

The Tipping Point



Is pressure on our recycling system reaching a 'tipping point', and if so, what can we do?

The Power of Less®





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Foreword

The way we live and shop is changing rapidly. We increasingly expect to purchase products tailored for us, whenever we want them, wherever we want them, delivered to us in a way that fits our busy lifestyles. We want more choice and convenience, but with less impact on the world around us.

Accelerating home shopping habits creating more waste in our homes, coupled with a failing waste management infrastructure, means it is clear that how we drive recycling in the UK is a critical part of this conundrum.

The UK's waste infrastructure is creaking as budgets for all waste management services have fallen significantly since 2011 across much of the country. It is no surprise that the overall UK recycling performance has stagnated over this period. However, if recycling operations did improve, we still have a huge challenge in educating the public. With a myriad of different recycling policies across our local councils, we should not really be surprised.



As a business that operates a circular supply cycle for paper-based packaging, DS Smith witnesses first-hand the powerful benefits of keeping resources in use for longer, reducing costs, and limiting the impact on the environment.

We also see the result of poor recycling systems. Our ability as a re-processor of paper and cardboard is inhibited by poor collection systems at a local authority level, with underfunded and inconsistent systems leaving a poor quality of materials that is difficult to recycle.

There is a need for a new way of thinking on recycling.

We believe that our industry has a huge role to play in leading the way forward. As a business, our purpose is Redefining Packaging for a Changing World. That's why we have commissioned this report with Central Saint Martins, UAL to bring new thinking to the recycling challenges we all face.

Only by exploring innovative solutions together will we be able to create meaningful change.

Jochen Behr
Head of Recycling, DS Smith

Foreword

The 'Tipping Point' report delivers clear evidence that accelerated innovation and cooperation are urgently needed to enable UK society and businesses to move from linear to circular use of the Earth's resources. This report raises critical challenges when it comes to implementing a pathway towards efficient recycling and waste management systems. Without change, the UK could be on course to miss its 2035 recycling targets by over a decade.

I've been leading the MA Innovation Management course at Central Saint Martins, UAL for over a decade now, bringing together experienced people from a range of backgrounds to examine critical issues in carefully managed ways. Ours is a unique positioning of innovation management within an internationally acclaimed art and design school. This allows us freedom to inspire and challenge new directions through agile ways of thinking, making and doing that is not always possible on traditionally-minded management courses.



On MA Innovation Management we operate creatively and strategically in open and responsible ways both individually, and in multidisciplinary, multi-cultural teams on projects that are global in nature. Our scholarly and creative practice addresses critical concerns through: exploration and experimentation; mapping and planning within complex environments and contexts; and the development of individual and cooperative approaches to delivering innovative propositions.

Critically examining recycling, sustainability, resilience and circular economy have been important aspects of the course since it began.

I am pleased to see the Uncertainty Project spanning out in January 2019, bringing the DS Smith and MA Innovation Management partnership to life and bridging the gap between sustainable business practices, ambitious environmental targets and tangible results, in ways that can reposition the UK as the thriving partner on the global recycling and circular economy map.

Dr. Jamie Brassett
Programme Research Director,
Central Saint Martins, UAL

Executive summary

“If we don’t take action, the collapse of our civilizations and the extinction of much of the natural world is on the horizon.”

David Attenborough, UN Climate Change Summit 2018

We are living in a time of extraordinary change. Towns, cities and entire populations are rapidly transforming and the growth in digital technology is revolutionising the way we shop and live. Global political shifts are creating volatility and population change is altering social dynamics. At the same time, our environment and the natural world has never been more threatened. There is growing acceptance of the risk that climate change poses for the planet. Our world is under considerable pressure. We face an urgent need to manage our resources more effectively.

This report examines the acute challenge facing the UK’s recycling goals and its preparedness to respond to this broader context of change. It reveals that despite some rapid early progress on UK recycling, a confluence of factors will see it not only lag behind the rest of Europe but potentially face a ‘tipping point’ with far-reaching consequences, even in people’s own homes. Policymakers and the public face a choice. The UK can either carry on with an untenable approach or decide it’s time to act.

The ‘Tipping Point’ report identifies a set of simple recommendations to ensure that the UK’s recycling approach and infrastructure is fit for the future. These proposed actions are designed to address changing consumer habits, as well as introduce a policy framework that recognises the need for a coherent and integrated approach. By adopting these measures, the UK can once again make rapid progress in helping to answer one of the most pressing challenges we collectively face.



Chapter 1:

The state of recycling in the UK

The UK has previously made great strides on recycling. Between 2000 and 2010, household recycling increased by 235%. Since then the rate of growth has plateaued. The latest available data revealed this had gone up by only 0.5%, while overall packaging recycling rates fell by 1.2%¹. With the exception of Wales, none of the UK nations are predicted to meet EU recycling targets.

In Wales the picture is noticeably different: it has the second-best recycling rate in the world. This success can be attributed to a combination of ambitious targets – the country has set a 70% recycling rate for 2025 and aims to be a ‘zero-waste nation’ by 2050 – as well as a highly progressive policy and funding approach, with guidance on separate collections and fines for local authorities who fail to reach targets. Similarly, amongst the five top performing EU states that have already surpassed the 50% target for household recycling set for 2020, the common characteristics are progressive policies and waste management practices.

In contrast, the UK as a whole is in danger of falling considerably behind. This report provides new data modelling to analyse the size of that potential gap. According to forecasting based on current household recycling trends, the UK risks not reaching the 65% recycling target rate for municipal waste until 2048, over a decade too late².



Chapter 2:

The role of changing consumer behaviour

There are a number of new consumer behaviours that are compounding the recycling challenges that the UK is facing: rapid adoption of e-commerce and therefore exponential growth in deliveries of packages, the rise of ‘on the go’ and convenience consumption and an associated increase in the use of composite and laminated packaging, and scepticism and confusion about the role individual households can play in recycling.

UK consumers have become avid online shoppers. The UK is now the third largest B2C e-commerce market in the world. About 18% of all retail sales in the UK are now made online³, almost double the proportion in the USA⁴. Our recycling infrastructure was designed in a pre-e-commerce era, but the reality is that 1.9 billion parcels – and the corresponding required packaging – are currently delivered directly to doors across the UK annually⁵.

At the same time as packaging is increasing in people’s homes, this report reveals that despite intentions to recycle more, the public

¹ Defra (2019), UK Statistics on Waste.

² Based on modelling carried out by Resource Futures on behalf of DS Smith.

