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Towards sustainable packaging:

A plan to eliminate plastic packaging waste from UK bottled water and soft drinks

The University of Cambridge Institute for Sustainability Leadership

For 800 years, the University of Cambridge has fostered leadership, ideas and innovations that have benefited and transformed societies. The University now has a critical role to play to help the world respond to a singular challenge: how to provide for as many as nine billion people by 2050 within a finite envelope of land, water and natural resources, whilst adapting to a warmer, less-predictable climate.

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Rewiring the Economy

Rewiring the Economy is our ten-year plan to lay the foundations for a sustainable economy. The plan is built on ten interdependent tasks, delivered by business, government and finance leaders co-operatively over the next decade, to create an economy that encourages sustainable business practices and delivers positive outcomes for people and societies.

Publication details

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Executive summary

If modern plastics were unveiled today as a new innovation, they would be rightly hailed as a stunning breakthrough. However, the significant challenges presented by plastic packaging waste cannot be ignored. Nor can they be solved in isolation – collective action is required from business, government, and society to create a transformational shift.

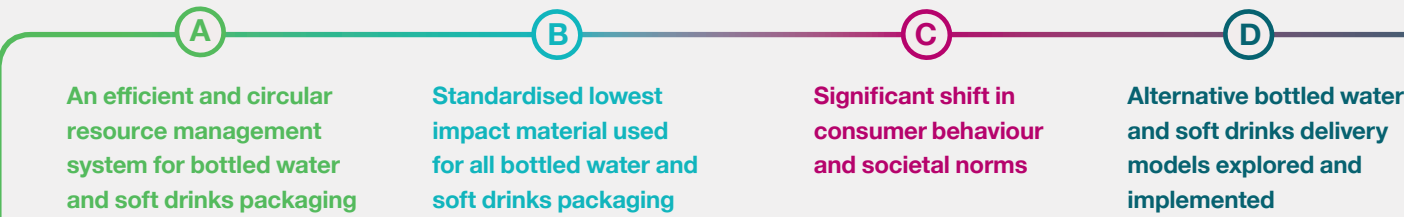
Leading bottled water and soft drinks companies understand that co-ordinated action is required across the value chain to address the challenge of plastic packaging waste from bottled water and soft drinks and to help create long-term sustainable solutions. They see that a systemic approach, bringing together all stakeholders across the value chain, government and society, is required to rethink existing business models and implement workable solutions to eliminate plastic packaging waste and to have the greatest impact.

Through the ambitious vision and roadmap set out in this report, they hope to achieve significant change on this global issue in one prominent sector in the UK that others may learn from and apply within their sectors and in other countries by creating their own systemic roadmaps and visions towards eliminating plastic packaging waste.

Vision for a zero plastic packaging waste future

The ambitious vision set out within this report is to have created a bottled water and soft drinks value chain by 2030 where zero plastic packaging is sent to landfill or escapes into the natural environment. Packaging will be made entirely from recycled or renewable materials or both, will be designed to be fully reusable or recyclable and will be recovered or recycled.

Achieving this vision requires all stakeholders in the bottled water and soft drinks value chain to commit to **eliminating plastic packaging waste as a strategic priority and work collaboratively and simultaneously towards the following four outcomes:**



Actions required to achieve a zero plastic packaging waste future

This report lays out practically how the bottled water and soft drinks value chain can work together, and more widely with others, to achieve this vision by 2030. It provides aspirational milestones for 2025 to show how these sectors should not only meet, but also exceed, the UK Plastics Pact targets. It identifies eight immediate actions for business and government. These actions will need to be undertaken simultaneously to achieve the 2030 vision, although some will take longer to initiate and implement than others.

Led by government

- A** Comprehensively revise the Extended Producer Responsibility (EPR) policy.
- A** Develop and implement consistent Deposit Return Schemes (DRS) across England, Scotland and Wales.
- A** Ensure all revenue from these new policies is earmarked and reinvested in recycling, sorting and reprocessing capacity.

Led by business

- B** Producers to continue to innovate to reduce the volume of plastic used in bottled water and soft drinks packaging and ensure any packaging material used is 100 per cent recyclable or reusable.
- C** Commit to and seek government mandate for a consistent, industry-wide standard labelling for bottled water and soft drinks packaging to ensure consumer clarity on recyclability and recycled content.
- D** Undertake an industry-wide feasibility study on alternative bottled water and soft drinks delivery models and seek to implement recommendations at scale where feasible.

For government and business together

- B** Undertake comprehensive research to investigate the optimal material for bottled water and soft drinks packaging that eliminates plastic waste while ensuring the lowest net environmental impact.
- C** Undertake research into consumer behaviour change and societal norms for a circular bottled water and soft drinks packaging system.



Contents

Page 4	Introduction
Page 6	The plastic packaging waste challenge
Page 10	Vision for a zero plastic packaging waste future
Page 12	How we get there: a plan to eliminate plastic packaging from the UK bottled water and soft drinks value chain
Page 14	A An efficient and circular resource management system for bottled water and soft drinks packaging
Page 20	B Standardised lowest impact material used for all bottled water and soft drinks packaging
Page 26	C Significant shift in consumer behaviour and societal norms
Page 32	D Alternative bottled water and soft drinks delivery models explored and implemented
Page 36	Next steps and recommendations
Page 38	Acknowledgements
Page 40	References

Introduction

Addressing the issue of plastic packaging waste from bottled water and soft drinks requires urgent, collaborative business action.

This report is the result of an industry-led, independent working group on the Future of Plastic Packaging in the bottled water and soft drinks value chain, convened and facilitated by the University of Cambridge Institute for Sustainability Leadership (CISL). The companies involved have sought to set out an ambitious vision and roadmap towards eliminating plastic packaging waste from the UK bottled water and soft drinks value chain.

While the urge to search for quick fixes may be strong, this report recognises the complexities of the plastics challenge and the need to avoid unintended consequences. It also recognises that while government and business are already starting to address the issue, there is still a need to set ambitious goals to push the sector and create a transformational shift to eliminate plastic packaging waste.

This report is relevant for anyone in the bottled water and soft drinks value chain seeking to work towards the common goal of eliminating plastic packaging waste. It is intended to encourage business leaders to work collaboratively on sustainable solutions and for government to consider how policy may accelerate business action. It aims to achieve significant change on this global issue in one prominent sector in the UK, that others may learn from and apply within their sectors and in other countries by creating their own systemic roadmaps and visions towards eliminating plastic packaging waste.

Box 1: Rewiring the Economy

Our current economic system produces positive outcomes such as jobs, healthcare and services. However, it also results in negative outcomes such as climate change and waste. CISL believe we can rewire the economy, so it produces these good outcomes without the bad – and businesses can be part of the solution.

*Rewiring the Economy*¹ is CISL’s model for the necessary collaboration between business, government and finance to rewire the system to deliver the UN Sustainable Development Goals.² The bottled water and soft drinks industry is just one part of this system, but we believe it is a good example of how careful consideration of the outcomes, and intentional collaboration to change the inputs and activities that drive them, is needed.

Action to eliminate plastic soft drinks packaging waste is viewed by CISL to be a key part of this plan. We believe it could:

- reduce reliance on natural materials
- maintain materials in the system
- reduce waste into the environment.

We believe it may also contribute to the economy through the creation of new jobs and development of skills to support, deliver and enable the innovative changes that may be required.

