer will have to pay more for beverages.

Another manufacturer said the charge would force untested less sustainable products onto the market before sufficient research is conducted on how they will perform at the end of their life. Two NGOs mentioned that alternatives to single-use plastic cups are not always good. Although often created

¹¹⁰ Interview with hospitality business, August 2022.

¹¹¹ Interview with Distributor, August 2022

with good environmental intentions, these alternative products have often not been designed with a clear vision or future wider use. There is indirect pressure from consumers on some companies to develop products too quickly that are not fully considered in the wider waste collection context.

7.3 Stakeholder insights on the impact of a charge on plastic single-use beverage cups

The stakeholder interviews provided the following insights:

- **Policy information and understanding gaps** - Many stakeholders were not clear on plans by Scottish Government to introduce a charge on single-use cups and the current stage of policy development and consultation.
- **Appetite for policy intervention** - Stakeholders interviewed were predominantly either against a charge or did not provide a conclusive statement regarding their attitude to a charge.
- **Mixed views on the impact on single-use cup usage** – Views varied on the behaviour change effect (reduction in drinks sales, moving to reusables, or new product innovation) and the scale of impacts.
- **Limited negative impact to UK manufacturers** – As, for some interviewees, Scotland generally comprises a small proportion of their market.
- **Unintended consequences** – A charge could lead to fewer drinks sales, particularly with the current cost-of-living crisis and may also affect private companies desire to fund single-use cup recycling initiatives and reduce recycling of single-use cups.
- **Uneven distribution of impacts** - It will be difficult to offer reusable products in food and drink delivery markets (such as Deliveroo).

7.4 Unintended environmental consequences

The key objective of implementing a charge on single-use plastic beverage cups is to move both retailers and consumers up the waste hierarchy, supporting a shift to a more circular economy¹¹² (Figure 4).

Figure 4: Waste Hierarchy (EPECOM)¹¹³



Our consumption of single-use cups has increased significantly over recent years and with this the negative environmental impacts. Many single-use cups are littered - an estimated half a million single-use coffee cups are littered every day in the UK¹¹⁴. Environmental impacts of plastic litter are

¹¹² Scottish Government, 2021. Charges on single-use drinks cups.
<https://www.gov.scot/news/charges-on-single-use-drinks-cups/>

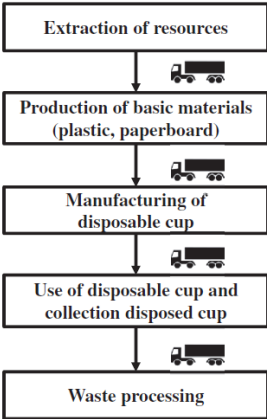
¹¹³ EPECOM, 2019. Single-use disposable cups: EPECOM recommendations.
<https://www.sustainabilityexchange.ac.uk/files/expert-panel-environmental-charging-measures-recommendations-single-use-disposable-beverage-cups.pdf>

¹¹⁴ Environmental Audit Committee, 2018. House of Commons Environmental Audit Committee

significant and varied. Larger plastic pieces such as fishing nets and grocery bags are a danger to wildlife and can lead to choking and physical damage. There is also risk with smaller plastic pieces (microplastics), these can be ingested by animals and then passed through the entire food chain, potentially contaminating human food sources. In addition to these physical risks, toxic additives, such as colour and texture agents, are harmful when released from plastics. Plastic litter, on a larger scale, can be moved from place to place by ocean currents. This litter can carry bacteria or invasive organisms with it, taking foreign species to new or isolated regions and potentially disturbing fragile ecosystems. Plastic litter also affects the tourism industry as the aesthetic degradation of the coastlines deters tourists.

The waterproof lining used on most fibre composite single-use cups is difficult to recycle meaning these often end up in incineration or landfill, contributing to climate change¹¹⁵. Figure 5 shows a simplified life cycle for most single-use cups. Some single-use cups are being collected and recycled through different schemes. Currently this accounts for less than 1% in the UK¹¹⁶, however with changes to packaging EPR and mandatory takeback it is hoped that this figure will increase. The influence of the cup charge has the potential to have environmental impacts across the whole lifecycle.

Figure 5: Simplified life cycle flow of single-use cups¹¹⁷



The charge on single-use disposable beverage cups acts to disincentivise consumption of single-use items, signalling that consumption of single-use items is not desirable, and promoting reuse. It is also a financial driver, so will encourage consumers to choose the alternative, simply to save money.

Disposable Packaging: Coffee Cups

<https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/657.pdf>

¹¹⁵ EPECOM, 2019. Single-use disposable cups: EPECOM recommendations. <https://www.sustainabilityexchange.ac.uk/files/expert-panel-environmental-charging-measures-recommendations-single-use-disposable-beverage-cups.pdf>

¹¹⁶ Environmental Audit Committee, 2018. House of Commons Environmental Audit Committee Disposable Packaging: Coffee Cups

<https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/657.pdf>

¹¹⁷ Harst, 2013, A critical comparison of ten disposable cup LCAs, <https://www.sciencedirect.com/science/article/abs/pii/S0195925513000747>

Charges for single-use disposable beverage cups have recently been brought into place in Vancouver¹¹⁸, and Berkeley¹¹⁹, followed by the wider California area¹²⁰. These schemes have only been in place since 2022, 2020, 2021, respectively, so data on environmental impact both positive and negative has yet to be quantified. This study therefore focusses on theoretical data from life cycle assessments (LCA) or inferred impact from other single-use plastic charges, which are longer established.

7.4.1 *Change of material*

For the purposes of this study, any single-use cup containing any amount of plastic is included as a single-use plastic cup and so would be eligible for a charge in Scotland. This includes more cup types than are captured under the EU SUPD. As such, it may be more likely to encourage a shift to reusable cups, as opposed to an attempt to manufacture single-use cups from another material, therefore avoiding potential impacts of using different disposable materials.

Convenience and ease of single-use items drives consumption. Findings from the impact of the German DRS (deposit return scheme) suggest that the financial deposit alone did not change the market share of single-use vs reusable plastic bottles¹²¹. Similarly in the USA¹²² when a plastic bag ban was introduced, shoppers moved to other stores, which were not so strictly enforcing this ban.

Given this, it is possible that retailers and manufacturers will spend more time finding another suitable single-use material, as opposed to actively encouraging reuse, especially as there are multiple systems and factors required for effective reuse systems that are outside manufacturers immediate control.¹²³

There are very few truly plastic free single-use cups in production. Single-use cups with an aqueous barrier are now being promoted as an alternative to plastic single-use cups, as they are classed as plastic-free under the EU SUPD. As these still contain a small proportion of plastic (approximately 0.75% to 8%¹²⁴), they would still be classed as single-use plastic cups in Scotland.

Given the recent innovation of this barrier, and the aim to protect market share and competitive advantage by the different manufacturers, little information is available on exactly what this barrier is and therefore the potential environmental impacts it could have.

One study investigated the recyclability of single-use cups with 'Water-soluble Polyacrylate-based Polymer'. If this is or is similar to the aqueous barrier championed by manufacturers, this raises some concerns. The study found that although recyclability is theoretically improved by PA's (Polyacrylate) hydrophilic nature, which resulted in less rejection of material, flakes from the coating or barrier

¹¹⁸ City of Vancouver, 2022. Green Vancouver: Cups. <https://vancouver.ca/green-vancouver/cups.aspx>

¹¹⁹ City of Berkeley, 2021. Single-Use Foodware Rules. <https://berkeleyca.gov/doing-business/operating-berkeley/food-service/single-use-foodware-rules>

¹²⁰ Dani Anguiano, 2022. California passes first sweeping US law to reduce single-use plastic. <https://www.theguardian.com/us-news/2022/jun/30/california-single-use-plastic-reduce-law-gavin-newsom>

¹²¹ Sebastian Rhein, 2021. Intended and unintended effects of statutory deposit return schemes for single-use plastic bottles.

https://www.oekom.de/_files_media/zeitschriften/artikel/GAIA_2021_04_250.pdf

¹²² Caliendo, 2013. The economic effect of plastic bag bans.

<https://www.plasticstoday.com/content/economic-effect-plastic-bag-bans/35843076718443>

¹²³ Zero Waste Europe, 2020. Reusable vs Single use packaging a review of environmental impact. https://zerowasteurope.eu/wp-content/uploads/2020/12/zwe_reloop_report_reusable-vs-single-use-packaging-a-review-of-environmental-impact_en.pdf.pdf_v2.pdf

¹²⁴ Biopak, 2022. Aqueous or "plastic free" cups: why we are proceeding with caution. [Link](#).

were more difficult to remove. To remove them required a different technique (kneading and beating) to standard processes.¹²⁵

Currently it is uncertain what the environmental impacts of an aqueous barrier layer would be. Further investigation should be focussed on the potential impacts when littered, particularly in the marine environment. The aqueous nature of this barrier, which is desirable to allow easy processing via traditional paper/card recycling may have negative environmental impacts if lost to the environment.

Despite aqueous barrier single-use cups seeming like the current most likely alternative for single-use plastic cups eligible under the EU SUPD, global stakeholders have expressed some concerns, specifically in relation to microplastics (as the aqueous barrier is made from plastic polymers) and chemical components at the start of life as well as food safety compliance¹²⁶. Though this is a potential area of focus for single-use cups going forward, there is some hesitation around its ability to meet start and end of life credentials, be functional and also meet their high demand.

Though the unintended environmental impacts of single-use cups made with materials such as PLA and other compostable or biodegradable plastic single-use cups may be avoided under Scottish legislation, care should be taken as these consequences are likely to occur as manufacturers search for other non-plastic single-use materials. These could include but are not limited to:

- Contamination of recycling streams
- Confusion by consumers resulting in incorrect disposal
- Continued pollution of marine environments by single-use cups
- Continued littering and the knock-on effects¹²⁷
- Impacts on marine biodiversity loss
- Impacts on industries like tourism, fishing, and shipping.

As a ban is not planned in Scotland, fibre composite single-use cups will still be used. The most significant impact category for single-use fibre composite cups is potential damage to ecosystems. This may arise as their manufacture requires large quantities of cellulose fibres, potentially from unsustainable sources.¹²⁸

The UN Environment Life Cycle Initiative's meta-analysis of single-use cup life cycle assessments concluded that no material consistently performs the best or worst across LCA studies, although some trends are evident:

- fibre composite single-use cups are comparable to rPET (recycled polyethylene terephthalate);
- the impact of paper and bio-plastic single-use cups is lower than that of PS single-use cups;
- the impact of paper single-use cups lined with PE is lower than that of paper single-use cups lined with PLA;

¹²⁵ Tai Ju Lee, 2017. A new potential paper resource: Recyclability of paper cups coated with water-soluble polyacrylate-based polymer.

https://www.researchgate.net/publication/315899320_A_new_potential_paper_resource_Recyclability_of_paper_cups_coated_with_water-soluble_polyacrylate-based_polymer

¹²⁶ Interview with hospitality business, August 2022.