³ ONS (2019), Internet sales as a percentage of total retail sales (ratio) (%).

⁴ US Department of Commerce (2018), Quarterly Retail E-Commerce Sales.

⁵ Ofcom (2019), Annual monitoring update postal market 2017.

are confused and concerned about how to do so. Nearly half of adults surveyed for this report admitted they 'could do more' recycling.⁶ However, this is set in the context of pessimism about recycling: more than a third said they feared the items they recycle end up at landfill or incineration sites.

Chapter 3: Pressured market dynamics

There are several additional colliding market factors – social, economic and geopolitical – which are putting further pressure on the UK's plans for resource efficiency. The first is the constraint in funding that local councils have faced since the financial crisis. Budgets for recycling services at councils in England have fallen on average by 10% over the past five years⁷. Less funding means that local authorities look to adopt the cheapest waste treatment rather than improve the quality of collected dry recyclables.

Costs for local councils are also being driven higher by the limits on imports of recyclables being applied by Asian markets. China's decision at the end of 2017 to stop accepting material that they perceived to be "dirty" or "hazardous" laid bare the uncomfortable economics behind the UK's recycling system. The result of this moratorium is that material exported for recycling is now being channelled to markets such as Malaysia, Thailand and Taiwan, and some local councils are reducing what they collect and recycle from households.

While incineration can play a role in recovering energy from materials that cannot be recycled, it does not encourage a systemic change of attitudes towards how we use our

resources efficiently. Since 2001, the amount of material burned by local authorities has tripled. In the UK, the number of energy from waste facilities has grown from 26 in 2014 to 40 in 2017. London had the lowest recycling rate in England and the highest incineration rate, demonstrating how urbanisation and the over-reliance on waste to energy can lead to poor recycling rates and a loss of valuable materials to a city's economy.

As well as the challenging context for push factors, there are also limited pull factors. It is often cheaper to produce goods from virgin raw materials than from secondary, recycled content. The environmental benefits have not been sufficiently understood to stimulate a strong market and real incentives are required to create demand.

All these market factors are compounded by confusion and inconsistency of infrastructure. There are a myriad of different approaches to recycling in England, as local authorities can determine this individually. Lack of standards and consistency across the household collection system undermine the ability to segregate and sort high quality recycling. This further underlines the consumer confusion explored in chapter 2.



⁶ YouGov (2019), Recycling research commissioned by DS Smith.

⁷ Rhodes, D. (2018), Recycling rates fall for 14 million homes in England.



Chapter 4: Are we facing a 'tipping point'?

The potential consequences of this confluence of factors are stark. This report points to an infrastructure that is already under strain. There is no consistent approach to collections across the UK. However, based on a total household recycling waste of 12.093 million tonnes⁸ and 27.2 million households in 2017⁹, if all households had a 240-litre wheelie bin of mixed dry recycling that was collected fortnightly, this report estimates that they are already 85% full¹⁰.

The number of parcels to be sent within the context of e-commerce growth will increase dramatically. Within 10 years this will have grown by over 50% to hit three billion by the end of 2028¹¹.

The growth in e-commerce packaging, combined with the lack of capacity for

recycling waste in our homes, may already be having an impact on consumer behaviour. It is notable that tonnes of paper and cardboard packaging recovered or recycled fell by 3.5% in 2017¹².

This report identifies that we face a potential 'tipping point' caused by the constraint on recycling capacity for each household and the rapid growth in e-commerce. Whilst there are many assumptions in the household capacity calculation above, it would indicate that each household is already just 218g per day of recycling away from a 'tipping point'.

Taken together with 171,000 tonnes of additional packaging material to be recycled from the predicted e-commerce growth¹³ – or put more starkly, enough cardboard to cover 55,000 football pitches or bigger than the city of Birmingham – it's not hard to see a future when materials for recycling could pile up in our homes or even on our streets.

⁸ Defra (2019), UK Statistics on Waste.

⁹ ONS (2017), Families and Households.

¹⁰ WRAP (2010) Materials Bulk Density Report.

¹¹ Based on DS Smith calculations, using Euromonitor Passport data.

¹² Defra (2019), UK Statistics on Waste.

¹³ Based on DS Smith calculations, using Euromonitor Passport data.

These findings should act as a stark warning that a radical new approach is required. E-commerce suppliers need packaging partners who will help them find innovative new ways to protect consumer goods while they are in transit and make the packaging easily recyclable after delivery. The UK needs a consistent, upscaled approach to recycling separation and collection, to create a system that is fit for the future.

Chapter 5: Towards a new approach to recycling

The 'tipping point' can be avoided. However, urgent action is required now to address the challenges to recycling in the UK. The report sets out a number of recommendations which, if adopted, can stave off the current consequences:

1. Appoint a dedicated recycling minister

The severity of the potential consequences for the UK of inaction on recycling warrant the appointment of a specific Minister for Recycling and Waste, with cross-departmental responsibility. The interrelated challenges that are faced in this area need to be tackled centrally and systemically.

2. Statutory recycling targets

As the UK leaves the European Union, all stakeholders should take this opportunity to coordinate across the home nations, with England learning and adopting best practice from Scotland, Wales and

Northern Ireland. We need minimum UK-wide recycling targets at national and local authority level to ensure we can reach our recycling policy ambition.

3. Prioritise waste separation

The UK should adopt statutory guidance on separate collections, backed by an increase in funding. Separate collection of paper and card would avoid contaminated recyclables and could drastically reduce the need for incineration and drive up recycling rates. Weekly food collections, as prescribed in the Resource and Waste Strategy, should be mandatory to reduce the effect of food as a significant contaminant of dry recycling.

4. Apply universal labelling

As part of a joined-up communications strategy to enable consumers to better recycle, all packaging and collection infrastructure should have standardised recycling labels that sufficiently informs the consumer about what materials can be recycled where.

5. Put circular at the heart of The Budget

Moving the UK towards a circular economy should be at the heart of all departments of Government. The Office of Budget Responsibility (OBR) should carry out an economic analysis of the benefits and costs of adopting a circular model over the next 25 years. This analysis should then be used to set more circular strategies for all UK government departments.

Conclusion – executive summary

The recommendations put forward by this report have the potential to ensure that the UK is able to meet its recycling targets and avoid a 'tipping point'. To do this, it is paramount that we radically overhaul our recycling infrastructures.