The Future of Plastic Packaging: Eliminating Plastic Packaging Waste Working Group members

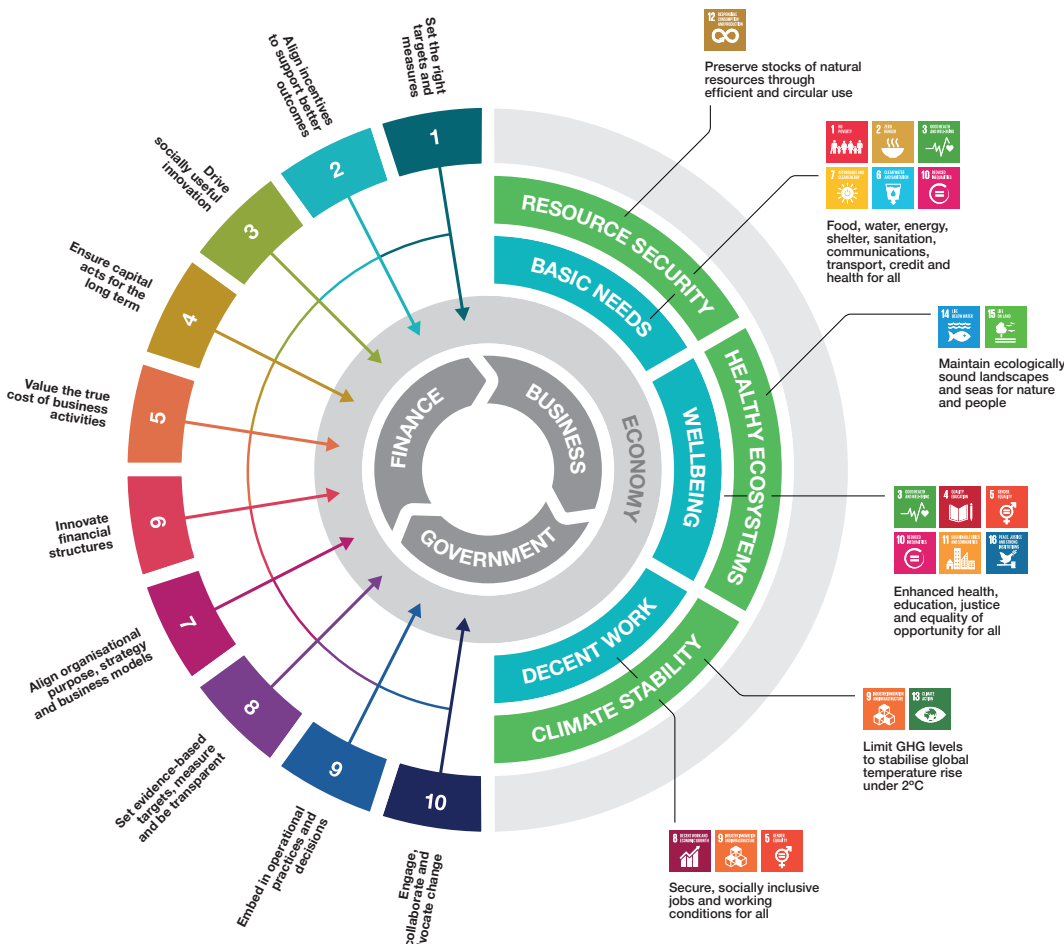


Figure 1: Rewiring the Economy: Ten tasks to lay the foundations for a sustainable economy

The plastic packaging waste challenge

If modern plastics were unveiled today as a new innovation, they would be rightly hailed as a stunning breakthrough: a family of materials that is cheap, durable, flexible, waterproof, lightweight, and able to be deployed in a multitude of ways that allow us to live better and more convenient lives. Globally, plastic production has risen from 1.5 million tonnes in 1950 to over 300 million tonnes today³ and is expected to rise to over 1,800 million tonnes by 2050.⁴ The UK uses over 5 million tonnes of plastic each year,⁵ of which 37 per cent is used to make packaging.⁶

There has been a significant shift by bottled water and soft drinks producers to move towards the use of plastic as a packaging material. It has been preferred due its lightweight qualities and subsequent carbon savings from transport, its recyclability and its effectiveness in preventing breakages and food waste. In the UK, a reported 72 per cent of soft drinks are packaged in plastic.⁷ Plastic is also used as a transit material – to safely wrap drinks in delivery. In the UK, an estimated 1.2 million tonnes of plastic film from all sectors ends up as waste each year.⁸ Yet one of the very qualities that makes plastic so attractive as a bottled water and soft drinks packaging material – its durability – also means that when it is lost into the environment, it does not break down, and therefore remains in the environment as a pollutant.

Society is in the midst of a global plastics pollution challenge. The UN has stated there is a “plastics crisis” and on 6 December 2017, adopted a (non-binding) resolution calling for an end to plastic entering the sea. If current production and waste management trends continue, an estimated 12,000 megatonnes of plastic waste from all sectors will be in landfills or in the natural environment by 2050.⁹

There is more public and political awareness and concern surrounding plastic waste than ever before. Multiple intersections with public health, the climate change agenda, resource scarcity, and human impacts on biodiversity create a perfect storm of forces, meaning that industry has an unprecedented opportunity to take a leadership role on the issue of plastic packaging waste.

There remain, however, a great deal of unknowns. These range from whether bio-based materials can be used for bottled water and soft drinks at scale, to how biodegradable materials would fit into existing recycling streams, to whether it is feasible for bottled water and soft drinks to be delivered in any way other than in packaging that is used once before disposal by the consumer. We do not know if it will even ever be achievable to totally eliminate plastic packaging waste. However, there is a need to act now, before all of these unknowns can be addressed, and to set a high level of ambition, even if it seems hard to achieve in the current context.

Box 2: Plastic soft drinks packaging

The use of plastic in soft drinks* packaging takes many forms and uses many different grades of plastic (see Figure 2). The grades used indicate what type of plastic resin an item is made from to support the recycling of that product.^{10,11} Most of these types of plastic can be technically recycled, however, polyethylene terephthalate (PET) and high-density polyethylene (HDPE) are the only ones that are widely collected in kerbside recycling schemes and some grades of plastic are not collected at all.

For example, bottles are usually made from PET or recycled PET (Grade 1 plastic); sleeves or labels are usually made from PET, polypropylene (PP) (Grade 5) or polyethylene (PE) based film, the caps are usually made from HDPE (Grade 2) or PP; shrink-wrap is usually made using low-density polyethylene (LDPE) (Grade 4); and straws are usually made from PP. Plastic can also be combined with aluminium to form a laminate, which is often used as packaging for smaller on-the-go soft drinks or further combined with cardboard to form cartons. For the purpose of this report we consider all of these items as plastic waste unless they are reused or recycled.

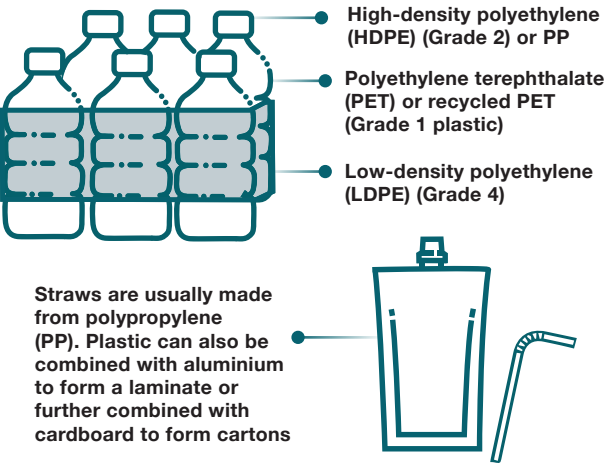


Figure 2: Plastic soft drinks packaging is made from many grades of plastics

Box 3: Eliminating plastic packaging waste

The ambition is that all plastic packaging should be recovered and either reused, recycled or repurposed. No plastic soft drinks packaging should end up in landfill and there should be no plastic packaging leakage into the land, river, or ocean environment. The ultimate goal is to transition to a more circular economy for plastic soft drinks packaging, where plastic packaging use is reduced wherever possible and otherwise is reusable or recyclable and recovered or recycled.

* In this report, both of the terms ‘soft drinks’ and ‘bottled water and soft drinks’ include all mineral, spring and table water, carbonated and non-carbonated beverages that are sold in the UK.





Leading bottled water and soft drinks companies are committed to decisive action, building upon progress made to reduce the use of plastic in packaging through light-weighting, water and carbon footprint reduction and more environmentally driven design. However, where to refocus efforts in eliminating plastic packaging waste is a challenging question for many companies. The ideal, from a waste hierarchy perspective, is to reduce, reuse, and then recycle, but how can business models adapt and remain futureproof? How can our society use plastic better as a resource? How can we be sure that backing one solution now will not cause other, currently unknown unintended consequences in a few years' time?

These significant challenges cannot be resolved in isolation – collective action is required across the full value chain. This report aims to provide a practical tool for collaborative action from industry, policymakers, and other key stakeholders, setting out action points and milestones to work towards a zero plastic packaging waste future for soft drinks. In isolation, this report cannot resolve the global plastics pollution problem. However, it can help achieve significant change in one prominent sector in the UK that others may learn from and apply within their own sectors and in other countries by creating their own systemic roadmaps and visions towards eliminating plastic packaging waste.