¹²⁷ Packaging News, 2019. Study: 'eco-littering' could blight the UK due to confusion <https://www.packagingnews.co.uk/news/environment/biodegradable-compostable/study-eco-littering-blight-uk-due-confusion-07-11-2019>

¹²⁸ UNEP, 2021. Single-use beverage cups and their alternatives. Recommendations from Life Cycle Assessments. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

- and the impact of wax lined paper single-use cups is lower than PE lined paper single-use cups¹²⁹.

The global warming potential (GWP) both within and across studies supports the conclusion that for single-use cups no one material is consistently better or worse than other materials. The differences in GWP are due to a number of factors, including cup material, cup weight, production processes, waste process, allocation options and data used¹³⁰. For single-use cups, manufacturing was found to be the greatest contributor to negative environmental impacts. Therefore increasing the use of recycled materials to produce single-use cups of any material will substantially reduce fossil fuel resource depletion and impact on climate change of each cup¹³¹. A summary of this impact for key materials is listed below:

- Producing a PP reusable cup with 25% recycled resin reduces the GWP by 27% and fossil fuel resource depletion by 40%.
- Producing a PET reusable cup with 25% recycled resin reduces fossil fuel resource depletion is by 22% but increases the GWP.
- Producing a PLA reusable cup with 25% recycled content reduces the GWP by 35%. PLA recycling is technically feasible but not practised due to the need for it to be collected and recycled separately from fossil fuel based plastics.
- Producing a steel reusable cup with 50% recycled content decreases the GWP by 94% and fossil fuel resource depletion by 97%.

According to another study from the Life Cycle Initiative, if there is a need for single-use option, if it could be ensured that end of life treatment would be recycling and not landfill, the least environmentally harmful choice would be to use fibre composite cups with a PLA lining.¹³²

The end-of-life management of single-use cups is an important contributor to life cycle impact, regardless of material used. Neither recycling, composting, landfilling or incinerating consistently give the lowest life cycle impacts across LCA studies and across all environmental impact categories considered. For all materials, recycling the cups at end-of-life is preferential to landfill; the higher the recycling rate the lower the potential impact on climate change. This has particular significance for fibre composite single-use cups¹³³. The real balance of end points of materials also needs to be considered and achievable capture rates set out as some single-use cups are likely to end up in landfill.

7.4.2 Increased reuse

Unintended environmental consequences as a result of implementing a charge for single-use plastic disposable beverage cups may arise from the impact of reuse. Figure 6 below shows a simplified

¹²⁹ Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

¹³⁰ Van der Harst, E. and Potting, J, 2013. A critical comparison of ten disposable cup LCAs. <https://www.sciencedirect.com/science/article/abs/pii/S0195925513000747>

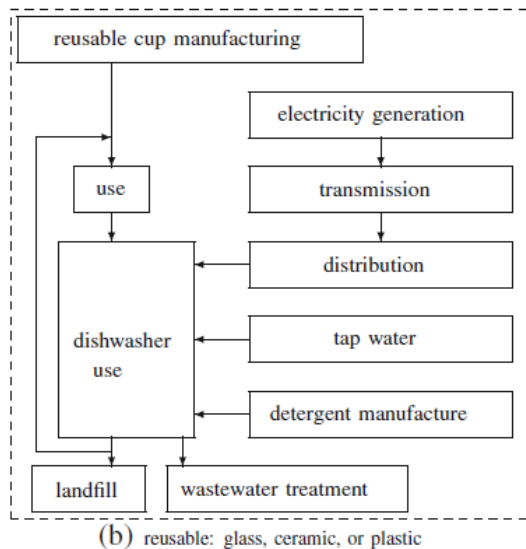
¹³¹ Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

¹³² Alison Watson, 2021. Addressing-SUP-Products-using-LCA https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/Addressing-SUP-Products-using-LCA_UNEP-2021_FINAL-Report-sml.pdf

¹³³ Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

process flow for reusable cups. When comparing this to Figure 5 above the different steps and considerations can clearly be seen.

Figure 6: Simplified process flow of a cup reuse model¹³⁴



By considering this comparison of key phases or steps in the process flow of single-use vs reusable cups it becomes clear that the environmental impact of each is in a different stage.

Currently LCA is the best standard that is used to compare the environmental impact of different beverage cup options. This section bases the comparison of single-use cups and reusable cups on LCA data. However, LCA findings may be subject to limitations resulting from the way in which the LCA method has been applied. Limitations may include:

- Lack of consideration of litter generation and subsequent impact on human health/marine life due to toxic chemicals present in plastic
- Lack of consideration of availability of recycling facilities
- May not effectively or consistently consider resource depletion
- Limited quantification of the true environmental benefits of reuse
- Prioritisation of climate impact, meaning results for other impact categories are often not presented, or are given far less attention ¹³⁵.

7.4.2.1 Summary of LCA findings

Many different LCA's are referenced within this section. Each has different parameters and main conclusions. Though few can be directly compared, due to the different assumptions made and parameters of the study, looking at the findings overall allows for us to see key trends and also identify key considerations to reduce environmental impacts of different products. There are a number of key

¹³⁴ Merugala, L.A. and Bakshi, B.R., 2014. Reusable vs. disposal cups revisited: guidance in life cycle comparisons addressing scenario, model and parameter uncertainties for the US consumer. https://www.researchgate.net/publication/271951563_Reusable_vs_disposable_cups_revisited_Guidance_in_life_cycle_comparisons_addressing_scenario_model_and_parameter_uncertainties_for_the_US_consumer

¹³⁵ Zero Waste Europe, 2020, Reusable vs Single use packaging a review of environmental impact https://zerowasteurope.eu/wp-content/uploads/2020/12/zwe_reloop_report_reusable-vs-single-use-packaging-a-review-of-environmental-impact_en.pdf.pdf_v2.pdf

considerations that should be taken into account when reviewing LCAs, to determine comparability between studies¹³⁶:

- Size and weight of the cup: the larger or heavier the cup, the higher the environmental impact.
- “Add-ons” that sometimes partner with beverage cups, e.g., lids to prevent spilling of drinks or bands, sleeves, or carriers to make the cup more transportable. These will increase environmental impact and be relevant when considering transitioning from single-use to reusable alternatives.
- End of life treatment: the relative impact of this will also differ between materials.
- Consumer behaviour: both in terms of number of uses and washing behaviour.
- Environmental impact indicators used
- Geographical context: influences technologies, energy sources and end of life management.

Table 14 below, briefly summarises key findings from LCA’s referenced. The cups compared in LCA studies were all fairly similar in terms of the size of cup and function, particularly for hot drinks. However, they were less consistent in terms of ‘add-ons’, specifically lids to prevent spilling when transporting hot drinks or bands or sleeves to make the cup more handleable when hot¹³⁷.

The sections following Table 14 review the varied impacts of increased reuse in terms of number of times of reuse, impact of consumer behaviour, and the impacts of energy consumption, manufacturing and waste generation. These sections present the results of previous studies – no primary research has been done through the course of this current study on the topic of environmental impact. As such, different options are presented at different points as the least impactful option, in line with the findings of the report we are quoting. While we cannot say that one type of cup is the least impactful in every situation, it appears that the most effective way to reduce environmental impact is to encourage consumers to reuse their cups as much as possible (regardless of mechanism, i.e. reuse of own cup, participation in reusable cup deposit scheme¹³⁸) for both hot and cold drinks as stated in the UNEP report ‘*overall, reusable cups emerge as the better alternative. . . If consumers are aware and responsible with regards to washing practices and number of reuses, reusable cups are the clear choice*¹³⁹. Where reusable cups are not possible, ensuring recycling of single-use cups is key – in line with the waste hierarchy.

¹³⁶ Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

¹³⁷ Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

¹³⁸ While reuse schemes were not the focus of the report in question, a cup loan scheme can play a role in encouraging reuse habits.

¹³⁹ Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

Table 14: Summary of findings adapted from the Life Cycle Initiative report on key reusable cup LCA studies with green highlighting cups defined as having the lowest climate impact in each study¹⁴⁰

Study	Single-Use Material	Reusable Material	Reusable Material
LCA Studies comparing single-use beverage cups			
A critical comparison of ten disposable cup LCAs <i>Van der Harst, E. and Potting, J. (2013)¹⁴¹</i>	Bio Based PLA Fossil Fuel Based plastic HI-PS; EPS; PP; PET & rPET Plastic PLA lining; PE lining; wax lining		Based on GWP for single-use cups no one material is consistently better or worse than other materials, Differences in GWP are due to a number of factors, including cup material, cup weight, production processes, waste process, allocation options and data used.
LCA studies comparing single-use and reusable beverage cups – HOT drinks			
How small daily choices play a huge role in climate change: The disposable paper cup environmental bane <i>Foteinis, S. (2020)¹⁴²</i>	Plastic PE lining	Plastic PP Cup with Silicone band	Environmental impacts can be minimised by switching to a reusable plastic cup. The reusable cup option has the potential to reduce climate impact by 69% (assuming 500 uses and compared to a landfilled fibre composite cup). If reuse is not an option ensuring correct disposal (recycling) of single-use fibre composite cups could reduce their climate impact by 36% compared to disposal to landfill.

¹⁴⁰ Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

¹⁴¹ Van der Harst, E., Potting, J. and Kroeze, C., 2014. Multiple data sets and modelling choices in a comparative LCA of disposable beverage cups, <https://sci-hub.wf/10.1016/j.scitotenv.2014.06.084>

¹⁴² Foteinis, 2020. How small daily choices play a huge role in climate change: The disposable paper cup environmental bane', <https://www.sciencedirect.com/science/article/abs/pii/S0959652620303413>
10.1016/j.jclepro.2020.120294. -content/uploads/2020/12/zwe_reloop_report_reusable-vs-single-use-packaging-a-review-of-environmental-impact_en.pdf.pdf_v2.pdf

Study	Single-Use Material	Reusable Material	Reusable Material
<p>Taking a closer look at paper cups for coffee</p> <p><i>VTT (2019)</i>¹⁴³</p>	<p>Plastic PE lining; PLA lining with and without PS lid</p>	<p>Plastic PP cup with silicone band Other Stainless Steel</p>	<p>If recycling of fibre composite single-use cups exceeds 80% or if washing of reusable cups between uses is inefficient (e.g., if washed in an older or partially loaded dishwasher) fibre composite single-use cups can be a better option in terms of climate impact than reusable cups. Number of reuses considered was 1000, but breakeven point was much lower (from 20-26 for the PP cup, and 130 for the stainless-steel cup).</p>
<p>Join the reusable revolution</p> <p><i>CupClub (2018)</i>¹⁴⁴</p>	<p>Fossil Fuel Based plastic EPS with PS lid Plastic PE liner and PS lid; PLA liner and PLA lid</p>	<p>Plastic PP cup with LDPE lid Other Ceramic</p>	<p>The PP plastic cup with lid (CupClub) is favourable to single use cups in most scenarios. It has a lower environmental impact than single use fibre composite single-use cups across all environmental impact categories and has lower environmental impacts than the single-use polystyrene cups in certain impact categories. Number of reuses considered was 132.</p>
<p>Case Study: Ceramic cup vs. Paper cup</p> <p><i>Martin, S., Bunsen, J. and Ciroth, A. (2018)</i>¹⁴⁵</p>	<p>Plastic PE lining and PS Plastic PE lining and PS lid</p>	<p>Other Ceramic, with and without rubber lid – washed in dishwasher Other Ceramic, with rubber lid – washed by hand</p>	<p>Reusable cups are recommended for hot drinks. Consideration must be given to the washing method (dishwasher or handwashing) and water temperature as these will influence the overall environmental impacts of the reusable cup. Number of reuses considered was 750, but breakeven point was much lower (11-89 uses).</p>