The measures announced in the Resources and Waste Strategy are important steps in the right direction, but we need to turn those intentions into concrete actions now to stimulate better recycling innovation in the UK and achieve a step change in our capability as a society to do more while using less.



Chapter 1: The state of recycling in the UK

In this chapter we explore the rapid early progress that the UK made on increasing recycling rates and how this has plateaued over the past eight years. We look at the picture across each of the four UK nations and explore why Wales has been so successful in establishing itself as one of the global leaders in recycling. Finally, based on the current trajectory, this chapter sheds new light on the UK's likely delay in meeting the next recycling targets.

1.1 Recycling rates in the UK: from rapid rises to later lagging

By any measure, recycling in the UK took a major step forward between 2000 and 2010. The household recycling rate increased by 235%. Indeed, recycling rates in the UK grew more rapidly in the first decade of the millennium than any other country in Europe¹⁴.

The UK was credited with having quickly established recycling within its culture: creating infrastructure, offering incentives to businesses and providing information to the wider public. This was a collaborative effort by the Government, local authorities, businesses and consumers themselves.

But since then, growth has stalled.

There has never been a greater focus on waste and recycling in the UK than now. Public awareness has soared, as people have become acutely aware of the need to manage resources more effectively. Yet in 2017, the average recycling rate from UK households was 45.7%¹⁵ (12.3 million tonnes). This represents an increase on the previous year of only 0.5%.

Despite the huge increase in awareness, the UK is already lagging in the household recycling targets set by the EU. The immediate European target is 50% by 2020. The notable exception to this stall in progress is Wales, where recycling rates are the second-best in the world.

“Over the past 20 years the UK has made progress to increase recycling. But we are only at the basecamp and are running out of oxygen. We need to pause, draw breath and rethink how we get to the summit.”

Ray Georgeson, Chief Executive at Resource Association

¹⁴ European Environment Agency (2013), Highest recycling rates in Austria and Germany - but UK and Ireland show fastest increase.

¹⁵ Defra (2019), UK Statistics on Waste.

The UK Government has begun consultation on its first Resources and Waste Strategy since 2011. This is a welcome move, and it is vital that all parties come together to make sure it is bold in its ambition and effective in execution to once again create a step-change in UK recycling rates.

1.2 A varied recycling landscape

While the recycling landscape varies across the UK, and progress is being made in pockets, the standout success story is in Wales, which has adopted ambitious targets and progressive policies.

• England - recycling rates have stagnated with incineration on the rise

The picture in England is much like the overall story in the UK. After a period of growth during the 2000s, when the household recycling rate significantly increased, progress has slowed, reaching only 45.7% in 2017. Landfill rates have been constantly decreasing, but incinerated waste has steadily grown and is predicted to overtake recycling in the short

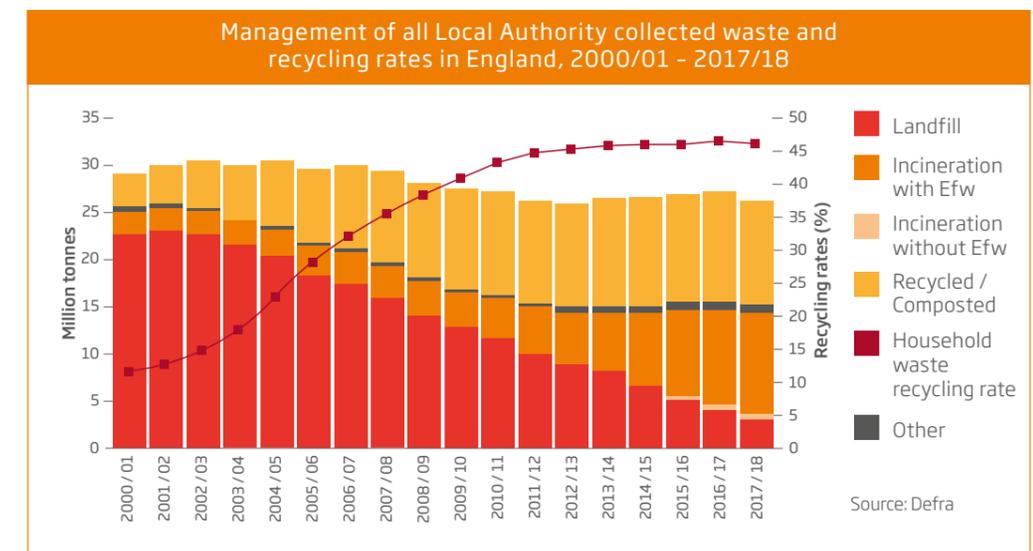
term¹⁶. While waste to energy can play a role in recovering energy from materials that cannot be recycled, it does not encourage a systemic change of attitudes towards how we use our resources efficiently.

• Northern Ireland - making progress as landfill rates continue to fall

Northern Ireland's recycling rates reached 48.1% in 2017, the second best of the four home nations. In 2017, it became a statutory requirement for all councils in Northern Ireland to provide each household with a container for food and separate recyclables collection¹⁷. Landfill rates remain high but continue to decrease - reaching a new record low of 32% in 2017/18.

“The future has to be indigenous recycling, and government has a big role to play in this by encouraging the creation and utilisation of domestic infrastructure.”

Margaret Bates, Professor of Sustainable Waste Management at University of Northampton and Chair of CIWM Executive Committee



¹⁶ Green Party 2018, A Burning Problem. How Incineration is stopping recycling.

¹⁷ Defra (2018), Northern Ireland Local Authority Collected Municipal Waste Management Statistics.

• **Scotland – pushing forward with Circular Economy Strategy**

In 2017, more Scottish waste was recycled rather than landfilled. The total amount of waste generated by Scottish households was also 5.6% below 2011 levels¹⁸. Scotland made strides to drive its zero waste and resource efficiency agendas with the launch of a Circular Economy Strategy in 2016. One of the aims of this strategy was to improve recycling routines with more consistent local services and ensure packaging is designed for recyclability. Within the Scottish recycling framework there are requirements for the separate collection of key materials, including food waste, and the prohibition of any separately collected material going to incineration or landfill.

• **Wales – the second-best recycling rate in the world**

Wales is the stand-out of the UK home nations, with the second-best recycling rate in the world.

It is driven by ambitious targets: Wales aims to be a ‘zero-waste nation’ by 2050¹⁹, and has set a 70% recycling rate for 2025²⁰.