Some examples of collective action are already emerging. This includes the launch, in April 2018, of the UK Plastics Pact, a set of four targets for 2025 (see figure 3) that commit the companies who sign up to take action towards creating a circular economy for plastics. These targets provide a minimum level of ambition for plastic soft drinks packaging that the sector should not only work to achieve, but to exceed.

The vision and pathways set out in this report are holistic and balance how the elimination of plastic packaging waste impacts other sustainability targets. It is important that any intervention made to eliminate plastic packaging waste from soft drinks does not have negative environmental or social impacts in other areas or sectors, for example through increasing carbon emissions or diverting land away from food production. Businesses considering how best to address the plastic packaging waste issue are balancing a number of seemingly conflicting concerns. While no perfect solution exists, a holistic approach is required to ensure that any changes to plastic soft drinks packaging do not replace one group of negative externalities with another, more damaging set.

Business and government must demonstrate strong leadership and a commitment to creating a transformational shift towards eliminating soft drinks plastic packaging waste.

Figure 3: The UK Plastics Pact

100%
Of plastic packaging to be reusable, recyclable or compostable by 2025

ELIMINATE
Single-use packaging through redesign, innovation or alternative (reuse) delivery models by 2025

70%
Of plastic packaging effectively recycled or composted by 2025

30%
Average recycled content across all plastic packaging by 2025

Vision for a zero plastic packaging waste future

Imagine a future where if you feel thirsty at home, at work or on the move, you have multiple options to obtain a soft drink, but none of those options need have a detrimental impact on the environment. Consumer choice and environmental impact will not be mutually exclusive. Soft drinks packaging will be designed to be ‘perfect for purpose’, while having minimal environmental and social impact, and it will be easy and instinctive to dispose of the packaging responsibly.

The ambition set out within this report is to have created a bottled water and soft drinks value chain by 2030 where zero plastic packaging is sent to landfill or escapes into the natural environment. Packaging will be made entirely from recycled or renewable materials or both, will be designed to be fully reusable or recyclable and will be recovered or recycled.

Business as usual will not solve the plastic packaging waste challenge. This vision sets out an aspirational picture of a better system that would challenge business as usual and go beyond existing perceptions of what is possible. The bottled water and soft drinks value chain does not yet have all the answers, but through collaborative action, needs to invest in finding them.

The capabilities of existing technologies should not limit ambition. Research and development will play a role in this transformation and conditions must be created to support this. For example, it is currently not possible to recycle PET infinitely. Could it be in the future, with the advent of chemical recycling combined with conventional mechanical methods? This vision attempts to strike a balance between what is now feasible and how the ideal sustainable bottled water and soft drinks economy will stimulate new ideas and exciting innovations.

Some of the aspirations in the vision may challenge existing business and delivery models. For example, potential alternative delivery systems, such as bottle refill, may not suit all products and will need a full life cycle impact assessment alongside other options. By law, mineral and spring water must be bottled at source, while some carbonated soft drinks cannot be made using syrup, making existing dispensing technology unsuitable. These are not easy challenges to overcome. Bottled water and soft drinks companies need to address these difficult questions and recognise they are part of a wider ecosystem and have a role to play in shaping the future – even if that means recalibrating existing business models and taking risks on new technologies.

This vision is a desirable future, a stimulus for action. The following sections lay out practically how the bottled water and soft drinks value chain can work together, and more widely with others, to achieve this vision by 2030. It provides aspirational milestones for 2025 to show how the sector should not only meet, but also exceed, the UK Plastics Pact targets. It identifies eight immediate actions for business and government. These actions will need to be undertaken simultaneously to achieve the 2030 vision, although some will take longer to initiate and implement than others.

This report provides all stakeholders in the bottled water and soft drinks value chain, including government, with the opportunity to take a leading role towards eliminating plastic packaging waste in the UK.

Vision

By 2030, to have created a bottled water and soft drinks value chain where:

Zero plastic packaging goes to landfill or escapes to the natural environment

Bottled water and soft drinks packaging is made entirely from recycled or renewable materials or both

Packaging is designed to be fully reusable or recyclable and is recovered or recycled

To achieve this requires working towards the following four outcomes:

A

An efficient and circular resource management system for bottled water and soft drinks packaging

B

Standardised lowest impact material used for all bottled water and soft drinks packaging

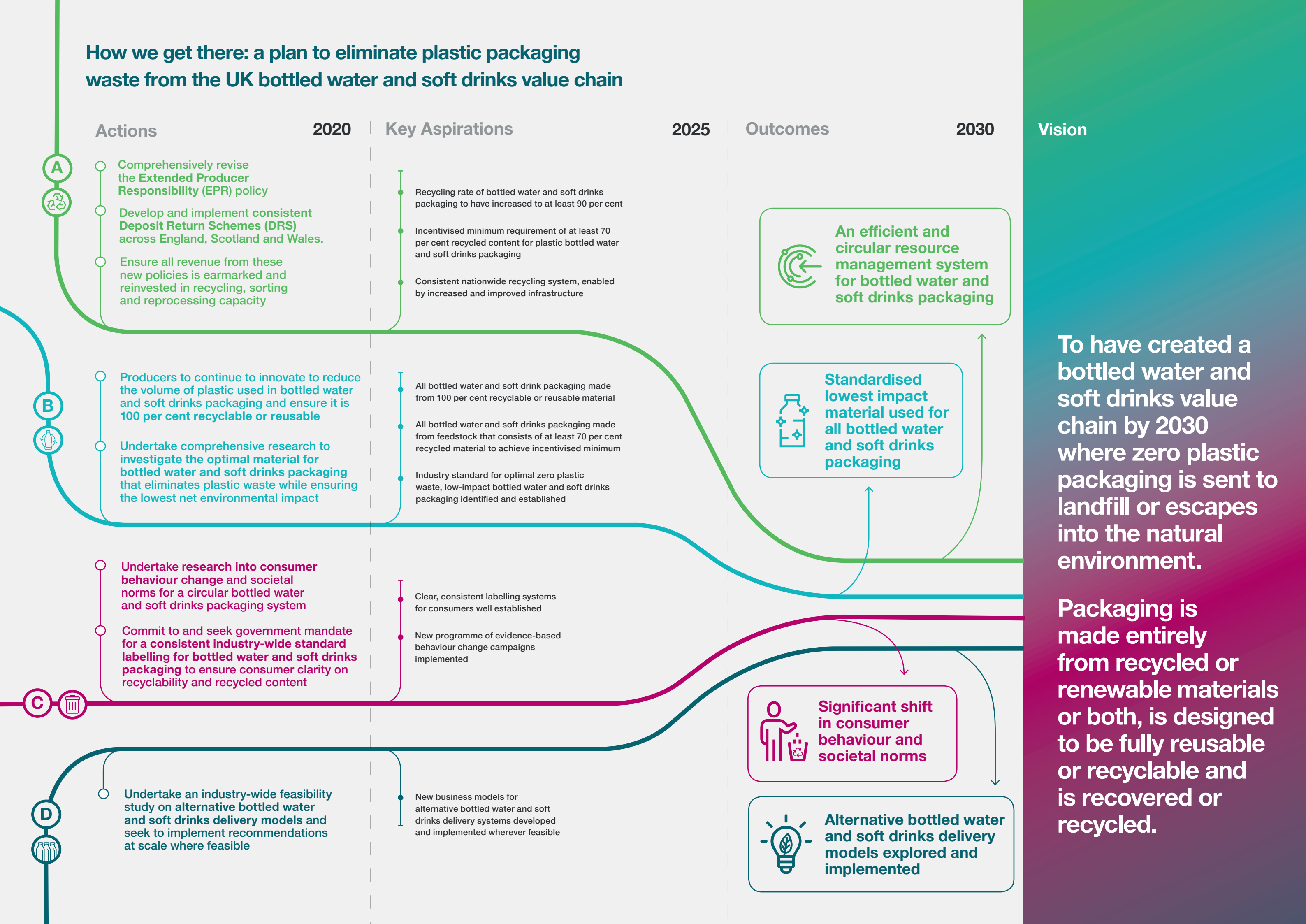
C

Significant shift in consumer behaviour and societal norms

D

Alternative bottled water and soft drinks delivery models explored and implemented

How we get there: a plan to eliminate plastic packaging waste from the UK bottled water and soft drinks value chain





An efficient and circular resource management system for bottled water and soft drinks packaging

The way the UK looks at waste, recycling, and resources needs a step change improvement. Rather than being seen as primarily an 'end of life' waste disposal system, it is being increasingly recast as a resource management system – an opportunity for the UK to steward resources through the economy, securing the maximum value and productivity from those resources. In practice, this means filling the gaps in the recycling system to ensure consistent nationwide recycling, and adequate infrastructure that is easy for consumers and businesses to engage with. It also means more investment into reprocessing to ensure enough high-value recycled material is available and used with incentives in place to specifically encourage secondary material use.