¹⁴³ VTT, 2019. Taking a closer look at paper cups for coffee. <https://www.huhtamaki.com/globalassets/global/highlights/responsibility/taking-a-closer-look-at-paper-cups-for-coffee.pdf>

¹⁴⁴ CupClub, 2018. Join the reusable revolution. <https://drive.google.com/file/d/1C5Qzx31HQnVPg-EyglzR3PRDteQH5SfK/view>

¹⁴⁵ Martin, S., Bunsen, J. and Ciroth, A, 2018. Case Study: Ceramic cup vs. Paper cup. https://www.researchgate.net/publication/345642567_Assessment_of_the_environmental_break-even_point_for_deposit_return_systems_through_an_LCA_analysis_of_single-use_and_reusable_cups

Study	Single-Use Material	Reusable Material	Reusable Material
<p>Reusable coffee cups life cycle assessment and benchmark</p> <p><i>Almeida, J., Pellec, M. L. and Bengtsson, J. (2018)¹⁴⁶</i></p>	<p>Plastic PE lining and PS lid; PLA lining and PLA lid</p>	<p>Plastic PP cup and lid, with and without silicone band</p> <p>Other Melamine and bamboo cup with silicone lid and band; Glass cup with silicone or cork band and rubber lid</p>	<p>KeepCups, bamboo and PP cups perform better compared to single-use cups when considering GWP and energy indicators. However, they have much higher water consumption as a result of washing. The GWP of the three KeepCups and the bamboo cup are relatively similar and are 88% lower than the fibre composite cup with PLA lining. One year's worth of reuse was considered, with breakeven from 10 to 24 uses.</p>
<p>Reusable vs. disposable cups revisited: guidance in life cycle comparisons addressing scenario, model, and parameter uncertainties for the US consumer</p> <p><i>Woods, L. and Bakshi, B. R. (2014)¹⁴⁷</i></p>	<p>Fossil Fuel Based plastic EPS</p>	<p>Other Ceramic</p>	<p>As availability of natural gas and renewables in the regional electricity grid mixes increases and inefficient dishwashers are replaced with newer models, reusable cups become an increasingly better option. Currently reusable cups perform better in terms of their climate impact across most regions of the United States compared to single-use polystyrene cups. Number of reuses considered was 500, with breakeven point between 60 and 670 uses.</p>
<p>LCA studies comparing single-use and reusable beverage cups – COLD drinks</p>			

¹⁴⁶ Almeida, J., Pellec, M. L. and Bengtsson, J. (2018) Reusable coffee cups life cycle assessment and benchmark. <https://au.keepcup.com/media/KeepCup%20LCA%20Report.pdf>

¹⁴⁷ Woods, L. and Bakshi, B. R., 2014. Reusable vs. disposable cups revisited: guidance in life cycle comparisons addressing scenario, model, and parameter uncertainties for the US consumer. <https://link.springer.com/article/10.1007/s11367-013-0697-7>

Study	Single-Use Material	Reusable Material	Reusable Material
<p>Choice of materials for takeaway beverage cups towards a circular economy</p> <p><i>Changwichan, K. and Gheewala, S. H. (2020)¹⁴⁸</i></p>	<p>Biobased PLA</p> <p>Fossil Fuel Based plastic PP PET</p>	<p>Other Stainless steel with plastic lid</p>	<p>Stainless steel reusable cups consistently perform well. Both handwashed and machine-washed stainless-steel cups have lower potential contribution to climate change than the plastic alternatives. However, it is only handwashed reusable stainless-steel reusable cups that have lower environmental impacts compared to single-use PP, PET and PLA. Inclusion of recycled materials decreases the impacts of all cup types, with the stainless-steel reusable cup showing the largest reductions. Recycling at end-of-life also significantly decreases the potential climate and human toxicity impact of the PP and PET cups. Number of reuses considered was 260, with breakeven point between 20 and 115 reuses.</p>
<p>Life cycle assessment and eco-efficiency analysis of drinking cups used at public events</p> <p><i>Vercalsteren, A., Spirinckx, C. and Geerken, T. (2010)¹⁴⁹</i></p>	<p>Indoor Events</p> <p>Biobased: PLA</p> <p>Fossil Fuel Based plastic: PP</p> <p>Plastic: PE coating</p> <p>Outdoor Events</p> <p>Biobased: PLA</p> <p>Fossil Fuel Based plastic: PP</p> <p>Plastic: PE coating</p>	<p>Indoor Events</p> <p>Plastic PC (polycarbonate)</p> <p>Outdoor Events</p> <p>Plastic PC</p>	<p>This LCA demonstrates that there is no one size fits all approach to single use cup reduction. There is no single best option for both events. The eco-efficiency analysis shows that the reusable PC cup has the lowest environmental impacts at small events, although the costs are higher than single-use cups.</p>

¹⁴⁸ Changwichan, K. and Gheewala, S. H., 2020. Choice of materials for takeaway beverage cups towards a circular economy. <https://www.sciencedirect.com/science/article/abs/pii/S2352550919304725>

¹⁴⁹ Vercalsteren, A., Spirinckx, C. and Geerken, T., 2010. Life cycle assessment and eco-efficiency analysis of drinking cups used at public events. <https://link.springer.com/article/10.1007/s11367-009-0143-z>

7.4.2.2 Consumer behaviour

Consumer behaviour is a much larger factor when considering the impact of reuse in comparison to single-use disposable cups. The Life Cycle Initiative, as commissioned by UNEP¹⁵⁰ sets out the different best-case options for single-use vs reusable cups based on 'eco conscious' consumer behaviour, or the 'indifferent' consumer. In order to decide which cup is best placed for an individual situation, consideration should be given to:

- Likelihood of efficient washing
- Likelihood of cup reuse
- Likelihood of littering
- Likelihood of correct disposal.

It is possible to influence human behaviour and therefore change the assumptions made in this study (i.e., the indifferent consumer who is washing inefficiently, and inefficiently reuses cups), for example through education campaigns, creating a nationwide simple system for reusables, and promoting its use through incentives. Changing these behaviours may reduce the comparative environmental impact of reusable cups.

7.4.2.3 Times of reuse

While reusable cups have lower impacts than single-use cups across most impact categories, this is contingent on the number of uses of the reusable cup. It has been found that most LCA studies determine a breakeven point between 10 and 670 uses depending on the materials compared, washing assumptions and end-of-life assumptions¹⁵¹.

Most LCAs stating that reusable cups are preferable to single-use cups work from a baseline assumption that cups are reused 500 times. The more a reusable cup is reused, the greater it's environmental benefit in comparison to a single-use cup. However, reusable PP cups only have to be used 21 times to breakeven with a PE lined fibre composite single-use cup if the fibre composite single-use cup is landfilled after use, and 41 times if the fibre composite single-use cup is recycled after use¹⁵². An NGO interviewed as part of this work said the percentage of cup recycling is very low with most single-use cups going into general waste. A hot beverage retailer mentioned their largest problem with recycling single-use cups is that over 90% of single-use cups they sell are leaving their premises, meaning they have no control over recycling, however this is likely to improve through mandatory takeback within Packaging EPR. In all cases discussed in this section, the number of reuses required to breakeven is well within the assumed life span of the reusable cups¹⁵³, and as outlined in Table 14, is below the total number of uses assumed. Research conducted by Hubbub suggests that consumers are not consistently using their reusable cup. It was found that over two-thirds (69%) of people have their own reusable coffee cup but only 1 in 6 say they remember to use them every time they buy a hot drink¹⁵⁴, however this doesn't mean that reusable cups don't reach their breakeven point.

¹⁵⁰ Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

¹⁵¹ Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

¹⁵² Foteinis, 2020. How small daily choices play a huge role in climate change: The disposable paper cup environmental bane', <https://www.sciencedirect.com/science/article/abs/pii/S0959652620303413>

¹⁵³ Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf

¹⁵⁴ Darrel Moore, 2020. Push to double the uptake of reusable cups. <https://www.circularonline.co.uk/news/push-to-double-the-uptake-of-reusable-cups/>
Consumption of Single-use Disposable Beverage Cups in Scotland and Impact of Policy Options

consideration must be given to the likely source of energy for cleaning of reusable items. In Scotland renewable electricity generation is more established than in the US making reusable cups a more favourable option. In 2020, Scotland produced 31.8 TWh of electricity from renewable sources. This is sufficient to power all homes in Scotland for at least 1 year¹⁶². However, Scotland exports renewable electricity, meaning that in 2020 56% of electricity consumed came from renewable sources¹⁶³. If, in the future, energy sources in Scotland continue to move towards more low carbon and renewable sources, the environmental impacts of reuse (e.g., emissions of energy from cup washing) will reduce, and so the relative benefits compared to single-use will increase.

7.4.2.5 Water

The use phase, dominated by washing, is the most significant contributor to the impact of reusable cups, therefore how reusable cups are washed is an important consideration. The Life Cycle Initiative concluded that factors such as water temperature and electricity source to heat the water were more important than whether cups are hand-washed, or dishwasher cleaned.¹⁶⁴

A study titled 'Ceramic cup vs. Paper cup' recommends serving hot drinks in a reusable cup. However, the overall environmental impacts of the reusable cup in linked closely with washing method (dishwasher or handwashing) and water temperature.¹⁶⁵

Though all studies dictate the need for washing of reusable cups between uses to be done efficiently, there is a lack of consistency as to what this means. The Life Cycle Initiative findings suggest that in an ideal situation an efficient dishwasher should be used, or reusable cups should be handwashed using cold water¹⁶⁶. If the recommended efficient washing techniques are not used the increased volume of water and energy used for cleaning reusable cups could negate any benefits when compared to single-use disposables. It should be noted that how all crockery and cutlery items are cleaned in the home or café context influences their environmental impact, however items intended for in home usage have a higher guarantee of reuse, compared to on-the-go reusables.

Washing process can also influence the impact of logistics and transport, as washing is not always possible on site. One study pointed to the necessity of reusing cups between washes (more likely if a consumer refills the same cup with the same drink without requiring it to be washed); this can be adopted at festivals and events by charging consumers a refundable deposit on the cup, which encourages them to return these reusable cups at the end of the day for further reuse¹⁶⁷.

¹⁶² Scottish Government, 2021. Energy Statistics for Scotland Q4 2020 Figures.

<https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2018/10/quarterly-energy-statistics-bulletins/documents/energy-statistics-summary---march-2021/energy-statistics-summary---march-2021/govscot:document/Scotland+Energy+Statistics+Q4+2020.pdf>

¹⁶³ Full fact, 2021. Scotland's electricity consumption isn't 100% renewable.