To achieve these targets, it has adopted progressive policies and legislative drivers of change. For example, the Well-being of Future Generations Act 2015 informed by the United Nations Sustainable Development Goals (SDGs) requires public bodies in Wales to think about the long-term impact of their decisions, to work better with people, communities and each other, and to prevent persistent problems such as poverty, health inequalities and climate change.

18 SEPA (2017), Household waste summary data and commentary text.

“We are working with consultants to model the practicalities, costs and benefits of an 80% recycling target for Wales in 2035. That’s why we are looking at niche materials such as carpets or nappies and what would happen if you send them to recycling plants.”

Devolved government waste policy official

A key driver has been statutory guidance on separate collections, backed by significant funding (£700 million) to local authorities since 2002. In addition, the Welsh Government is introducing fines to drive local authorities to reach statutory targets. Missed targets could cost a local council £200 per tonne.

Wales has adopted an innovative approach to collections. In partnership with The Waste and Resources Action Programme (WRAP), it developed a Collections Blueprint, which advocates weekly collections of dry recycling in three separated containers. It also recommends modern single pass Resource Recovery Vehicles that are made to separate up to nine waste streams, the provision of kitchen caddies to all residents to segregate food waste and a 30% target of non-recyclable waste to be sent to an energy from waste plant with incinerator bottom ash recycling.

1.3 The UK is likely to miss its next recycling target, in 2020, by 5 years

Wales is not the only example of stand-out success on recycling. The top performing EU states, Germany, Slovenia, Austria, Belgium, and the Netherlands, have already surpassed the 50% target for household recycling set for 2020.

What do they have in common? Progressive policies and waste prevention practices,

19 Welsh Government (2017), Towards Zero Waste.

20 Welsh Government (2010), The Waste Measure 2010.

some that were set in the 1990s. They all have widespread separate collection systems at the household, they operate deposit return schemes on packaging and ban certain materials being dumped in landfill or incinerated.

The target set for 2020 is only the first in a series of milestones that the UK needs to reach. Further targets for recycling municipal waste have been laid out as part of the European Circular Economy Package. Given the current stagnation in recycling rates in the UK, we undertook new analysis to predict whether those targets will be met.

Recycling targets:

By 2020	By 2025	By 2030	By 2035
50%	55%	60%	65%

We commissioned Resource Futures to consider when the EU and UK Government targets would be achieved, based on current trends.

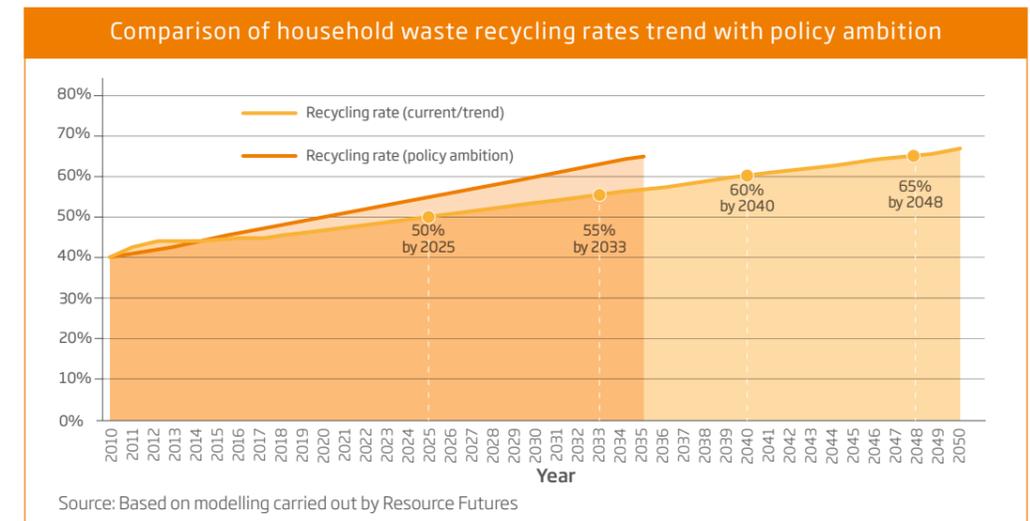
Household waste is the largest component of municipal waste, and recycling rates

for it are well monitored. Based on the UK household waste recycling growth rate trend experienced over the last 8 years²¹.

According to the forecast in the chart below, modelled from household recycling rates, the 60% EU municipal recycling policy ambition will be achieved 10 years late, by 2040, if recycling rates follow the current trend line. The 65% recycling target rate will not be reached until 2048 – 13 years late.

Cumulatively, the UK will need to recycle at least an extra 24 million tonnes of material from households over that period to 2035 if it is to hit the Government target, more if population growth is factored in and likely significantly more if the commercial household-like element of municipal waste is also considered. This is material that would fill at least 2 million refuse vehicles.

These illustrations are based on a logical progression of the current trajectory of household recycling rates but changing trends in consumer behaviour could mean we are even further off track on the targets.



21 Defra (2019), UK Statistics on Waste.

Chapter 2: The role of changing consumer behaviour

There are a couple of distinct but significant trends in consumer behaviour that could have a further impact on the UK's ability to make progress on recycling rates: the exponential rise of online shopping, increasing the packaging that is coming into homes across the country; and the consumer confusion and scepticism around recycling that remains. This chapter explores the impact that both trends might have on meeting UK recycling rate targets.

Top 10 Countries in terms of e-GDP

	GDP at market prices	GDP per capita at market prices	Share of E-commerce in GDP
Global	\$73,106bn	\$20,776	3.11%
China	\$10,866bn	\$7,925	7.05%
United Kingdom	\$2,849bn	\$43,714	6.12%
South Korea	\$1,378bn	\$27,222	4.70%
USA	\$17,947bn	\$55,904	3.32%
France	\$2,423bn	\$36,503	2.97%
Japan	\$4,123bn	\$32,477	2.77%
Canada	\$1,551bn	\$43,249	2.30%
Germany	\$3,357bn	\$41,162	1.97%
Australia	\$1,236bn	\$56,328	1.80%
Spain	\$1,200bn	\$25,581	1.68%

GDP at market prices, GDP per capita at market prices and share of E-commerce in GDP, 2015