Vision for 2030:

An efficient and circular resource management system for bottled water and soft drinks packaging

Aspirations for 2025:

- Recycling collection rate of bottled water and soft drinks packaging to have increased to at least 90 per cent
- Incentivised minimum requirement of at least 70 per cent recycled content for plastic bottled water and soft drinks packaging
- Consistent nationwide recycling collection system enabled by increased and improved infrastructure

Actions required by 2020:

- **Comprehensively revise the Extended Producer Responsibility policy**, so it (1) incentivises bottled water and soft drinks packaging that contains recycled material and is recyclable by consumers; (2) disincentivises the overuse of materials and use of hard-to-recycle materials; and (3) incentivises a minimum recycled content for plastic bottled water and soft drinks packaging that is gradually increased over time to reach 100 per cent by or before 2030.
- **Develop and implement consistent DRS across England, Scotland and Wales**, to create a system that (1) enables on-the-go recycling and prioritises filling gaps in current recycling infrastructure; and (2) specifies that all material collected is then recycled and is prioritised as feedstock for new packaging in the same sector.
- **Ensure all revenue from these new policies is earmarked and reinvested in recycling, sorting and reprocessing capacity**, to ensure (1) recycling facilities are consistent across all local authority areas; and (2) adequate facilities using the latest technology exist in the UK to separate and reprocess high-value bottled water and soft drinks packaging, so it can be available as feedstock for new bottled water and soft drinks packaging rather than exported.



By 2030, the opportunity is for **all plastic soft drinks packaging to be recovered or recycled**



Increasing recycling collection rates

Although there has been a significant increase in plastic bottle recycling collection rates in the last few years, an average 26 per cent of soft drinks bottles¹² are still not being recycled by households in the UK. In 2017, if every adult had recycled just one more plastic drinks bottle during the year, the recycling rate would have increased by 4 per cent.¹³

With the aim of increasing recycling collection rates and reducing plastic packaging leaking into the environment, England, Scotland and Wales have all committed to introducing a Deposit Return Scheme (DRS) for soft drinks packaging (Northern Ireland has not yet announced a similar commitment).¹⁴ The schemes will place a deposit on soft drinks packaging before they are sold, which is returned once they are deposited, including through ‘reverse vending machines’. In countries such as Norway, this has led to a 97 per cent recycling rate¹⁵ and the long-term ambition is to achieve a similarly high recycling collection rate in Great Britain. If it is introduced, any DRS scheme needs to be designed to be as effective as possible and form part of a wider solution to increase recycling collection rates.

To maximise the potential of a DRS to eliminate plastic packaging waste and increase recycling rates in the UK, machines need to be placed in areas where recycling facilities are not currently available. This would increase the likelihood of capturing bottled water and soft drinks packaging that may otherwise have gone to landfill or be lost to the natural environment. Ideal locations could include transport hubs, service stations, town centres, cafés, parks, hospitals, universities, schools, retailers, retail parks, and public buildings. By placing them near or adjacent to, not only point of sale, but also point of on-the-go consumption, they will be easier and more convenient for consumers to use.

Alongside this, consideration should be given to how businesses, particularly small and medium enterprises, are incentivised or obligated to support collection and recovery of plastic soft drinks packaging material. Commercial and industrial sectors in the UK produce in total over 40 million tonnes per annum of waste.¹⁶ Although every business in the UK is required to complete waste transfer notes for every item of waste that leaves their premises,¹⁷ it is not clear how much of this is plastic soft drinks packaging or the percentage that is recycled or not recycled, as there are no published figures available.

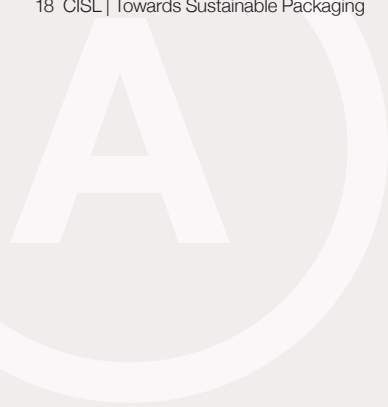
Consistent recycling collection infrastructure

Currently, 99 per cent of local authorities provide collection for plastic bottles.¹⁸ It is important that this consistent provision is not only maintained, but also increased to 100 per cent. A recommendation by the Welsh Government in 2011 for a consistent recycling system, supported by an ambitious recycling target for household waste, is cited to be a key reason why they have a higher overall recycling rate (57.3 per cent in 2016) than the rest of the UK (England – 44.9 per cent, Northern Ireland – 43 per cent and Scotland – 42.8 per cent).^{19,15}

The implementation of a DRS should also be consistent across the whole of Great Britain. This could be delivered through one co-ordinated scheme, or, at a minimum, the three schemes for England, Scotland and Wales need to be harmonised with core fundamentals to ensure simplicity for consumers and industry. These should include: the collection of the same materials; application to all drinks containers of all the same sizes; and the deposit value should be the same across the three countries.

DRS has the potential to generate high-quality material for recycling because there is a far greater degree of control over what is collected and how it is separated. This is especially important when incorporating recycled PET (rPET) in soft drinks packaging, as only food-grade material is acceptable. The DRS will need to be carefully designed such that it complements existing kerbside collection schemes.²⁰ Although some material may be diverted away from home recycling collections, it could result in net cost savings for local authorities due to a reduction in residual waste requiring treatment, along with the possibility of reduced material recovery facility (MRF) costs and potential efficiencies in collection.²¹ Local authorities should also have the opportunity to identify and advise on optimal locations for reverse vending machines in their localities to ensure the system is well designed to maximise the capture of plastic soft drinks bottles.





Incentivising secondary material use

In reforming the Extended Producer Responsibility (EPR) scheme for packaging, known as the Packaging Recovery Note (PRN) system, there is an opportunity for government to encourage secondary material use and support investment in reprocessors and public communication schemes. This would reduce the likelihood of soft drinks being produced using plastic packaging that is hard to recycle, for example, plastic laminates, and increase the likelihood of soft drinks packaging being made from material that is recyclable, for example, PET. It would also drive investment in innovation to find alternatives for hard-to-recycle plastic packaging, for example, the plastic laminates, sleeves, carton straws, and plastic shrink-wrap packaging, for which no suitable alternatives currently exist, or to drive innovation in recycling technology to be able to accept a wider range of plastic packaging material for reprocessing, for example, through chemical recycling.

Box 4: Chemical recycling

Chemical recycling offers a potential opportunity for capturing and recycling currently harder-to-recycle and lower-value plastic soft drinks packaging, such as the caps, plastic sleeves and shrink-wrap. Chemical recycling refers to the process of converting lower-grade plastic packaging waste materials back into a form of oil, which can be used as a feedstock, for example, for new plastic packaging. This process, which is being trialled in the UK,²² has the potential to create an almost entirely closed system. This is closer than mechanical recycling is ever likely to get, although it is only through a combination of both that it is ever likely we will get near to a 100 per cent recycling rate for all plastic soft drinks packaging.

If the UK's recycling capacity is significantly extended and modernised by 2030, an estimated 25,000 new jobs could be created.²⁵

To effectively encourage higher rates of packaging recovery and recycling and help build a circular system for plastic packaging in the UK, an updated PRN system should:

- **financially reward recyclability** – with maximum incentives for packaging materials that are 100 per cent collectable in both home and DRS recycling schemes
- **financially reward use of recycled content** – with maximum incentives for packaging made from 100 per cent recycled material
- **ensure all proceeds from a new PRN fund** go back into supporting infrastructure and consumer campaigns to increase recycling rates, and all unclaimed deposits from a DRS go back into maintaining the DRS scheme and consumer campaigns to support implementation
- **require all bottled water and soft drinks producers** of any size to be part of it
- **ensure all reprocessors and exporters** are obligated to be part of the system to ensure true recycling rates are measured
- **incentivise a minimum recycled content** for plastic soft drinks packaging that gradually increases towards 70 per cent in 2025 and 100 per cent in 2030
- **reform the Packaging Export Recovery Note (PERN)** system to incentivise recycling and reprocessing of plastic packaging waste in the UK and reduce levels of export with the aim of increasing the volume of recycled plastic feedstock available in the UK.