<https://fullfact.org/environment/scotland-renewable-energy/>

¹⁶⁴ Alison Watson, 2021. Addressing-SUP-Products-using-LCA , 2021

https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/Addressing-SUP-Products-using-LCA_UNEP-2021_FINAL-Report-sml.pdf

¹⁶⁵ Martin, S., Bunsen, J. and Ciroth, A, 2018. Case Study: Ceramic cup vs. Paper cup.

https://www.researchgate.net/publication/345642567_Assessment_of_the_environmental_break-even_point_for_deposit_return_systems_through_an_LCA_analysis_of_single-use_and_reusable_cups

¹⁶⁶ Alison Watson, 2021. Addressing-SUP-Products-using-LCA , 2021

https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/Addressing-SUP-Products-using-LCA_UNEP-2021_FINAL-Report-sml.pdf

¹⁶⁷ Zero Waste Europe, 2020, Reusable vs Single use packaging a review of environmental impact

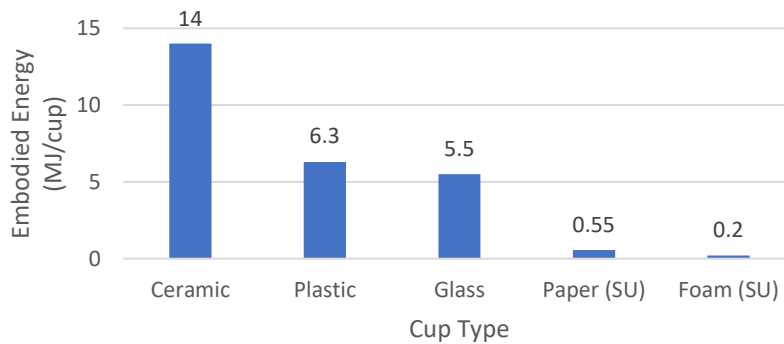
https://zerowasteurope.eu/wp-content/uploads/2020/12/zwe_reloop_report_reusable-vs-single-use-packaging-a-review-of-environmental-impact_en.pdf.pdf_v2.pdf

7.4.2.6 Manufacturing impact

A high proportion of the environmental impact of both single-use and reusable cups is embodied in the manufacturing process, and this is highly dependent on size, weight and material of cup.

Reusable cups can be made of many different types of materials, with many advertised as being 'eco-friendly'. The majority of LCA studies do not include 'novel materials' (i.e., bamboo) but focus on more traditional reusable materials such as glass, ceramic and plastic, which may suggest these hold the dominant market share. Using a life cycle energy analysis shows that the energy required to manufacture reusable cups is larger than that needed to manufacture disposable single-use cups (Figure 7).

Figure 7: Measurement of Energy Input Needed (kJ/Cup) to Produce 1 Unit¹⁶⁸

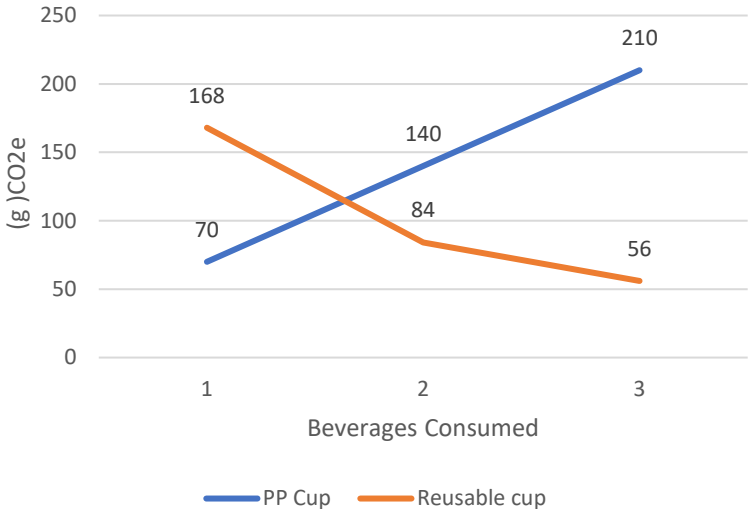


Despite the higher initial impact of reusable cups, this reduces if impacts are calculated 'per use'. For example, if the CO₂e impact of one drink in a PP plastic disposable cup is 70.0g, that means that the impact of three drinks served is 210g. For reusables, if the impact of manufacturing is 168g CO₂e but the cup is reused three times, the impact of the three drinks is not tripled¹⁶⁹, it stays the same, or reduces when considered per beverage, as demonstrated in Figure 8 below.

¹⁶⁸Hocking, Martin B, 1994. Reusable and Disposable Cups: An Energy-Based Evaluation. <https://sustainability.tufts.edu/wp-content/uploads/Comparativelifecyclecosts.pdf>

¹⁶⁹ Hope Solutions, 2020. Reusable Cups Figures https://static1.squarespace.com/static/5b24c9e74611a03086c51efe/t/6082da2e20a25c20cd2f7af5/1619188270840/Reusable+Cups+In+Numbers_Hope+Solutions.pdf

Figure 8: Carbon Equivalent impact of single-use vs reusable cups over lifespan



The largest contributor to the life cycle environmental impacts of single-use cups is manufacturing. To significantly reduce the fossil fuel resource depletion and impact on climate change both for single-use cups and reusable cups recycled material must be used in production. Factors such as how much energy from which sources, whether it is fossil or renewable, as well as the availability of feedstocks, should be considered.

7.4.3 Stakeholder insights

During interviews conducted through the course of the current research, stakeholders expressed a concern about recycling infrastructure if and when there is a change in material for single-use cups. One stakeholder deals with a global standard of regulation and is currently not comfortable with the certification on origin of alternate lining materials such as PLA. Though exploring other avenues, the current approach is a reduction on the current lining as far as possible. This is mainly driven by the assurance that end-of-life processing for PE lined fibre composite single-use cups can and will be done effectively¹⁷⁰.

Stakeholders interviewed had varying levels of support for the single-use cup charge, favouring continued reform and use of existing schemes such as EPR (extended producer responsibility), DRS and mandatory takeback^{171, 172}. The general consensus was a need to refine material used in single-use cups and support the current recycling infrastructure to grow and be more robust^{173, 174, 175}.

The main potential unintended environmental consequences of the single-use cup charge focussed on the potential negative impacts of reusables, though this was anecdotal with no evidence provided. These included the likelihood of new reusables being purchased for every takeaway drink purchased; there is no environmental benefit to buying lots of reusable cups and having them sat in the cupboard

¹⁷⁰ Interview with hospitality business, August 2022
¹⁷¹ Interview with hospitality business, August 2022
¹⁷² Interview with paper cups manufacturer, August 2022
¹⁷³ Interview with cups manufacturer, 2022
¹⁷⁴ Interview with hospitality business, August 2022
¹⁷⁵ Interview with 'Other' sector stakeholder, August 2022

at home^{176, 177, 178, 179, 180}. Secondly there was concern that if the shift to reusables was too rapid, the market would be flooded with cheap, bad quality and short lifespan reusable cups that are not going to meet the required breakeven point of LCA's¹⁸¹. Finally, concern was raised over material of manufacture for reusable cups, and if these are recyclable at end of life^{182, 183}.

There was also concern raised about impact of use of reusables in store for the hospitality industry, with the need for staff to wash hands, and use napkins and or gloves to touch reusables, thereby increasing their impact¹⁸⁴. It was noted that reusables are unlikely to be the best in every situation and context should be considered with the negative impact of 'logistics' involved with reusables potentially negating any positive impact¹⁸⁵. It was also expressed that to make a true impact we should not just be focussing on single-use cups, but the broader plastics market and promoting reuse culture in all aspects of life including supermarkets etc.¹⁸⁶

7.4.4 Environmental studies

In line with the project specification, a list of studies has been provided, which give information relevant to the environmental impact of a charge on single-use plastic cups.

1. Alison Watson, 2021. Addressing-SUP-Products-using-LCA.
https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/Addressing-SUP-Products-using-LCA_UNEP-2021_FINAL-Report-sml.pdf
2. Garrido N., del Castillo M. D. A. (2007) Environmental evaluation of single-use and reusable cups. The International Journal of Life Cycle Assessment, 12: 252-256.
<https://link.springer.com/article/10.1065/lca2007.05.334>
3. Harst, 2013, A critical comparison of ten disposable cup LCAs.
<https://www.sciencedirect.com/science/article/abs/pii/S0195925513000747>
4. Hocking, Martin B, 1994. Reusable and Disposable Cups: An Energy-Based Evaluation.
<https://sustainability.tufts.edu/wp-content/uploads/Comparativelifecyclecosts.pdf>
5. Martin, S., Bunsen, J. and Ciroth, A, 2018. Case Study: Ceramic cup vs. Paper cup.
https://www.researchgate.net/publication/345642567_Assessment_of_the_environmental_break-even_point_for_deposit_return_systems_through_an_LCA_analysis_of_single-use_and_reusable_cups
6. Pierre-Olivier Roy, 2017. Reusable or Disposable Which coffee cup has a smaller footprint?
<https://www.anthropocenemagazine.org/2017/07/reusable-or-disposable-which-coffee-cup-has-a-smaller-footprint/>
7. Sebastian Rhein, 2021. Intended and unintended effects of statutory deposit return schemes for single-use plastic bottles.
https://www.oekom.de/files/media/zeitschriften/artikel/GAIA_2021_04_250.pdf
8. Tai Ju Lee, 2017. A new potential paper resource: Recyclability of paper cups coated with water-soluble polyacrylate-based polymer.

¹⁷⁶ Interview with cups manufacturer, August 2022

¹⁷⁷ Interview with trade organisation, August 2022

¹⁷⁸ Interview with hospitality business, August 2022

¹⁷⁹ Interview with marine environment NGO, August 2022

¹⁸⁰ Interview with 'Other' sector stakeholder, August 2022

¹⁸¹ Interview with hospitality business, August 2022

¹⁸² Interview with cups manufacturer, August 2022

¹⁸³ Interview with paper cups manufacturer, August 2022

¹⁸⁴ Interview with hospitality business, August 2022

¹⁸⁵ Interview with paper cups manufacturer, August 2022

¹⁸⁶ Interview with hospitality business, August 2022

https://www.researchgate.net/publication/315899320_A_new_potential_paper_resource_Recyclability_of_paper_cups_coated_with_water-soluble_polyacrylate-based_polymer

9. Van der Harst, E., Potting, J. and Kroeze, C., 2014. Multiple data sets and modelling choices in a comparative LCA of disposable beverage cups. <https://scihub.wf/10.1016/j.scitotenv.2014.06.084>
10. Van der Harst, E. and Potting, J., 2013. A critical comparison of ten disposable cup LCAs. <https://www.sciencedirect.com/science/article/abs/pii/S0195925513000747>
11. VTT, 2019. Single-use paper cups (PE- and PLA lined) and reusable PP, stainless steel and ceramic cups in sit-down and takeaway contexts. <https://www.huhtamaki.com/globalassets/global/highlights/responsibility/taking-a-closer-look-at-paper-cups-for-coffee.pdf>
12. Yvonne Lewis, 2020. Single-use beverage cups and their alternatives. https://www.lifecycleinitiative.org/wp-content/uploads/2021/02/UNEP_-LCA-Beverage-Cups-Report_Web.pdf
13. Zero Waste Europe, 2020. Reusable vs Single use packaging a review of environmental impact. https://zerowasteurope.eu/wp-content/uploads/2020/12/zwe_reloop_report_reusable-vs-single-use-packaging-a-review-of-environmental-impact_en.pdf.pdf_v2.pdf

7.5 Unintended social, equality and geographical impacts

7.5.1 Equality impact

In line with the project specification, a list of studies has been provided, which give information relevant to the equality impact of a charge on single-use plastic cups.