Source: Eurostat

2.1 The boom in e-commerce will put even greater pressure on the system

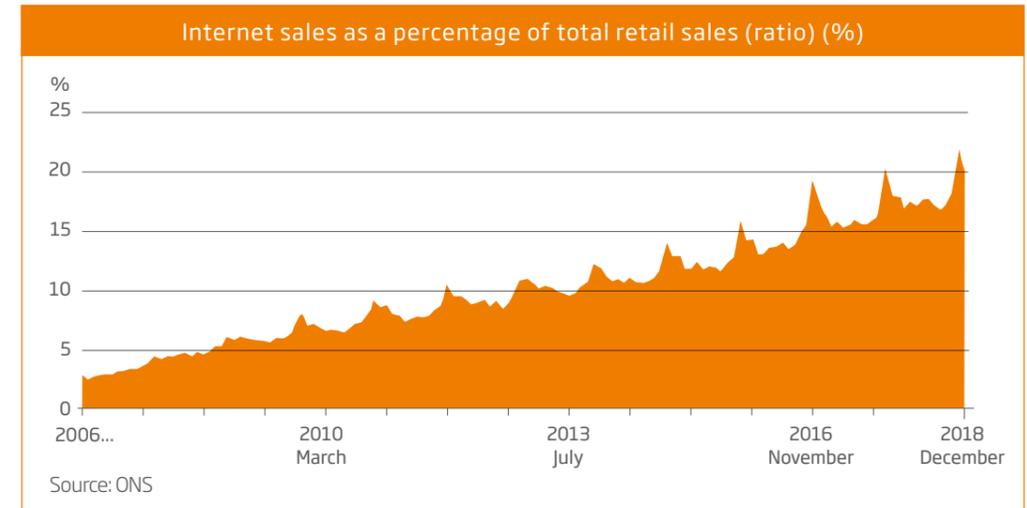
Shopping habits are changing rapidly. E-commerce has grown steadily worldwide over the past five years and is projected to grow exponentially in the years ahead. UK consumers are avid online shoppers, making the UK the third largest B2C market in the world. About 18% of all retail sales in the UK are now made online²², almost double the proportion in the USA²³. As each year goes by, the UK is shopping online in greater numbers. A staggering 1.9 billion parcels are now delivered directly to homes²⁴.

Vast amounts of recyclable paper and cardboard packaging that can and should be channelled back into a circular system

22 ONS (2019), Internet sales as a percentage of total retail sales (ratio) (%).

23 US Department of Commerce (2019), Quarterly Retail E-commerce Sales 3rd quarter.

24 Ofcom (2019), Annual monitoring update postal market 2017.



are entering an already stressed collection infrastructure. The greatest volumes are arriving in the worst-performing localities - urban areas with a high density of dwellings. We explore this further in chapter 4.

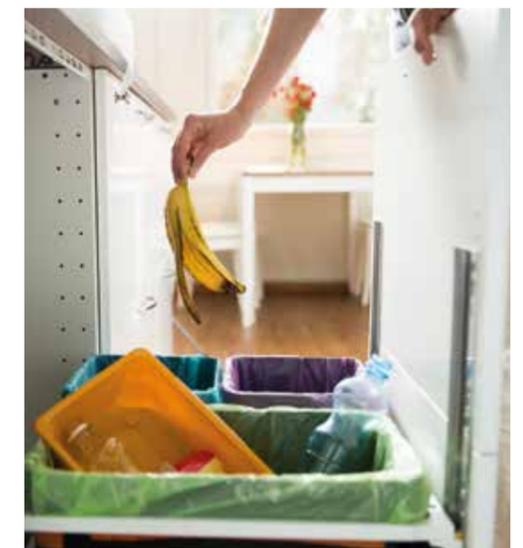
Many factors - economic, social, regulatory, technological - may influence how we manage this dramatic shift in behaviour. But the immediate picture is clear - based on data from CPI and Euromonitor, DS Smith estimates that between 2017 and 2022 e-commerce packaging will have grown three-fold in comparison to traditional packaging. The UK's approach to recycling will need to consider the changing consumer purchasing behaviour that is resulting in billions of packages arriving at households. In turn, it will need to consider their actual behaviours and attitudes with regards to recycling.

2.2 Consumers want to recycle more - but are confused and sceptical

Over the last decade, there has been growing public awareness of the impact of threats such as climate change. Likewise, public awareness of the need to recycle continues

to increase. While awareness is high, it's important to understand how this translates into actual behaviour. We commissioned a YouGov survey of 2,170 UK adults to establish an up-to-date snapshot of attitudes towards recycling, as of January 2019.

As expected, there is a significant desire throughout UK households to recycle, with 65% of those surveyed stating they recycle more now than they did five years ago. However, nearly half (49%) admitted they 'could do more' recycling. The key question, therefore, is what is stopping people from doing more?



Consumer confusion

The research revealed that only 18% of adults surveyed say they are well informed about what they can recycle. This would suggest widespread consumer confusion about recycling. When asked which schemes 'would be most likely' to encourage members of the public to recycle more, over a third (34%) cited clearer labelling on products and packaging was needed.

Latent scepticism

The research showed that 41% of those surveyed think that less than 25% of waste is recycled. More than a third (37%) said they feared that materials they recycled would go to landfill or incineration sites. This negative perception could impact on levels of household recycling and may be a contributing factor to the 'stagnation' highlighted in this report.

Lack of means

Some of the findings revealed by the research were linked to the availability of recycling at people's homes. For instance, almost half of adults surveyed (49%) are currently mixing card/paper with other recyclables. One in five said they wanted more recycling bins to be offered by their local authorities.

These findings are compounded when set against existing research that has already shown:

- Eight in ten consumers were not aware how recycling makes a difference²⁵.
- More than three quarters of UK households (76%) add one or more item to their recycling collection that is not accepted locally²⁶.
- UK consumers of all ages are frequently confused, presuming that on-pack recycling labels do or do not apply to their local collection scheme. This can lead them to putting recyclable material into the general rubbish bin - as declared by almost half (46%²⁷) of UK households.
- A third of Londoners would recycle more if they had extra bin space and as many as 52% of those living in the capital identify overflowing bins. This is so common that it has been termed 'Bindigestion'²⁸.

Combined, this research would suggest that public behaviour change campaigns around recycling will need to adopt a multi-faceted and sophisticated approach. The challenge is no longer just about awareness, but in building trust in recycling. To do this credibly, the UK needs to grapple with some of the macro dynamics in the market that are causing pressure and potentially undermining residents' confidence in recycling systems.

²⁵ Telegraph (2017) Eight out ten people believe recycling 'makes a difference', but have no idea how.

²⁶ WRAP (2017), 2017 Recycling Tracker report.

²⁷ WRAP (2015), 3Rs Tracking Survey: Recycling Attitudes and Behaviour.