Making rPET commercially viable

There is currently a price difference between food-grade quality virgin feedstock and rPET, which makes it cheaper for producers to use the former rather than the latter.²³ Alongside this, UK reprocessors are currently unable to meet demand from industry for rPET drinks packaging because of a chronic shortage of suitable feedstock.²⁴ One cause of this can be ineffective sorting of recycled material, which results in bottles that could have been used to create food-grade rPET suitable for bottled water and soft drinks packaging ending up in the recycling stream for lower-quality material destined for use in other products, such as toys, outdoor furniture or textiles. Investment in sorting and reprocessing systems, supported by an effectively implemented DRS and revised EPR scheme, could ensure an increase in availability of high-value recycled material. Incentivising a minimum required recycled content for plastic soft drinks packaging also has the potential to stimulate the market for recycled material, as it would encourage all businesses to work towards meeting this target and therefore increase demand.



Standardised lowest impact material used for all bottled water and soft drinks packaging

Industry and government should work together to optimise material choice for soft drinks packaging. This could be achieved through a process of innovation, based on agreed goals and dynamic industry standards that ensure soft drinks are only put on the market in the best packaging available that can be recycled or reused, but that also has the lowest environmental impact overall.

Vision for 2030:

Standardised lowest impact material used for all bottled water and soft drinks packaging

Aspirations for 2025:

- All bottled water and soft drink packaging made from 100 per cent recyclable or reusable material resulting in non-recyclable and hard-to-recycle plastics being phased out
- All bottled water and soft drinks packaging is made from feedstock that consists of at least 70 per cent recycled material, to achieve incentivised minimum
- Industry standard for optimal zero plastic waste, low-impact bottled water and soft drinks packaging identified and established

Actions required by 2020:

- **Producers to continue to innovate to reduce the volume of plastic used in bottled water and soft drinks packaging and ensure it is 100 per cent recyclable or reusable.** This includes all plastic soft drinks packaging. Hard-to-recycle plastic soft drinks packaging should start being phased out immediately.
- **Undertake comprehensive research to investigate the optimal material for bottled water and soft drinks packaging that eliminates plastic waste while ensuring the lowest net environmental impact.** This will explore plastic (PET/laminate), non-plastic (glass, aluminium, cartons) and bio-based materials. From this will be created (1) a design checklist that sets an industry standard based on properties of ideal material for soft drinks packaging; and (2) innovation funding to research and identify new materials based on the industry standard.



By 2030, the opportunity is for **all bottled water and soft drinks packaging** to be made entirely from recycled or renewable materials or both, and be designed to be fully reusable or recyclable

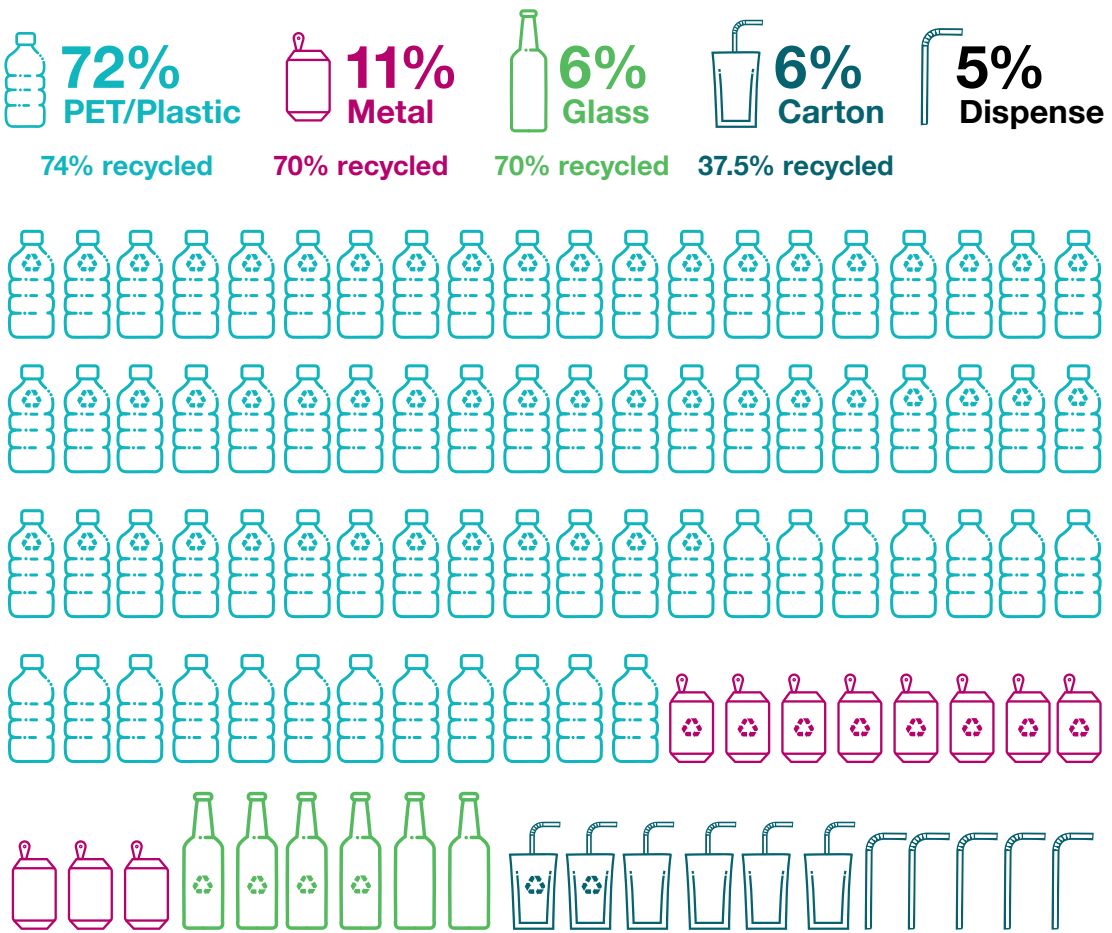


Plastic – the current material of choice

In the UK each year, the average person consumes approximately 200 litres of soft drinks.²⁶ They are most likely to consume them from plastic packaging (see figure 4) – 72 per cent of all soft drinks are packaged in PET/ plastic – with this likelihood being higher for bottled water (95 per cent) and dilutables (96 per cent) than it is for still and juice drinks (67 per cent), carbonates (61 per cent), sports and energy drinks (55 per cent), and fruit juices (34 per cent).²⁷ The current percentage of recycled PET (rPET) used to produce this packaging is unclear, as there is no formal reporting within the sector. One 2017 report identified that five of the six top international soft drinks companies used a combined average of 6.6 per cent rPET globally,²⁸ however, based on recent commitments by bottled water and soft drinks companies the actual figure is likely to be far higher than this. Of the PET/ plastic drinks bottles put on the market in the UK, 74 per cent are currently collected for recycling from kerbside – the highest recycling rate of all soft drinks packaging materials.¹¹

Most UK bottled water and soft drinks companies already have targets to ensure all their packaging is 100 per cent recyclable by 2025,²⁶ in line with the UK Plastics Pact targets.²⁹ In addition, many have targets to increase levels of recycled content ranging from 25 per cent by 2020 to 50 per cent by 2025. Few have a target of 100 per cent recycled content, although Highland Spring is trialling a 100 per cent rPET ‘eco bottle’³⁰ and Ribena has had 100 per cent rPET bottles since 2007.³¹ For all plastic soft drinks packaging to contain even 70 per cent recycled content, some challenges will need to be overcome, for example, increasing the availability and quality of recycled material, as well as making rPET commercially viable. Predictions based on currently available technologies only expect that between 70 to 90 per cent recycled content is possible by 2030,³² however, setting a higher level of ambition could drive the innovation required to achieve 100 per cent recycled content, although this does not allow for growth in the sector.