1. Bitker, J. (2019) *Bay area disability advocates speak out against paper-cup bans*. San Francisco Chronicle. <https://www.sfchronicle.com/restaurants/article/Bay-Area-disability-advocates-speak-out-against-14871654.php>
2. Burgmann J. (2019) *Banning disposable cups might help the environment, but it will hurt people like me*. The Mighty. <https://themighty.com/topic/disability/paper-cup-bans-disability-san-francisco>
3. Your say on disability (2022) Weekly poll – charges on single-use drinks cups (week beginning 16 May 2022). <https://yoursayondisability.scot/charges-on-single-use-drinks-cups/>

The main equality concerns raised by stakeholders interviewed were anecdotal as opposed to evidence based. The disabled community was highlighted as potentially vulnerable to feeling the impact of this charge disproportionately^{187, 188}. This was for two key reasons, firstly the fact that disabled people are more likely to be in a lower income bracket, so any additional charge would have a more significant impact. Secondly it was highlighted that members of the disabled community who have difficulty leaving the home, have taken up the home delivery service, which currently only uses single-use cups¹⁸⁹. It would be inequitable to charge for using single-use cups through this service as there is not an alternative option. It is possible to implement reusables through delivery services, but only through a deposit levy which is not something they are doing now.

Alongside this health and hygiene were also highlighted as concerns. By moving away from single-use cups which add an element of standardisation to hygiene and moving towards reusables you are more reliant on human behaviour with regards to cleanliness which adds potential risk and inequality¹⁹⁰.

¹⁸⁷ Interview with Hospitality sector representative, August 2022

¹⁸⁸ Interview with Manufacturer, August 2022

¹⁸⁹ Interview with Hospitality sector representative, August 2022

¹⁹⁰ Interview with Manufacturer, August 2022

7.5.2 Social impact

In line with the project specification, a list of studies has been provided, which give information relevant to the social impact of a charge on single-use plastic cups.

1. Little S. (2022) *Vancouver proposes tweaks to cup-fee bylaw to reduce impact on low-income people*. Global News. <https://globalnews.ca/news/8648939/vancouver-cup-fee-changes/>
2. Toor S., Khan M., Dhir N., Bajwa A. (n.d.) *Ecological and Social Costs of Single Use Coffee Cups*. The University of British Columbia, Open Case Studies. <https://cases.open.ubc.ca/w17t2con200-3/>

There was concern from many stakeholders about the disproportionate impact a single-use cup charge would have on the lower socio-economic groups¹⁹¹. Economic challenges are already being felt¹⁹². Concerns were also raised around the proportionality of the charge. If it is a flat rate of, for example 20p, this is inequitable and penalises lower income groups¹⁹³. For a London coffee of roughly £4, 20p is insignificant but for cheaper drinks, from 80-90p, this is roughly a 25% increase^{194, 195, 196, 197}. This concern was highlighted particularly in relation to vending machine coffee which accounts for a high proportion of hospitality. This issue has also been seen in Vancouver, where particular emphasis has been placed on the impact of the charge on the homeless¹⁹⁸. Vancouver's bylaw has now been amended to exempt free coffees from the charge, to ease this impact¹⁹⁹.

Concerns were also raised around the knock-on impact to business and how this has a more significant impact in a shorter timescale for lower income areas. Alongside this the potential impact to organisations, who do not sell drinks to customers but provide them to staff, so would be absorbing the cost internally, for example the NHS, could be significant²⁰⁰.

7.5.3 Geographical impact

No references were found which discussed the geographical impacts of a single-use cups charge.

Potential impacts of the single-use cup charge based on geography were anecdotal or inferred by stakeholders as opposed to evidence based.

Some of the stakeholders that were interviewed did not see the potential for unintended geographical influences.

Others highlighted different behaviours and access to services linked to urban vs rural areas. For example, delivery services are more available in urban than rural areas. Stakeholders suggested that messaging may be more condensed in cities, and social norming greater in cities than in the Highlands. It was also suggested that in rural areas dine in environments are more common, whereas in the city there is more on the go usage, so therefore more single-use in urban areas than rural. It was also theorised that there may be more buy in to reusables in rural areas, so you could see a more positive impact here.

¹⁹¹ Interview with Manufacturer, August 2022

¹⁹² Interview with Hospitality sector representative, August 2022

¹⁹³ Interview with Manufacturer, August 2022

¹⁹⁴ Interview with Manufacturer, August 2022

¹⁹⁵ Interview with 'Other', August 2022

¹⁹⁶ Interview with Recycler, August 2022

¹⁹⁷ Interview with Hospitality sector representative, August 2022

¹⁹⁸ Global News, 2022. 'Enormous difference': Concern about impact of Vancouver's new single-use fee on homeless. <https://globalnews.ca/news/8491684/vancouver-single-use-cup-fee-homeless/>

¹⁹⁹ City News, 2022. Free drinks no longer subject to Vancouver's 25-cent cup fee.

<https://vancouver.citynews.ca/2022/03/30/vancouver-25-cent-fee/>

²⁰⁰ Interview with Biopac, August 2022

The use of coffee vending machines was also discussed. Currently, these are only compatible with single-use cups. Though these are available in all locations, the question was posed as to whether a charge on single-use cups used through these machines would disproportionately effect those in rural areas?²⁰¹ This was because large chains are less likely to put a manned shop in a rural area and are more likely to put a vending machine style service there instead.

The main concerns raised were around tourism, especially in relation to rural environments. Highland areas have a high volume of tourists. Though individuals' behaviour at home may be good, they may not practise this same behaviour on holiday²⁰². Individuals may not pack their reusable cups when they travel. This also connects to littering, which is a concern in rural locations, that have less regular cleansing teams, but people litter more in these locations as they feel they can 'get away with it'.

Tourism is key to business in a lot of remote and highland areas. Business is tough currently, and though tourism is healthy, businesses won't want to jeopardise this. They will respond to consumer needs, which is currently convenience. They are unlikely to want to risk trying a new model of service which will have a direct economic impact²⁰³.

²⁰¹ Interview with Hospitality sector representation, August 2022

²⁰² Interview with 'Other', August 2022

²⁰³ Interview with Manufacturer, August 2022

7.6 International experience and best practice

When reviewing international experience and best practice around a charge to the consumer for single-use cups for the purposes of this study, it has been important to recognise that most existing examples of a charge to the consumer for single-use cups are either in the very early stages (or are not yet launched) or are occurring at a very small scale (e.g., on university campuses). As such examples of best practice are drawn from elements of existing examples which have drawn approval but are not necessarily quantitatively proven to affect the impact of a charge, as this data is often not yet available.

International experience and best practice have been divided into key themes that have been identified in multiple case studies, as outlined in the following sections.

7.6.1 Clarity

Previous single-use cups charges have hit problems when a lack of clarity is given to businesses around what the charge will entail and how it is expected to be implemented. While not the same as a charge, there have been complaints raised around South Korea's reusable cup loan scheme as the government has not been forthcoming with key details, months prior to the introduction of the scheme²⁰⁴. There have also been complaints voiced around the charge due to come into force in Ireland in December 2022, which was confirmed in March 2022²⁰⁵. It was noted that there was still a lack of clarity around how businesses are expected to facilitate people bringing their own reusable cup²⁰⁶. A preference of a two-year lead in time to implementation was stated, which has been seen in the bans on single-use items coming into play in France and Germany²⁰⁷.

There are examples of clear communication provided from The Netherlands²⁰⁸ and Vancouver²⁰⁹ on their cup charges. The Dutch website makes it very clear why bioplastics are included, as well as giving clarity on why the charge is set at its fee level. It also makes it clear that businesses should be communicating with consumers around the charge. The page from the City of Vancouver clearly lays out how to comply with the by-law, using 12 different sections to break down the key topics.

There is also a need to be very explicit on the definition of 'plastic'. As stated above, the Dutch scheme makes it clear that bioplastics are treated the same as traditional plastics. Conversely, the City of Berkeley scheme states that where single-use cups are to be used, they "must be BPI-Certified Compostable. No single-use plastic allowed"²¹⁰. Businesses may only use other plastic types if they can prove no compostable item exists, or the cost of such an item would cause "undue financial hardship"²¹¹. This preference for compostable items is at odds with the preference put forward by a stakeholder in the UK for items that have been proven recyclable²¹². This may reflect a difference in waste management infrastructure in the UK compared to California, or the fact that the EU SUPD is not of relevance in California.

²⁰⁴ Eco-Business, 2022. Plastic to go? All eyes on world's first compulsory deposit return scheme for takeaway cups in South Korea. <https://www.eco-business.com/news/plastic-to-go-all-eyes-on-worlds-first-compulsory-deposit-return-scheme-for-takeaway-cups-in-south-korea/>

²⁰⁵ Interview with Hospitality organisation. August 2022

²⁰⁶ Interview with Hospitality organisation. August 2022

²⁰⁷ Interview with Hospitality organisation. August 2022

²⁰⁸ Ministry for Infrastructure and Water Management. New rules for disposable plastic cups and containers. <https://business.gov.nl/running-your-business/products-and-services/product-safety-and-packaging/new-rules-for-disposable-plastic-cups-and-containers/>

²⁰⁹ City of Vancouver. Cups. <https://vancouver.ca/green-vancouver/cups.aspx>

²¹⁰ City of Berkeley. Single-use foodware rules. <https://berkeleyca.gov/doing-business/operating-berkeley/food-service/single-use-foodware-rules>

²¹¹ City of Berkeley. Single-use foodware rules. <https://berkeleyca.gov/doing-business/operating-berkeley/food-service/single-use-foodware-rules>

²¹² Interview with 'Other' category stakeholder. August 2022

It may also be advisable to provide clarity on the pros and cons of alternatives, as well as the different plastic options available. This has been provided by the scheme in Vancouver²¹³.

Clarity should also be provided on where money raised by the cup charge will go. This has been identified as best practice internationally, as well as being requested by stakeholders²¹⁴. In Vancouver²¹⁵, businesses keep the cup fees and are encouraged to use them to cover the cost of complying with the by-law (i.e., software updates and staff training) and to invest in reusables. The Starbucks 5p cup charge publicly funds other plastic pollution reduction campaigns²¹⁶.

Another area requiring clear definitions and expectations is needed regarding whether the charge will be price neutral. As discussed above, there have been some studies that implemented a price neutral charge²¹⁷ (i.e., the charge did not make the drink any more expensive for the consumer). While no definitive statement has been found regarding other cup charges and price neutrality, newspaper articles refer to paying extra, which suggests charges in Vancouver are not cost neutral²¹⁸.