²⁸ Cole, R. (2017), New Recycle for London campaign targets lack of bin space (Resource).

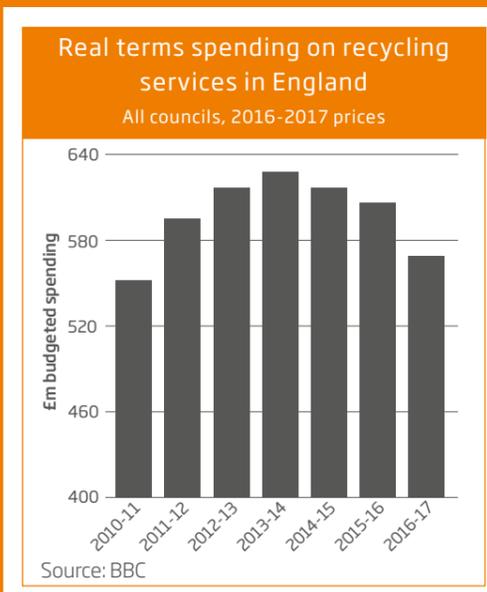


Chapter 3: Pressured market dynamics

The UK waste management system is facing a perfect storm of challenges as the system strains under the weight of social, economic and geopolitical trends. This was further compounded in 2018 with China's ban on low quality recycling imports, heightened public awareness around single-use plastic, increases in household waste incinerated and ongoing local authority funding squeezes. This chapter explores the challenges posed to the market by these interconnected market forces.

3.1 Waste and recycling infrastructure in England has been under-funded

Budgets for recycling services at councils in England have fallen, on average, by 10% over the past five years. The total amount spent has dropped from £630 million in 2013-14



to £569 million in 2016-17²⁹. This has led to lower recycling rates in 173 of the 350 councils in England in 2016-17, compared to 2011-12. Less funding means that local authorities look to adopt the cheapest waste treatment rather than improving the quality of collected dry recyclables.

Following the 2007-2008 financial crisis and the government's austerity program, local authorities have had to review and streamline their services, including waste collection and recycling. Between 2015 and 2020 the Revenue Support Grant to English authorities will have been slashed by 75%³⁰. Against this backdrop it's not surprising that recycling rates are stagnating.

3.2 The UK has become over-reliant on the export of recyclables

To compound the lack of direct investment, councils' finances are further impacted

²⁹ Rhodes, D. (2018), Recycling rates fall for 14 million homes in England.

³⁰ LARAC (2018), The future of Local Authority Waste Funding.



reveals that: "A fifth of councils see recycling costs rise after China ban." At least 20% of councils have felt a direct impact from China's decision, according to a snapshot poll for the Local Government Association. There are fears that this could mean more charges for council taxpayers. The experts interviewed for this report suggest that the local councils suffering most are those with a collection system that does not deliver high quality materials for recycling.

The dynamics of the recycling market shifted dramatically on December 31, 2017, when China announced it was clamping down on imports of low-quality materials for recycling, citing the fact that large amounts of it were "dirty" or "hazardous" and a threat to the environment. China and Hong Kong went from buying 60% of the plastic waste exported by G7 countries during the first half of 2017, to taking less than 10% during the same period a year later³¹. The prices of plastic waste collapsed, as did the price of low-grade paper.

China's restrictions have laid bare the uncomfortable economics behind the UK

recycling system. Industry experts point out that the UK could have avoided this stress point by focusing on policies and collection systems that deliver quality recycling from the outset.

"An uncomfortable truth is that we send millions of tonnes of waste to be recycled in countries who singularly do not have the infrastructure to cope. That is now over."

Ray Georgeson, Chief Executive at Resource Association

Exports of plastic material to Malaysia have tripled during the first four months of 2018, making it now the single biggest destination for British plastics. Exports to Thailand rose 50-fold in the four month period, while those to Taiwan rose more than ten-fold³².

Such changes in overseas markets for recyclable materials has meant some local councils are reducing what they collect and recycle from households. If quality in recycling had been a focus from the outset in the UK, this crisis could have been averted.

³¹ Hook, L. & Reed, J. (2018), Why the world's recycling system stopped working (Financial Times).

³² Hook, L. (2018), Plastic waste export tide turns to south-east Asia after China ban (Financial Times).

3.3 Waste incineration is out-pacing recycling growth

The changing dynamics of the export market could also create increases in incineration. Efficient resource management means keeping valuable recyclables within our system for as long as possible. However, since 2001 the amount of waste burned by local authorities has tripled (see chart on page 13).

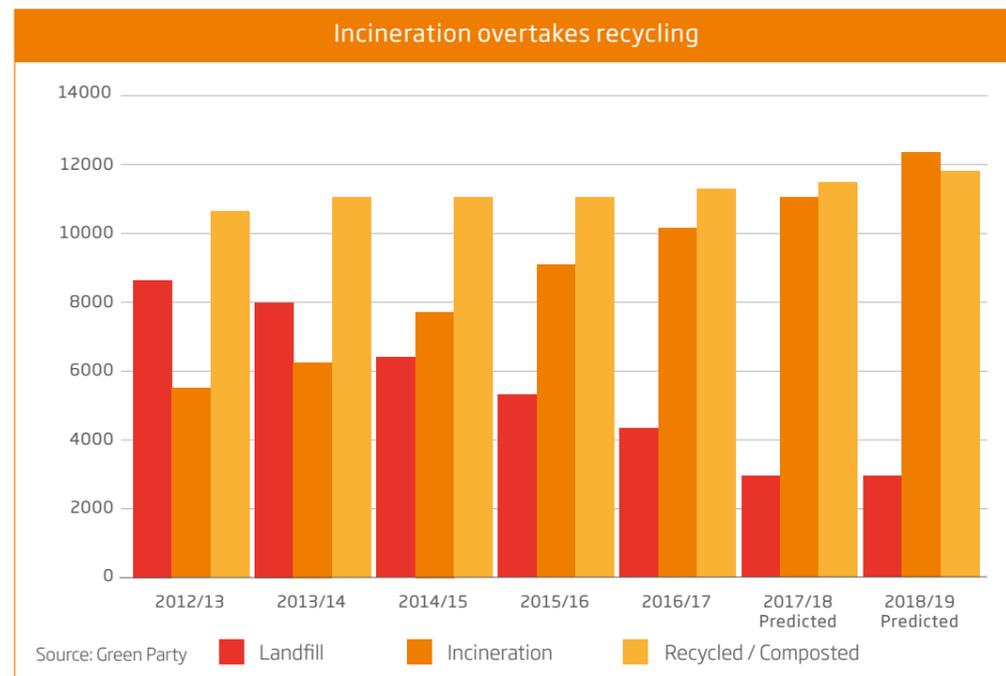
Indeed, waste incineration is set to overtake recycling rates in England, according to a report by the Green Party.³³

In the UK, the number of Energy from Waste facilities has grown from 26 in 2014 to 40 in 2017. Together they have a combined operational capacity to handle 12 million tonnes of waste a year, a figure expected to rise to nearly 16 million by 2022.