Figure 4: UK soft drinks packaging types⁷ and the percentage of each type that are recycled¹²



Box 5: The South Korean approach to reducing complexity and increasing recyclability

The number of different polymers, types and colour of plastics used to produce packaging causes challenges for recycling firms and reproducers.³³ For example, reproducers require clear or slightly blue-tinted feedstock to produce high-quality rPET and avoid discolouration issues.³⁴ Working in conjunction with their Government, South Korean industry has recently agreed to tackle this directly. A group of 19 major fast-moving consumer goods companies (FMCGs) producing 55 per cent of PET bottles in Korea have signed up to a voluntary agreement to make a number of changes to their plastic packaging by 2020. This includes to change from coloured PET to clear, ensure caps are produced using the same material as the bottle and use sleeves made from plastic rather than paper or print labels. Such a change presents challenges for companies in relation to branding and differentiation, but is a logical step in making recycling of packaging easier.



“The Highland Spring eco bottle trial will feed into category wide insights on how consumers’ perceptions are impacted by water bottles made entirely from recycled plastic.

It also helps us get across the message that plastic water bottles are recyclable and should be seen as a resource and not thrown away.”

Les Montgomery, Chief Executive, Highland Spring

Switching materials to avoid plastic waste

In eliminating plastic packaging waste, one option would be to switch materials, and there are instances of this already occurring. Some soft drinks are now being transported in cardboard instead of plastic shrink-wrap.³⁵ The plastic straws offered by food and drink outlets are being replaced with metal, bamboo and paper alternatives.³⁶ Some retailers are offering soft drinks in only glass or aluminium³⁷ with an increasing number of 'zero waste' stores opening.³⁸ Many consumers are also making choices based on the assumption that glass is less environmentally bad than plastic.³⁹

In making this shift, businesses need to ensure they understand the full impacts of any alternative to ensure they do not have any other, potentially worse, environmental consequences. One study estimates the overall environmental cost of using plastics in the soft drinks industry at nearly four and a half times less than it would be if the plastics were replaced with

alternative materials, such as aluminium, paper and glass.⁴⁰ For plastic bottles, life cycle analysis (LCA) consistently highlights its lower carbon footprint, with glass bottles needing to be reused at least 20 times before their carbon emissions become equivalent at current recycling rates for PET soft drinks bottles.⁴¹

However, some current assessment methods and studies do not necessarily account for end-of-life impacts. This includes how an item is disposed of and what impact it can have on the environment if not disposed of properly. Further research could help business to understand not only the net environmental impact of current materials available, but also lead to the potential development of a new full LCA tool to inform future packaging design considerations.

An opportunity for bio-based materials?

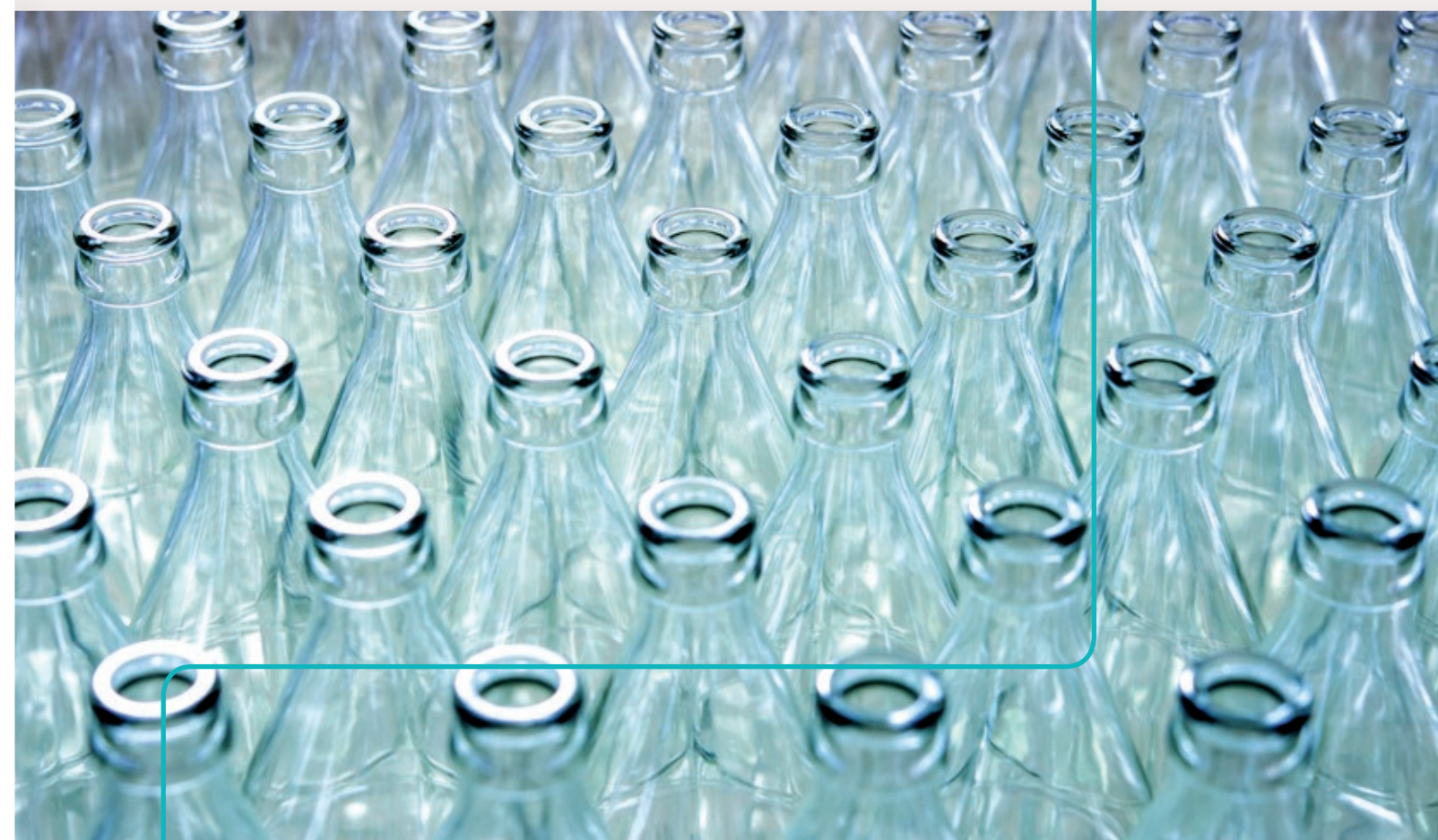
Bottled water and soft drinks companies are exploring the opportunity for creating bottles from plant-based materials, with some already on the market.⁴² However, although made from natural materials, bio-based PET bottles perform in the same way as oil-derived PET bottles, with the same plastic pollution challenges if they escape into the environment. Biodegradable materials that break down either in the environment or in composting facilities present another potential opportunity, for which the feasibility needs to be explored. The innovations already emerging include drinking water held in an edible film that you can eat⁴³ to a bottle made from paper that is designed to fully decompose within three weeks.⁴⁴

However, there remain unknowns with biodegradable materials that need to be explored fully to see whether they could provide a solution at scale for soft drinks packaging. Most require specific controlled circumstances to break down, such as in industrial-grade composting facilities, so to be implemented at scale would require national infrastructure that is currently not available.⁴⁵ Some, such as poly-lactic acid (PLA) biodegradables, look like conventional plastic, so there is a risk they may be disposed of via recycling instead of with compostable waste, which could contaminate PET reprocessing. Biodegradables, although made using renewable materials, also only provide a linear (take-make-dispose) solution, as they require adequate natural feedstock to produce. Although compostable, the broken-down product cannot currently be used to make new biodegradable products.

Holistic environmental footprints

There are few independent studies giving comparable, holistic environmental data, including end-of-life impacts, for popular soft drinks packaging materials that also assess emergent materials. While there are innumerable LCA studies, each highlighting the respective benefits of a particular material, when taken in comparison, these do not present a consistent, clear picture of the best material choice overall, especially when also taking into account end-of-life impact.

Alongside this, there are currently no publicly available up-to-date studies comparing the holistic impact of newer packaging materials, such as those based on renewable plant-based carbon, with conventional packaging options. Nor are there any to identify what qualities the optimal low-impact material would have, if not currently available. While individual companies might be undertaking this research internally, to create competitive advantage they may not publish their findings externally. However, to address the issue of plastic soft drinks packaging waste, there is a clear need for independent, publicly available research and data in this area to support business and consumer decision-making, both in the current context and to leverage new innovations in the future. This would need to look at all types of plastic soft drinks packaging to include, for example, laminates, plastic caps, sleeves and shrink-wrap.