7.6.2 *Wide-reaching*

As previously stated in the EPECOM report²¹⁹, implementing a charge nationwide increases the potential for effectiveness in comparison to local or store-specific charges, as it signals that reusable cups are the norm and becomes a more continuous habit disruptor if a charge is required at any point of takeaway coffee consumption. There is significant behaviour change required to move individuals towards reusable cups, as considerable forward planning is needed to have a clean, reusable cup on one's person, which is at odds with impulsive coffee purchasing behaviour. As such a nationwide scheme may be more likely to facilitate more consistent and long-term behaviour change, particularly as it prevents consumers being able to respond with a shift to purchasing beverages from another store. The scheme soon to be launched in South Korea has already been criticised as it has limited market coverage – only 35% of relevant businesses will be required to participate²²⁰. This was felt to be a problem because it creates an unequal playing field and causes customer confusion²²¹.

The Starbucks method of a 5p charge on single-use cups partnered with a 25p discount on reusables has also been called confusing for customers due to the diverse incentives, particularly when this only operates for hot beverages, not cold²²².

²¹³ City of Vancouver. Cups. <https://vancouver.ca/green-vancouver/cups.aspx>

²¹⁴ Interview with 'Other' category stakeholder. August 2022

²¹⁵ City of Vancouver. Cups. <https://vancouver.ca/green-vancouver/cups.aspx>

²¹⁶ Hubbub, 2018. Starbucks rolls out 5p paper cup charge to all stores across Britain.

<https://www.hubbub.org.uk/Blog/starbucks-rolls-out-5p-paper-cup-charge-to-all-stores-across-britain>

²¹⁷ Lenaghan, Clark and Middlemass, 2019. Cups Sold

Separately <https://www.zerowastescotland.org.uk/sites/default/files/Cups%20Sold%20Separately%20-%20final2.pdf>

²¹⁸ 604Now, 2022. You will now be charged an extra \$0.25 for single-use cups bought in Vancouver. <https://604now.com/single-use-coffee-cups-vancouver-extra-charge-2022/>

²¹⁹ EPECOM, 2019. Rapid Review of Charging for Disposable Coffee Cups and other Waste Minimisation Measure. <https://orca.cardiff.ac.uk/id/eprint/124422/1/rapid-review-charging-disposable-coffee-cups-waste-minimisation-measure-full-report.pdf>

²²⁰ Eco-Business, 2022. Plastic to go? All eyes on world's first compulsory deposit return scheme for takeaway cups in South Korea. <https://www.eco-business.com/news/plastic-to-go-all-eyes-on-worlds-first-compulsory-deposit-return-scheme-for-takeaway-cups-in-south-korea/>

²²¹ Eco-Business, 2022. Plastic to go? All eyes on world's first compulsory deposit return scheme for takeaway cups in South Korea. <https://www.eco-business.com/news/plastic-to-go-all-eyes-on-worlds-first-compulsory-deposit-return-scheme-for-takeaway-cups-in-south-korea/>

²²² Resource, 2018. Starbucks announces nationwide five pence coffee cup charge.

<https://resource.co/article/starbucks-announces-nationwide-five-pence-coffee-cup-charge-12731>

7.6.3 *Waivers and exemptions*

In schemes worldwide, waivers and exemptions are in place for end of life, logistical or locational reasons. Cup charges in The Netherlands²²³, Berkeley²²⁴ and Vancouver²²⁵ all exempt hospitals and community care facilities that use single-use cups for safety and hygiene reasons.

The Netherlands²²⁶ also has an exception for PET single-use cups that can be recycled back into cups or food packaging. Businesses wishing to apply for this exception must register with the Human Environment and Transport Inspectorate, collect the materials themselves and submit them for high-quality recycling. The minimum percentage they must collect increases annually (from 75% to 90%). When this point was raised in an interview, it was deemed inappropriate for the situation in Scotland with on-the-go items, as businesses would not necessarily be able to collect items themselves, and it would be too hard to prove collection rates²²⁷. The Netherlands also specifies that this exception does not need to apply at a municipal level, as municipal rules can be stricter²²⁸.

In the City of Berkeley, businesses may qualify for a waiver if dishwashing capacity is unavailable due to “insurmountable space constraints, undue financial hardship, and/or other extraordinary insurmountable circumstances”²²⁹.

7.6.4 *Complementary measures*

No examples have been identified where a cup charge has been implemented without any complementary measures – all are accompanied by at least some signage and explanatory messaging. However, there are some complementary measures that are either frequently used or cited as being important for the success of a charge.

7.6.4.1 **Measures to raise awareness in the consumer**

Messages of encouragement and gratitude, and messages explaining the environmental impact have been quantitatively proven to be a low cost, effective contributor to encouraging reusable cups in combination with a cup charge. When the University of British Columbia introduced a cup charge, they tested the additional impact of this type of messaging, which was found to increase the sales of drinks in reusable cups by 2.2%²³⁰. Trials in the UK analysed from an interrupted time series perspective found that environmental messaging alone led to an increase in the proportion of hot drink sales in reusable cups of 2.3%²³¹.

²²³ Ministry for Infrastructure and Water Management. New rules for disposable plastic cups and containers. <https://business.gov.nl/running-your-business/products-and-services/product-safety-and-packaging/new-rules-for-disposable-plastic-cups-and-containers/>

²²⁴ City of Berkeley. Single-use foodware rules. <https://berkeleyca.gov/doing-business/operating-berkeley/food-service/single-use-foodware-rules>

²²⁵ City of Vancouver. Cups. <https://vancouver.ca/green-vancouver/cups.aspx>

²²⁶ Ministry for Infrastructure and Water Management. New rules for disposable plastic cups and containers. <https://business.gov.nl/running-your-business/products-and-services/product-safety-and-packaging/new-rules-for-disposable-plastic-cups-and-containers/>

²²⁷ Interview with ‘Other’ category stakeholder. August 2022

²²⁸ Ministry for Infrastructure and Water Management. New rules for disposable plastic cups and containers. <https://business.gov.nl/running-your-business/products-and-services/product-safety-and-packaging/new-rules-for-disposable-plastic-cups-and-containers/>

²²⁹ City of Berkeley. Single-use foodware rules. <https://berkeleyca.gov/doing-business/operating-berkeley/food-service/single-use-foodware-rules>

²³⁰ Sidhu et al., 2018. Single-Use Items Reduction: Disposable Cups.

<https://open.library.ubc.ca/soa/cIRcle/collections/undergraduateresearch/18861/items/1.0387025>

²³¹ Poortinga and Whitaker, 2018. Promoting the Use of Reusable Coffee Cups through Environmental Messaging, the Provision of Alternatives and Financial Incentives. <https://www.mdpi.com/2071-1050/10/3/873/htm>

Initiatives using environmental messaging or highlighting social norms have been shown to be the most successful in increasing reusable cup use and reducing single-use²³². This was also shown to be true for the single use carrier bag charge, where people were shown to support the charge because of its environmental impact²³³.

The Starbucks scheme, the Berkeley scheme and the Vancouver scheme require in-store signage and information on menus or receipts which communicate the charge to consumers. The Starbucks scheme also requires staff training on the charge. Anecdotal evidence suggests that while in store signage is required in Starbucks, it is not highly visible and is likely only to be seen by those who are looking for it²³⁴. A lack of awareness of a cup charge has also been proven in studies on Dalhousie campus²³⁵. This suggests that if these communications are to be provided in store, they need to be made highly visible, or given verbally by staff to customers, as has been trialled in Scotland²³⁶.

7.6.4.2 Provision of reusables

Trials in the UK have shown that the provision of reusables, either for free or to purchase, increases the proportion of hot drinks sold in reusable cups. Having them available to purchase in store increases their use by 2.5% and distributing them for free increases use another 4.3%²³⁷. In the University of British Columbia trial mentioned above, in stores that implemented both consumer messaging and selling reusables, use of reusables increased 3.6%²³⁸.

As use of single-use cups is predominantly a convenience-based behaviour, there may be a limit to the parallels that can be drawn with the single-use carrier bag charge, as use of carrier bags is more habitual and easier to factor into a routine. However, consumers have been helped to adjust behaviour by being provided with reusable cups – trials where reusable cups have been distributed to consumers have been the most successful in raising reuse rates²³⁹. Concerns have been raised by stakeholders that consumers may not remember to bring in reusable cups once they have used them once, and around the environmental impact of this along with flooding the market with cheap reusables²⁴⁰. It would be beneficial to conduct long term studies to understand how many customers repeatedly bring back the reusable cup they have been issued.

²³² EPECOM, 2019. Rapid Review of Charging for Disposable Coffee Cups and other Waste Minimisation Measure. <https://orca.cardiff.ac.uk/id/eprint/124422/1/rapid-review-charging-disposable-coffee-cups-waste-minimisation-measure-full-report.pdf>

²³³ Thomas et al., 2019. The English plastic bag charge changed behaviour and increased support for other charges to reduce plastic waste. <https://orca.cardiff.ac.uk/id/eprint/119198/7/fpsyg-10-00266.pdf>

²³⁴ Interview with 'Other' category stakeholder. August 2022

²³⁵ Fairbairn. Reducing disposable cups on Dalhousie Campus: a second cup case study. <https://dalspace.library.dal.ca/bitstream/handle/10222/77842/Coffeecups.pdf?sequence=1&isAllowed=y>

²³⁶ Lenaghan et al., 2019. Cups sold separately. <https://www.zerowastescotland.org.uk/sites/default/files/Cups%20Sold%20Separately%20-%20final2.pdf>

²³⁷ Poortinga and Whitaker, 2018. Promoting the Use of Reusable Coffee Cups through Environmental Messaging, the Provision of Alternatives and Financial Incentives. <https://www.mdpi.com/2071-1050/10/3/873/htm>

²³⁸ Sidhu et al., 2018. Single-Use Items Reduction: Disposable Cups.

<https://open.library.ubc.ca/soa/cIRcle/collections/undergraduateresearch/18861/items/1.0387025>

²³⁹ EPECOM, 2019. Rapid Review of Charging for Disposable Coffee Cups and other Waste Minimisation Measure. <https://orca.cardiff.ac.uk/id/eprint/124422/1/rapid-review-charging-disposable-coffee-cups-waste-minimisation-measure-full-report.pdf>

²⁴⁰ Interview with hospitality business, August 2022 and interview with 'Other' category stakeholder, August 2022.

7.6.5 Phasing and delayed enforcement

Two international examples have applied a delay prior to enforcement to support businesses with making the transition to a charge. Berkeley²⁴¹ and Vancouver²⁴² both stated their wish to understand how they can support businesses with specific challenges. Berkeley have given businesses a year to adjust before enforcement begins. In Vancouver, if a business is found to be non-compliant, education and support to help them comply will be prioritised. Increasing levels of enforcement will then apply for any ongoing non-conformance, up to a business licence suspension or revocation.

As well as supporting businesses with logistical challenges, it will also be important to allay fears that a cup charge will lead to a negative impact on their business in terms of reducing sales. Studies have shown these fears are unfounded, and a charge on single-use coffee cups does not have a negative impact on drinks sales²⁴³. Nonetheless, negative impacts on sales are still predicted by stakeholders²⁴⁴.