“Since the China ban, waste is travelling different routes. Short term effect is that mixed waste started going more to Malaysia and Vietnam, who closed their borders in result. It also caused countries like US, for example, to reopen landfills. We can see that short term this is creating issues, but long term I believe it can deliver an opportunity.”

Jochen Hertlein, Packaging Performance and Sustainability Lead at Nestlé

Waste to Energy plants have a role to play – especially as an alternative sustainable energy source to fossil fuels. However, balance needs to be struck so that every effort is directed to ensure that recyclables are recycled, and the remainder treated in the most sustainable way.



33 Green Party (2018), A Burning Problem. How incineration is stopping recycling.



3.4 The secondary materials market is in urgent need of stimulation

As well as the challenging context for push factors, there are also limited pull factors. It is too often cheaper to produce goods from virgin raw materials than from secondary, or recycled content.

The benefits of using secondary materials (in place of virgin raw material) should be clear – they contribute to lower energy usage, preserve natural resources and keep the value of the primary material in the supply chain for longer. But these environmental benefits alone have not been sufficient enough to stimulate a strong market and the total “lifecycle” costs involved with, for example, extraction and refinery of primary materials, ignored.

A recent Plastics Call for Evidence by the UK Chancellor of the Exchequer³⁴ highlighted the lack of end markets for recycled plastic

“Since the debate about plastics started, alternatives are thinkable again and so we asked ourselves: How did we pack when plastic was not around? What can we learn from that experience today? Key element for me is going towards standardised materials, the less complex the better.”

Jochen Hertlein, Packaging Performance and Sustainability Lead at Nestlé

material, or a lack of requirement to use recycled content, as one of the main barriers to increased investment in recycling infrastructure.

If the secondary market is to thrive, a robust policy framework is needed with real incentives to stimulate demand. The key question is how to create a step-change in recycling in the UK to consistently deliver high quality material that is kept in use for longer making us more resource efficient.

34 HM Treasury (2018), Tackling the plastic problem – summary of responses to the call for evidence.

3.5 Inconsistency of infrastructure

All these factors creating pressure in the recycling market are compounded by confusion and inconsistency of infrastructure, which make it harder to deliver the high-quality recyclables that are required.

Householders face a bewildering range of collection systems across the country. As people travel they need to familiarise themselves with local practice. In England alone, there are a myriad of different approaches governing how and what materials are collected.

Lack of standards and consistency across the household collection system - materials, formats, labelling, collection, sorting and reprocessing - undermine the system's ability to segregate and sort high quality recycling.



The benefits of consistency can also provide significant economic savings. A WRAP study sponsored by the Department for Environment, Food and Rural Affairs (DEFRA) calculated that the cumulative benefits of consistent household recycling in England over the next seven years would be £33 million - resulting from reduced reprocessing costs and avoiding 5.1 million tonnes of CO2 emissions, which would support the UK's carbon budget targets: an outcome that would benefit all.



Chapter 4: Are we facing a 'tipping point'?

We have already explored the challenging context that changing consumer behaviour might present, with e-commerce increasing. In this chapter, we present new evidence on the strain that this may place on an already stressed infrastructure. We look at the impact that this could have in terms of how we might cope in our own homes and the potential for a 'tipping point'.

4.1 Our recycling bins are nearly full

The total tonnage of household recycling, excluding IBA metals, reported in 2017 was 12.093 million tonnes³⁵. While there are no standard approaches in place across local authorities in the UK, this report examines what this means in practice in terms of the amount that is accumulating in our homes.

On the basis that there were 27.2 million households in 2017³⁶, this would equate to 444.6kg of recyclable material per household per year. Based on an assumption that an average 240 litre wheelie bin contains 20.1kg³⁷ of mixed dry recycling, and each household has the equivalent of one of these collected fortnightly, this would mean that they are already 85% full.

While this calculation is based on an imperfect assumption on the frequency, given these are inconsistent across local

authorities, it points to an infrastructure that is already under considerable strain.

4.2 'Empty space' will decrease, but parcels will hit three billion in 10 years

The impact that the increase in e-commerce and home shopping is having on the recycling infrastructure was introduced in chapter two. One of the key challenges that is currently being presented by this trend is the excess packaging that is created as packages are sent with disproportionate 'empty space'.

Based on DS Smith customer data, this report has calculated that this 'empty space' will reduce significantly - from up to 50% of packaging today, to 21% in 2035. This represents an overall space reduction of 29%. This is not only good news in terms of reducing excess packaging, but also reduces the number of vehicles that are needed to deliver the packages that are currently inefficiently filled.

³⁵ Defra (2019), UK Statistics on Waste.

³⁶ ONS (2017), Families and Households: 2017.

³⁷ WRAP (2010) Materials Bulk Density Report.

While the 'empty space' in packaging is decreasing, the number of actual parcels to be sent within the context of e-commerce growth will increase dramatically. Within 10 years, from the end of 2018, the number of parcels will have grown by over 50% to hit three billion by the end of 2028³⁸.

4.3 Recycling of packaging is on the decline

The strain being placed on recycling in our homes by the growth in e-commerce may already be making an impact. It is notable that while household waste recycling overall saw a marginal gain between 2016 and 2017, recycling of packaging waste decreased. Overall packaging waste recycling declined by 1.2% - from 71.4% in 2016 to 70.2% in 2017.

While there is no hard evidence to suggest that this decline can be linked to the growth in e-commerce packaging combined with the lack of capacity for recycling in our homes, it is further notable that tonnes of paper and cardboard packaging recovered or recycled fell by 3.5% from 3.9 million tonnes in 2016 to 3.8 million tonnes in 2017³⁹.

4.4 A potential 'tipping point'

This report sheds new light on the direct impact that the increase in e-commerce packages could have on the recycling infrastructure at our homes. Taking into account the likely reduction in 'empty space' in parcels, we have modelled the excess packaging waste which will need to be recycled over the coming years.