Significant shift in consumer behaviour and societal norms

Engaging consumers across the UK is critical to eliminating plastic soft drinks packaging waste. By encouraging them to treat plastic packaging material as a valuable resource not to be wasted and working to facilitate behaviour change (so their actions reduce the need for packaging, they reuse packaging where possible, and recycle where not) a cultural shift could be achieved that makes it far less likely for plastic soft drinks packaging to end up as waste. Consumer engagement, supported by consistent infrastructure and labelling, can increase impact and effectiveness towards creating new societal norms, where it is widely acceptable and expected that consumers engage with how and why they are using a product, how it is packaged and delivered to them, how they dispose of it and what happens beyond disposal.

Vision for 2030:

Significant shift in consumer behaviour and societal norms

Aspirations for 2025:

- Clear, consistent labelling systems for consumers well established
- New programme of evidence-based behaviour change campaigns implemented

Action required by 2020:

- **Undertake research into consumer behaviour change and societal norms for a circular bottled water and soft drinks packaging system**, building on existing knowledge and exploring:
 - how to address barriers that restrict consumer recycling of materials
 - how to engage consumers in not just recycling but rethinking how they access and use products, creating a wide-scale mindset shift and new norms
 - willingness of consumers to buy in to alternative ways eg refill systems, larger formats, delivery direct to the home
- **Commit to and seek government mandate for a consistent industry-wide standard labelling for bottled water and soft drinks packaging ensuring consumer clarity on recyclability and recycled content**, building on current progress and consistent with recommended DRS design



By 2030, the opportunity is for a significant shift in societal norms resulting in **zero plastic soft drinks packaging waste** going to landfill or escaping to the environment



Consumer concern about plastic waste

The issue of plastic waste is increasingly a matter of public concern. In the UK, the Blue Planet II series narrated by Sir David Attenborough drew attention to the issue and was the most watched series of 2017.⁴⁶ After the last episode aired, internet searches for ‘plastic recycling’ rose by 55 per cent and oceans-focused NGOs saw hits to their websites rise dramatically.⁴⁷ Alongside this, there are a growing number of campaigns, some consumer led, raising awareness of the issue and urging consumers to take actions such as, ‘pass on plastic’,⁴⁸ ‘go plastic free’,⁴⁹ and ‘create a world free of single use plastic’.⁵⁰

In response, some businesses, community groups, and schools are taking unilateral, local action to support consumers in making different choices. For example, some businesses and government offices are no longer selling mineral and spring water in plastic bottles and making water refill stations available instead.⁵¹ One school has also banned plastic straws, bottles and cups from school grounds, branding them as ‘anti-social’.⁵² These actions may provide ‘quick fix’ solutions in the short-term, however, to create a transformational systemic shift, a more holistic, longer-term, collaborative approach is required.

Engaging consumers in recycling

Consumers can play a critical role in ensuring that valuable plastic packaging material is recycled and its value retained in the transition to a circular system for plastic soft drinks packaging. However, not all consumers understand the value of recycling or what recycled material can come back as,⁵³ and few report having heard of ‘a circular economy’ and know exactly what it means.³⁸

The UK has had a national campaign for recycling, Recycle Now, since 2004.⁵⁴ Last year they launched a campaign ‘What goes around comes around’ to try and help consumers understand the value of recycling.⁵⁵ To support an increase in recycling rates, more campaigns like this are needed that engage consumers in understanding the value of the packaging material and the benefits of recycling. To increase the impact of such campaigns there may be key lessons to learn from improved understanding of behavioural science. Alongside this, systemic changes that increase availability and consistency of recycling, such as implementation of a DRS scheme, will provide further opportunity to engage consumers and increase understanding.

Engaging consumers through on-pack labelling

On-pack labelling can also engage consumers in understanding how and where an item of packaging can be recycled. However, current labelling systems cause confusion⁵⁶ – over 50 per cent of households in the UK assume that on-pack labelling applies to their local area when it may not.⁵⁷ Although some symbols such as the ‘green dot’ or Mobius symbol show that an item may be recyclable, it does not mean that there are recycling facilities available for it in a particular locality or even in the UK.⁵⁸

A 2016 study found a third of respondents did not know which plastics could be recycled in kerbside recycling schemes.⁵⁹ The UK-wide On-Pack Recycling Label (OPRL) scheme, launched in 2009, is trying to address this issue with clearer labelling,⁶⁰ however, it is only a voluntary scheme and not all producers are signed up to it. If the scheme were to be mandated, so every bottled water and soft drinks producer operating in the UK would be required to join, this would then mean that every item of soft drinks packaging sold in the UK would be clearly labelled and identifiable as widely recyclable or not. Implemented alongside behaviour change campaigns, mandated labelling could encourage greater recycling rates.

Box 6: On-Pack Recycling Label

The UK-wide On-Pack Recycling Label (OPRL) scheme⁶¹ is used by over 600 brands. Its universal adoption is encouraged by the UK Government and WRAP.⁶²

The OPRL label has three categories (see figure 5) which tell consumers how likely it is that their local authority will accept specific packaging materials for recycling:

- **Widely Recycled** (75 per cent or more of UK local authorities collect this type of packaging)
- **Check Locally** (between 20 per cent and 75 per cent of UK local authorities collect this type of packaging)
- **Not Yet Recycled** (less than 20 per cent of UK local authorities collect this type of packaging)

OPRL’s consumer research in 2016 showed at least seven in ten consumers recognised and acted on the label, rising to nine in ten recognition among 18–24 year olds and eight in ten among 25–34 year olds.



Figure 5: The three OPRL label categories



Creating a societal shift

From a classic waste hierarchy perspective, action should be taken to reduce and reuse before recycling. This means consumer campaigns need to focus not just on the value of recycling, but also on how consumers can value the material and take actions that reduce the need for packaging or to reuse it where possible. There are indications this is already starting to happen – in one survey, over half of consumers report taking increasing action to reduce plastic packaging usage.⁶³ However, to unlock new behaviours and achieve a dramatic change in recycling rates will require a societal shift in expectations, so it is widely acceptable and expected that consumers engage with how and why they are using a product, how it is packaged and delivered to them, how they dispose of it and what happens to it beyond disposal.

For soft drinks, if a consumer were to avoid plastic packaging that would currently mean choosing soft drinks in an alternative packaging material such as glass or aluminium, the implications of which are considered in the previous section. If consumers are to access drinks in a different way (see the following section), for example, through a refill system, more research is required to understand how consumers' relationship with soft drinks consumption can be transformed to help them rethink how they access and use products.

Current research into the use of refillable water bottles shows a gap in intentions and uptake, with barriers including convenience,⁶⁴ forgetfulness and hygiene concerns.⁶⁵ These barriers and potential enablers need to be explored further to understand the willingness of consumers to buy in to different delivery systems, how any barriers may be overcome and the role of business in creating this shift, including the opportunity to develop innovative new business models.

Influencing behaviour change

Consumer-focused campaigns about plastic packaging aim to do one key thing – change behaviour with regard to the use of plastic. However, how effective a campaign will be in changing behaviour can depend on how it is designed to appeal to and affect its target audience.

There is a growing body of research and debate discussing this. A number of theories, for example, cite the importance of values in shaping our behaviour. Some models explore the importance of designing behaviour change campaigns to work with people's existing values,⁶⁶ whereas others explore how communications and actions can support the development of values that in turn support better behaviours and choices.⁶⁷

Other work emphasises evidence-based experimentation about which interventions are best to trigger behaviour changes, something the UK Government has itself experimented with, establishing the Behavioural Insights Unit, which started in 10 Downing Street and has now become a social purpose company jointly owned by the Government.⁶⁸

All of these models and approaches aim to identify the power of social norms in shaping and enforcing behaviours. To deliver on the scale of transformation required in the vision will require a shift in behaviours at a societal level. Government and business should work together to explore how best to trigger this change.





Alternative bottled water and soft drinks delivery models explored and implemented

Reducing the use of plastic packaging for bottled water and soft drinks at point of sale could potentially have an impact on eliminating waste by reducing the flow of materials into the economy. This may not work for every drink, or every situation, and may not be the choice every consumer wants to make. There may be real challenges to delivering at scale, and unintended consequences. However, where possible, such options offer clear environmental benefits, which should be recognised and alternative delivery systems actively explored.