The Irish single-use cup charge is also planned to be phased, but this is a phasing on product eligibility. The charge will initially only apply to hot beverages, with cold beverages being included at a later date²⁴⁵. As there is currently so little published work on cold beverage single-use cup use and a single-use cup charge on cold beverages, this may be a prudent decision.

7.7 Promoting Reuse

Existing Schemes

Four existing reusable cup schemes from across the UK and Ireland have been summarised to show different models of reuse, and some of the challenges still to overcome²⁴⁶.

2GoCup²⁴⁷: Operating at 150 locations, including small independent cafes as well as larger organisations, this is a reusable cup system with a €1 cash deposit.

Key Feature/Learning: On-site washing of reusable cups ensures a consistent standard of cleanliness in line with dine in ceramics. In addition to this it makes the best use of existing infrastructure and reduces cost.

Reuser²⁴⁸: Currently focussed on East London this reusable cup scheme operates in independent coffee shops as well as corporate events and offices.

²⁴¹ City of Berkeley. Single-use foodware rules. <https://berkeleyca.gov/doing-business/operating-berkeley/food-service/single-use-foodware-rules>

²⁴² City of Vancouver. Cups. <https://vancouver.ca/green-vancouver/cups.aspx>

²⁴³ Poortinga and Whitaker, 2018. Promoting the Use of Reusable Coffee Cups through Environmental Messaging, the Provision of Alternatives and Financial Incentives. <https://www.mdpi.com/2071-1050/10/3/873/htm>

²⁴⁴ Interview with 'Other' category stakeholder. August 2022

²⁴⁵ Interview with hospitality business. August 2022.

²⁴⁶ Hubbub and Bunzl, 2022. Reuse systems Unpacked: Challenges and opportunities for food and drink packaging. https://issuu.com/hubbubuk/docs/bunzl_reuse_report_bunzl_a4_no_cp_v7?fr=sYmMwMzQ4ODM3OTk

²⁴⁷ Hubbub and Bunzl, 2022. Reuse systems Unpacked: Challenges and opportunities for food and drink packaging. https://issuu.com/hubbubuk/docs/bunzl_reuse_report_bunzl_a4_no_cp_v7?fr=sYmMwMzQ4ODM3OTk

²⁴⁸ Hubbub and Bunzl, 2022. Reuse systems Unpacked: Challenges and opportunities for food and drink packaging. https://issuu.com/hubbubuk/docs/bunzl_reuse_report_bunzl_a4_no_cp_v7?fr=sYmMwMzQ4ODM3OTk

Key Feature/Learning: This scheme is app based, providing incentives for return of reusable cups, without creating a cost barrier for engagement with the service. The system is free to use, and customers are charged a fee for not returning the cup, which is monitored through an app. Deposits and refunds were found to slow down service, which is a challenge in busy cafes.

Shrewsbury Cup²⁴⁹: A community-led reusable cup scheme with a £1 cash deposit, operating in more than 30 independent cafes across Shrewsbury.

Key Feature/Learning: This scheme is a cash-based deposit system. As it doesn't require a customer-facing app or technology the scheme is accessible to a more diverse group of retailers and customers.

Stack Cups²⁵⁰: This is a cold drink reusable cup scheme designed for events, that has recently been implemented at Glasgow Scottish Event Campus. Those using these reusable cups are required to pay a £1 deposit at the bar, with a new cup being issued at the next order.

Key Feature/Learning: The deposit can later be retrieved at a redemption point, or the cup can be left in a designated drop off point which will see the deposit donated to charity.

Trials

There have been many different reusable cup trial schemes across Scotland, the rest of the UK and the world. These tend to be focussed on coffee cups and shops, but these are also a good starting point for learnings to be translated to cold drink cups, and the different settings these are found within.

In 14 Costa stores in Glasgow a trial 'BURT' was run. 'BURT' (Borrow, Use, Reuse, Take back) was the first on-the-go reusable cup scheme trial at Costa. The scheme was designed to encourage the use of reusables by customers who didn't have their own cup with them or didn't want to carry a reusable cup. Customers could borrow a reusable cup, use it, reuse it (indefinitely), and take it back to a store for it to be washed before being used again. Findings from this trial have yet to be published, but Costa are aiming to improve the experience to build a reusable cup scheme at scale²⁵¹.

The Ditching Disposables project set up by Zero Waste Scotland is a pilot project testing alternatives to various single-use disposable items. This is not just limited to single-use cups, but many single-use items in hospitality. This will provide evidence, best practise guidance and scalable models that work in a Scottish context²⁵². This pilot project had to be paused due to businesses closing in line with lockdown restrictions during the covid pandemic but is due to commence again.

Starbucks Returnable Cup trials have taken place at Gatwick airport and Canary Wharf along with other schemes launched in France and Switzerland. In Gatwick airport returnable reusable cups were offered to customers at no extra charge and collection points provided around the airport, this set up was effective due to the closed system of an airport. In Canary Wharf, a different approach was taken. When a returnable cup is provided, a £1 deposit is collected from the customer, this deposit can either be refunded upon return of the cup or transferred to a fresh cup when a new drink is purchased. Staff engagement was found to be vital in this trial as most customers discovered the scheme through

²⁴⁹ Hubbub and Bunzl, 2022. Reuse systems Unpacked: Challenges and opportunities for food and drink packaging https://issuu.com/hubbubuk/docs/bunzl_reuse_report_bunzl_a4_no_cp_v7?fr=sYmMwMzQ4ODM3OTk

²⁵⁰ Packaging Scotland, 2022. Glasgow's SEC to launch 'incredibly easy to carry' reusable cup <https://packagingscotland.com/2022/03/glasgows-sec-to-launch-incredibly-easy-to-carry-reusable-cups>

²⁵¹ Costa, 2022. Testing reusable cup schemes <https://www.costa.co.uk/sustainability/cups-and-packaging>

²⁵² Zero Waste Scotland, 2020. Global first is part of £1m plan to ditch disposables in Scottish communities <https://www.zerowastescotland.org.uk/press-release/global-first-part-%C2%A31m-plan-ditch-disposables-scottish-communities>

conversation with baristas. The environment, novelty and discount were top motivators for customer engagement. The returnable cup was also found to be more conducive to the drive through service. Efficient service is key, specifically in drive through settings. If the customer wishes to use their own reusable cup in the drive through, either the barista must wait for the customer to drive from where they place the order, to the collection window for the cup to be provided before making their drink, which is inefficient, or they must make the drink in a separate cup and transfer it across. By having a returnable cup, this is immediately available to the barista to start making as the order is placed, and before the previous cup is returned.²⁵³

Borealis has recently launched a closing the loop trial across its four sites in Belgium. This system is limited to within its manufacturing and office sites, and focusses on hot or cold drinks from coffee machines. Instead of using one cup per drink, users are encouraged to use the same lightweight Bockatech cup throughout the day before dropping it in a collection point. These reusable cups are then professionally cleaned. When the cup can no longer be cleaned it is recycled into pellets, and then made into a new cup as demonstrated in Figure 9. The aim of this pilot is to reduce the 1.5 million single-use cups used annually on site to 30,000 reusable cups²⁵⁴.

Figure 9: Double closed loop system



Zero Waste Scotland and two public sector partners conducted a trial in 2019, providing data to prove the value of a charge/levy as opposed to a discount. This trial conducted in 4 cafes showed that by simply replacing existing reusable cup discounts with an equivalent, cost-neutral disposable coffee cup charge, reusable cup usage will significantly increase (average 185% across all four locations). Importantly to retailers this did not negatively impact overall drink sales, and as the swap from a discount to a charge was cost neutral this shift in approach came at no extra financial burden to the consumer²⁵⁵.

Campaigns

In January 2020, a jingle campaign was launched in Manchester city centre. The reuse campaign created by Hubbub was called Grab Your Cup. Research conducted by Hubbub has shown that people in Britain buy an average of four take away hot drinks a week, with 1 in 5 buying at least one a

²⁵³ Hubbub and Bunzl, 2022. Reuse systems Unpacked: Challenges and opportunities for food and drink packaging. https://issuu.com/hubbubuk/docs/bunzl_reuse_report_bunzl_a4_no_cp_v7?fr=sYmMwMzQ4ODM3OTk

²⁵⁴ Borealis, 2022. Borealis closes the loop. <https://www.borealisclosestheloop.com>

²⁵⁵ Lenaghan, Clark and Middlemass, 2019. Cups Sold Separately <https://www.zerowastescotland.org.uk/sites/default/files/Cups%20Sold%20Separately%20-%20final2.pdf>

day²⁵⁶. Across the UK, the research found that over two-thirds (69%) of people have their own reusable coffee cup but only 1 in 6 say they remember to use them every time they buy a hot drink. The aim of this campaign was to promote the use of reusable cups by reminding people to pick up their reusable cup in the morning and normalise drinking from reusables. The campaign aims to do this with a radio jingle created by Huey Morgan, in conjunction with a stickering campaign in coffee shops in the city centre and a unique reusable cup mascot²⁵⁷. At the time of writing this report the impact and learnings from this campaign had not yet been published. One of the key factors to consider in the success of a shift to reuse is the number of times that reusables are used. Campaigns like this could be an important part of this, hence the need to monitor the learnings from this trial.

In 2022, a Bring it Back Fund was launched by Hubbub in partnership with Starbucks to boost reusable packaging across the food and drink industry²⁵⁸. Research conducted by Hubbub found that inconvenience, hygiene concerns and cost are key barriers to wider use of reusables by the British public. The aim of this fund is to support projects to accelerate new ideas to reduce reliance on single-use packaging.

Best Practise

North Lanarkshire have decided to lead by example and have published a Single Use Plastic Action Plan²⁵⁹, for actions to be taken within the council to show businesses and communities what is possible. It includes actions focussed on reduction, reuse and recycling of single-use plastic items. This is broken down into four ambitions:

1. Identify current use
2. Develop alternatives
3. Raise awareness
4. Implement change.

Hubbub in partnership with Bunzl have released a report 'Reuse Systems Unpacked: Challenges and opportunities for food and drink packaging'²⁶⁰. This draws on knowledge from existing schemes, trials, consumers, and stakeholder insights to outline 10 key recommendations to set up reuse systems at scale:

1. Current consumer behaviour prioritises convenience, so the reusable system needs to be as simple as possible.
2. The price of reusables needs to be comparable to that of single-use.
3. The right incentives will encourage the shift to reusables, but the wrong incentive can be off putting.

²⁵⁶ Hubbub, 2020. Push for reusable cups has ambitions to save 150 million paper cups a year. https://issuu.com/hubbubuk/docs/hubbub_grab_your_cup_national_press_release#:~:text=Research1%20released%20today%20by%20Hubbub,they%20buy%20a%20hot%20drink.