³⁸ Based on DS Smith calculations, using Euromonitor Passport data, CPI data and DEFRA statistics on waste.

³⁹ Defra (2019), UK Statistics on Waste.

Based on Euromonitor's forecast data for internet retailing market size in the UK, we predict that the corrugated packaging material generated by e-commerce is set to increase by 171,000 tonnes over the next 10 years⁴⁰. This additional recycling material is the equivalent to enough cardboard to cover 55,000 football pitches or bigger than the city of Birmingham.

Whilst there are many assumptions in the household capacity calculation above, it would indicate that each household is already just 218g per day of recycling away from a 'tipping point'. Alongside the additional e-commerce packaging and the need to increase recycling rates to meet targets, it's not hard to see a future when materials for recycling could pile up in our homes or even on our streets.

4.5 The importance of separation of materials at our homes

The potential 'tipping point' that this report highlights would suggest that there is a need to radically upweight and invest in a consistent recycling infrastructure to serve the UK and enable consumers to adopt greater recycling practices, especially in the face of potentially growing materials to recycle.

There is also an important factor in encouraging innovation in packaging. The benefits and incentives of decreasing the

'empty space' in e-commerce packaging should be made clear. E-commerce packaging suppliers should be encouraged to find ways to reduce the raw materials in packaging while maintaining its performance. Manufacturers should look to work in partnership with packaging suppliers to find innovative new ways to protect consumer goods while they are in transit.

The scenario modelled above is based on a household with one 240 litre wheellie bin of mixed recycling that is collected fortnightly. We know that across the country how recycling is collected varies, both in bin type and frequency. What is required is sufficient capacity for recycling at our homes with consistent clear separation of materials and regular collections. Food is also a significant contaminant of dry recycling and therefore weekly food collections should be made mandatory.

We already have evidence that these kinds of progressive policies can work. Some of the successes we have seen in Wales should act as a blueprint for the rest of the United Kingdom. By adopting a consistent, upscaled approach to recycling separation and collection, we could create a system that is set for the changing future.

⁴⁰ Based on DS Smith calculations, using Euromonitor Passport data.



Chapter 5: Towards a new approach to recycling

The multiple interrelated challenges explored in the preceding chapters point clearly towards the need for a new approach. This chapter sets out the potential way forward for better recycling in the UK.

5.1 The UK at a critical crossroads

We are at a critical juncture in the UK. Waste management systems need to be radically reformed to cope with the demands of the modern economy, and to meet environmental sustainability targets and aspirations.

As levels of e-commerce continue to rise in the coming years, we can expect further increases in recyclables entering our homes. As evidenced by our research, consumers want to recycle more, and they expect action on the part of local and national government to help them. But across most of the UK, recycling rates are stagnating, and in 2019 we are on track to send more material for

incineration than we send for recycling. At current rates of progress, we risk missing the 2035 recycling target by over a decade.

This is the result of years of underinvestment and, more recently, the restriction by overseas markets of the quality of recyclables they are prepared to buy and re-process.

We are therefore at a crossroads and the UK Government's consultation of its new Resource and Waste strategy is timely. Radical reform can lead England and the rest of the UK on a brighter path that meets public expectation for a better environment. In short - now is the time to act.

"We have not been successful at recycling. After 40 years of trying, we have not been able to make it work. It needs a systemic change."

Ellen MacArthur, Founder of the Ellen MacArthur Foundation

"Our Resources and Waste strategy sets out how we will go further and faster, to reduce, reuse, and recycle. Together we can move away from being a 'throw-away' society, to one that looks at waste as a valuable resource. Through this plan we will cement our place as a world leader in resource efficiency, leaving our environment in a better state than we inherited it."

Rt Hon Michael Gove MP, Secretary of State for the Environment

5.2 Recommendations for reinvigorating recycling in the UK

While the Resources and Waste Strategy, 25 Year Environment Plan and upcoming Environment Bill demonstrate a welcome aspiration to take bold measures to crack down on waste crime, work towards zero avoidable waste, and fundamentally reform parts of the UK's waste and recycling infrastructure, the measures adopted need to be radical enough to fundamentally shift the UK's recycling rates.

Not all of this falls on the Government or local authorities, as consumers must also play their part. Local authorities will need to

better educate residents about what can be recycled and provide consistent collection. Consumers need to feel informed and confident in the system.

To achieve this, the following recommendations are proposed:

1. Appoint a dedicated recycling minister

The severity of the potential consequences for the UK of inaction on recycling warrant the appointment of a specific Minister for Recycling and Waste with cross-departmental responsibility. The interrelated challenges that are faced in this area need to be tackled centrally and systemically.





2. Statutory recycling targets

As the UK leaves the European Union, all stakeholders should take this opportunity to coordinate across the home nations, with England learning and adopting best practice from Scotland, Wales and Northern Ireland. We need minimum UK-wide recycling targets at national and local authority level to ensure we can reach our recycling policy ambition.

3. Prioritise waste separation

The UK should adopt statutory guidance on separate collections, backed by an increase in funding. Separate collection of paper and card would avoid contaminated recyclables and could drastically reduce the need for incineration and drive up recycling rates. Weekly food collections, as prescribed in the Resource and Waste Strategy, should be mandatory to reduce the effect of food as a significant contaminant of dry recycling.

4. Apply universal labelling

As part of a joined up communications strategy to enable consumers to better recycle, all packaging and collection infrastructure should have standardised recycling labels that sufficiently informs the consumer about what materials can be recycled where.

5. Put circular at the heart of The Budget

Moving the UK towards a circular economy should be at the heart of all departments of Government. The Office of Budget Responsibility (OBR) should carry out an economic analysis of the benefits and costs of adopting a circular model over the next 25 years. This analysis should then be used to set more circular strategies for all UK government departments.

Conclusion

It is a cause for national concern that we are set to miss our recycling targets, reflecting a failure in the UK's vision to build a better environmental future.

The perfect storm of increasing e-commerce, urbanisation, rising populations and the restriction of overseas markets for recyclables, may mean we fall even further behind.

It is paramount that we radically overhaul our recycling infrastructures. We cannot afford to reach a 'tipping point', which could have far reaching consequences, even extending into our homes.

The measures announced in the Resources and Waste Strategy are important steps in the right direction, but we need to turn those intentions into concrete action now to stimulate better recycling innovation in the UK and achieve a step-change in our capability as a society to do more while using less.



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