Vision for 2030:

Alternative bottled water and soft drinks delivery models explored and implemented

Aspirations for 2025:

- New business models for alternative bottled water and soft drinks delivery systems developed and implemented wherever feasible

Action required by 2020:

- **Undertake an industry-wide feasibility study on alternative bottled water and soft drinks delivery models and seek to implement recommendations at scale where feasible.**

Research to address:

- what alternative systems exist and whether there are any new possibilities that can be identified and explored
- where alternative delivery systems are suitable for bottled water and soft drinks – which products/where accessed (eg standard syrup diluting systems, cooler systems and new emerging tech, home versus on-the-go)
- how holistic environmental LCA impact compares
- how to take to scale across all points of sale.



By 2030, the opportunity is to have **created a transformational shift in the bottled water and soft drinks value chain** to eliminate plastic packaging waste



An old solution for a new problem

Refillable packaging has been used in the UK for soft drinks since the 19th century. Before alternative materials were available, the high cost of glass and the local nature of production and consumption favoured reuse. A glass bottle could be reused seven or eight times before it was recycled. However, in the 1980s the market share of refillable glass bottles in the soft drinks sector dropped by 35 per cent and the last scheme in the UK ceased in 2015.⁶⁹ The decline was due to the growth of cheaper alternatives, such as PET bottles, which were lighter weight, less breakable, easier for consumers to use 'on-the-go' and recyclable.

In eliminating plastic packaging waste, refillable systems offer the opportunity to reduce the flow of packaging material to consumers. At least one soft drinks company has a small refill trial underway in a UK university.⁷⁰ Unlike traditional systems, this trial involves 'smart' systems where micro-chipped, pre-paid reusable bottles are filled at drinks dispensers. Whether this could be scaled up for wider use, at more varied points of sale, is as yet unknown.

At the simplest level, a number of cities and other local government authorities are involved in campaigns to encourage tap water refill as a choice – something that is gaining significant support from catering, retail, and water utility companies.^{71,72}

In considering the potential of a refill system, whether through syrup or powder-based dilution systems or small or large-format refillable bottles or at home or on-the-go, a number of potential environmental and social impacts need to be measured and taken into account. This includes water use, carbon emissions, transport distances, potential for leakage, recycling rates, material impacts and likelihood of consumer uptake.⁶⁸ To identify where there is potential for refill to be implemented at scale requires looking at particular products and market segments, actively exploring options and feasibility, and reviewing the impact to see if it provides a large-scale opportunity to eliminate plastic packaging waste.

In eliminating plastic packaging waste, refillable systems offer an opportunity to reduce the flow of packaging material to consumers.

Box 7: Doorstep deliveries – a resurgence

Milk was traditionally delivered to doorsteps to stop it from spoiling. Since the invention of the fridge and the availability of low-cost milk in larger formats in supermarkets, doorstep deliveries have declined. However, in recent months, with increasing awareness of the issue of plastic waste, there has been a resurgence in domestic milk delivery demand, with one company reporting 7,000 new customers in a four-week period, 90 per cent of whom requested milk in glass bottles.⁷³

Modern domestic milk delivery companies also offer the delivery of a range of other products, including fresh juice in reusable glass bottles. This raises the question of whether there could be an opportunity for this to be expanded to include reusable/refillable home delivery solutions for other soft drinks, although the implications for business models and comparable environmental impacts of this would need to be explored to establish feasibility.



Next steps

Over the coming years, there is a real opportunity for business and government to demonstrate strong leadership and a commitment to creating a transformational shift towards eliminating plastic packaging waste from the bottled water and soft drinks sector.

The ambitious vision set out within this report is to have created a bottled water and soft drinks value chain by 2030 where zero plastic packaging is sent to landfill or escapes into the natural environment. Packaging will be made entirely from recycled or renewable materials or both, will be designed to be fully reusable or recyclable, and will be recovered or recycled.

The companies who have worked with CISL on this report start from a perspective that such a vision is and must be deliverable. However, it is also clear that, as a first step to achieving this vision, producers and stakeholders in the bottled water and soft drinks supply chain should **commit to eliminating plastic packaging waste as a strategic priority and work collaboratively and simultaneously towards the following four outcomes by 2030:**

- A** An efficient and circular resource management system for bottled water and soft drinks packaging
- B** Standardised lowest impact material used for all bottled water and soft drinks packaging
- C** Significant shift in consumer behaviour and societal norms
- D** Alternative bottled water and soft drinks delivery models explored and implemented

CISL will continue to convene, educate, and mobilise businesses and policymakers to deliver on these outcomes. We urge more stakeholders in the bottled water and soft drinks value chain, and involved in tackling plastics packaging issues more generally, to come together with us and co-create the next step of this work.

If you are interested in participating in the next phase of this project, or learning more about our work on resource efficiency, please contact us at info@cisl.cam.ac.uk.

Recommendations

This report highlights aspirations for 2025 on the way to achieving the 2030 vision, demonstrating how the bottled water and soft drinks sector can support and go beyond the level of ambition currently articulated. However, these outcomes will only be achieved if action is taken by government and business, starting now.

To have the greatest impact, this needs to be delivered in collaboration, including policymakers, NGOs, suppliers, bottled water and soft drinks producers, recycling processors and other key organisations to rethink existing business models and implement workable solutions to eliminate plastic packaging waste.

LED BY GOVERNMENT

- A** Comprehensively revise the Extended Producer Responsibility (EPR) policy, so it (1) incentivises soft drinks packaging that contains recycled material and is recyclable by consumers; (2) disincentivises the overuse of materials and use of hard-to-recycle materials; and (3) incentivises a minimum recycled content for plastic bottled water and soft drinks packaging that is gradually increased over time to reach 100 per cent by or before 2030.
- A** Develop and implement consistent Deposit Return Schemes (DRS) across England, Scotland and Wales to create a system that (1) enables on-the-go recycling and prioritises filling gaps in current recycling infrastructure; and (2) specifies that all material collected is then recycled and is prioritised as feedstock for new packaging in the same sector.
- A** Ensure all revenue from these new policies is earmarked and reinvested in recycling, sorting and reprocessing capacity, to ensure (1) recycling facilities are consistent across all local authority areas; and (2) adequate facilities using the latest technology exist in the UK to separate and reprocess high-value bottled water and soft drinks packaging, so it can be available as feedstock for new bottled water and soft drinks packaging rather than exported.

LED BY BUSINESS

- B** Producers to continue to innovate to reduce the volume of plastic used in bottled water and soft drinks packaging and ensure any packaging materials used is 100 per cent recyclable or reusable. This includes all plastic bottled water and soft drinks packaging. Hard-to-recycle plastic bottled water and soft drinks packaging should start being phased out immediately.
- C** Commit to and seek government mandate for a consistent industry-wide standard labelling for bottled water and soft drinks packaging to ensure consumer clarity on recyclability and recycled content, building on current progress and consistent with recommended DRS design.
- D** Undertake an industry-wide feasibility study on alternative bottled water and soft drinks delivery models and seek to implement recommendations at scale where feasible. Research to address:
 - what alternative systems exist and whether there are any new possibilities that can be identified and explored
 - where alternative delivery systems are suitable for bottled water and soft drinks – which products/where accessed (eg standard syrup diluting systems, cooler systems and new emerging tech, home versus on-the-go)
 - how holistic environmental LCA impact compares
 - how to take to scale across all points of sale

FOR GOVERNMENT AND BUSINESS TOGETHER

- B** Undertake comprehensive research to investigate the optimal material for bottled water and soft drinks packaging that eliminates plastic waste while ensuring the lowest net environmental impact.

This will explore plastic (PET/laminate), non-plastic (glass, aluminium, cartons) and bio-based materials. From this will be created (1) a design checklist that sets an industry standard based on properties of ideal material for bottled water and soft drinks packaging; and (2) innovation funding to research and identify new materials based on the industry standard.
- C** Undertake research into consumer behaviour change and societal norms for a circular bottled water and soft drinks packaging system, building on existing knowledge and exploring:
 - how to address barriers that restrict consumer recycling of materials
 - how to engage consumers in not just recycling but rethinking how they access and use products, creating a wide-scale mindset shift and new norms
 - willingness of consumers to buy in to alternative ways eg refill systems, larger formats, delivery direct to the home.

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Roadmapping exercise at the Future of Plastic Packaging Multi-Stakeholder Workshop, 27 March 2018

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