²⁵⁷ Hubbub, 2020. Boosting the use of reusable cups with a catchy jingle <https://www.hubbub.org.uk/grab-your-cup-jingle-huey-morgan>

²⁵⁸ Restorick, 2022. New £1 million 'Bring It Back Fund' launched by Hubbub and Starbucks to boost reusable packaging <https://www.hubbub.org.uk/blog/new-1-million-bring-it-back-fund-launched-by-hubbub-and-starbucks-to-boost-reusable-packaging>

²⁵⁹ Bryans and Pew, 2019. Single Use Plastic Action Ban <https://www.northlanarkshire.gov.uk/sites/default/files/2020-07/Single%20use%20plastic.pdf>

²⁶⁰ Hubbub and Bunzl, 2022. Reuse systems Unpacked: Challenges and opportunities for food and drink packaging. https://issuu.com/hubbubuk/docs/bunzl_reuse_report_bunzl_a4_no_cp_v7?fr=sYmMwMzQ4ODM3OTk

4. Logistics has an important role to play. Currently logistics are designed around the linear single-use model. Innovative logistics models will be needed to make reusables successful and should be considered and integrated from project inception.
5. Packaging design needs to consider more than just aesthetics, it should include technology, and consider packaging and transport environmental footprints.
6. Consistent, accurate and comparable analysis of environmental impact should be established. This will allow for different reuse systems to be compared and improved.
7. An integrated reuse network is more convenient and less confusing for users. A system that works across brands, locations and platforms should be the aim.
8. Technology should be used where possible to simplify the experience (e.g., payments, deposit refunds, rewards).
9. Coming out of the pandemic the public have concerns around hygiene. A thorough washing process should be part of any reusable system, this should be supported by good communications.
10. Policy can support a shift to reuse.

Hubbub have highlighted low price and incentivisation as key to the success of making reusables work at scale. The proposed charge on single-use cups could help to make reusables more financially appealing.

City to Sea is an environmental organisation, campaigning to stop plastic pollution at source. Through partnerships with individuals and other organisations they have provided guidance documents on many subjects including but not limited to²⁶¹:

- Takeaway packaging
- Bioplastics
- Reducing plastics for accommodation providers
- Water fountain guidance
- Hygienic use of reusable cups

Other best practise guidance has also been released:

- The sustainable packaging coalition: Guidance for Reusable Packaging²⁶² and
- Manchester City Council: Sustainable Events Guide²⁶³.

7.7.1 Evidence and Analysis

Individual and structural inequity as well as unconscious biases and prejudice will inherently be a risk when undertaking evidence synthesis and analysis. There is the potential for this to be particularly prevalent when asking for public consultation responses, with certain demographics being more likely to make their opinions heard.

Being conscious of this likely inherent inequity is part of taking in measures to minimise its impact. Another key aspect is ensuring that a diverse group of stakeholders are an active part of policy development, or act as a working group to provide guidance, support, and criticism.

²⁶¹ City to Sea, 2022. Research and Resource <https://www.citytosea.org.uk/research-and-resource/>

²⁶² Sustainable Packaging Association, 2022. Guidance for Reusable Packaging <https://sustainablepackaging.org/wp-content/uploads/2022/04/Guidance-for-Reusable-Packaging.pdf>

²⁶³ Manchester City Council, 2022. Sustainable Events Guide <https://www.vision2025.org.uk/wp-content/uploads/2021/10/Reusable-cups-guide-why-and-how.pdf>

8 Potential issues and relevant solutions linked to the design of a national single-use disposable beverage cups charge for Scotland

Interviews with stakeholders raised potential **issues** that may come to light from the design of a national single-use disposable beverage cup charge for Scotland. These are stakeholder comments are listed below for future consideration, but without interpretation or further analysis. These can help inform potential areas for future research, and how potential future policy is consulted on, structured and communicated.

- Those that were against a charge all pointed to the difficult economic times and cost of living crisis. Interviewees often raised the issue of acceptability of a charge amongst consumers.
- Consideration needs to be given to drive-through contexts. If accepting reusable cups in the drive through window, this will significantly impact internal logistics for food preparation. Staff would all have to wash hands or use a napkin after touching reusable cups before attending the next customer.
- Consideration should also be given to single-use cups supplied through vending machines. One manufacturer who supplies single-use cups to this market was concerned that this segment of the market would bear unequal consequences compared to other markets (e.g., hospitality/food sector). In situations where drinks are provided free of charge (e.g., through vending machines in canteens), it is unclear who would be responsible for paying the charge. In these contexts (industrial factory settings, canteens, etc), one stakeholder believed that due to hygiene reasons reusable cups were not an option.
- Some stakeholders believed that the charge would generally stimulate research and development of other (potentially not fully researched) materials, rather than encourage the uptake of reusable cups.
- There was also concern that brands and manufacturers will prefer to import cheaper materials from abroad (rather than 'better', and generally more expensive material choices within the UK) in order to keep the prices low, so that the charge appears price neutral (particularly in the context of a cost-of-living crisis).
- There was confusion around how the mandatory take-back requirement will work alongside the charge, and particularly how this will affect consumer engagement. For example, customers that have paid the charge on the cup may be less inclined to dispose of it properly, as they may consider they have 'done enough' by paying for the cup. If customers were able to be refunded the charge by returning it to the mandatory take-back return points, this could encourage consumer uptake in both schemes.
- One retailer felt that if figures are quoted around the reduction in single-use cups due to the charge, that a distinction should be made around whether this is due to more people moving to reusables, or due to a reduction in footfall/consumption generally.
- There was some concern by one hospitality group regarding a charge on single-use PET cold cups, as these are high quality recyclable materials which are often fully recyclable at home. There was confusion around why a PET drink bottle would have a deposit (under DRS), redeemable if returned to store, but PET single-use cups would have a charge (i.e., non-redeemable deposit), with no incentives to properly dispose of the cup.
- Consideration needs to be given to smaller businesses. They are greatly impacted by costs and energy increases. According to a recent poll by a trade organisation, one in six small businesses think they will have to shut, be sold or shrink in the next year.
- Finally, one manufacturer brought up that plastic packaging is often the best solution to maintain product integrity. They mentioned that when considering the carbon emissions of a drink, the packaging typically only makes up 4% of the emissions. The implication here was that if the product is damaged due to faulty packaging (linked to switching to a different, but potentially not fully understood material), the carbon impact is much greater as it damages the whole product.

Interviews also highlighted some relevant **solutions** that Scottish Government could consider when designing and implementing the charge. These are listed below, without further analysis beyond the interview comments. These can help inform potential areas for future research, and how potential future policy is consulted on, structured and communicated.

- Providing a clear narrative to customers about exactly how and where funds from the charge are being used has helped in the uptake of the charge. Customers were more agreeable to the change to paying for the single-use cup and felt that they were part of the solution by supporting a good cause. There was concern that this narrative would be lost if 'overtaken' by a government-mandated charge, as the retailer was not sure they could share as openly with their customers what the charge was being used for.
- Linked to the above, many stakeholders believed that uptake on the charge would be higher, if it was clear that the revenue from the cup charge would be spent by Government to support retailers and brands to switch to more circular business models or to develop the infrastructure to be able to collect and recycle more single-use cups. There is opportunity for the Government to celebrate and showcase what revenue from the charge has accomplished.
- There is a good opportunity for Scottish Government to educate consumers. Some stakeholders believed that the only way to effectively change consumption in the long term is through education and outreach, not through a charge on single-use cups, as inevitably a segment of the population will always pay this charge. Communicating the motivations for this charge will be very important.
- When the charge is implemented, there is an opportunity to also strengthen public procurement processes, to demonstrate commitment in this area. For example, scoring tenders based on recyclability of products supplied, and/or sustainability credentials of the company. One stakeholder interviewed operating in the distribution industry highlighted that currently, the score on a tender is 80 to 90% based on price. An aqueous barrier cup, a product they are aiming to introduce, is more expensive and therefore would score lower in the tenders. The stakeholder explained that public tenders are largely price driven and although they are asked about the recyclability of their products, this is not scored on a tender and therefore there is no benefit attached to spending time demonstrating the sustainability credentials of the product.
- When implementing the charge, it was preferred that the charge be required to be passed on to the consumer (e.g., not absorbed by the brand/retailer and not included within the price of the drink) in order to level the playing field for small businesses.

9 Appendix A – Literature review technical detail

Literature searches were performed using Google to search for grey literature and Google Scholar for peer reviewed literature.

Search terms used included:

- Single use
- Cup
- Lid
- Plastic
- Paper
- Compostable
- Plastic free
- Consumption
- Market
- Hospitality
- Coffee
- Fast food
- Trends
- Pandemic
- Demand
- Import
- Purchase

Combinations of these terms were trialled to ensure a thorough search of the available literature.

10 Appendix B – Interview Questions

10.1 Full interview proforma

Topic	Question
General Information	Business Name
	Contact Name
	Contact Details
	Position / Role
	Nature of Business
	Which Part of Scotland do you operate in?
Support of Charge	Are you aware of any trials or programmes trialling a charge on single-use cups or single-use plastic cups?
	How might your organisation respond to a charge? (i.e., Change systems, reusables, offer other products, do nothing)?
Market	What is the proportion of sales/orders/use between hot and cold beverage single-use cups?
	How was the market changing up until 2020 (beginning of the C19 outbreak)? How has it changed during the pandemic, over the last two years?
	How is the market likely to change over the next five years?
	Where are your single-use cups manufactured? (Plastic and non-plastic)
	For retailers and distributors -- Where do you procure single-use cups from? (Plastic and non-plastic)
Alternative	Is your organisation/members you represent already switching or planning to switch away from single-use plastic cups? If so, what are they switching to?
	What alternative products might you provide your customers if there were a charge on single-use plastic cups? If still a single-use alternative, what would it be made from?
	Are some of your customers already using alternatives to single-use cups (e.g., reusables)? Do you think this will continue even without a charge?
	In your opinion, are the single-use alternatives to single-use plastic cups suitable? (Hot and cold - functionally for users)
Environmental Impact	Do you think the alternatives to single-use plastic cups will have any environmental consequences (positive or negative)?
	Is there scope for encouraging reusable products?
	Do you think encouraging reusable products will have an environmental consequence (Positive or negative)?
	Is there another way to encourage reducing consumption and waste, e.g., using fewer items?
Equality Geographical and Social Impacts	Could this policy change disproportionately negatively impact those with protected characteristics? Please explain.
	How would a charge on single-use plastic cups impact the highlands and islands in Scotland? (Positively and/or negatively). How about a charge on all single-use cups?
	What are the potential social impacts of a ban? How might consumers respond?
AOB	Is there any other information you would like to provide? Or contacts we should speak to?
	Are there any alternatives to a charge that you think would be more effective?

10.2 Questions sent to stakeholders for POM data

Topic	Question
Market	<p>In order to help us understand the present market for these single-use products, can you tell us...</p> <ul style="list-style-type: none"> a) How many single-use (SU) cups do you use/distribute/order -- plastic AND non-plastic? b) What are your single-use plastic cups made of? What are your non-plastic single-use cups made of? c) Do you know what % of the market this makes up?
	<p>Same question for lids...</p> <ul style="list-style-type: none"> a) How many lids do you use/distribute/order? (for hot and cold cups) b) What material are lids made of? Does this differ depending on plastic vs non-plastic single-use cups, or hot vs cold cups? c) Do you know what % of the market this makes up?

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