



BRIDGING THE GAP: ENDING BRITAIN'S RELIANCE ON PLASTIC WASTE EXPORT

Assessing the scale of the opportunity that can be delivered by closing the recycling infrastructure gap

Final report

June 2022



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GLOSSARY & DEFINITIONS

Term	Meaning/definition
Re-processing	In the plastics sector, this term is used to describe mechanical recycling into pellets
Recycling	The point at which waste meets the end of waste test, is no longer subject to waste regulation and is suitable for use as a raw material. For plastics, this is the point at which waste material is extruded into pellet for the manufacture of new products.
MRF	Materials Recycling Facility - where dry mixed recycling is sorted and separated for recycling or further processing.
PRF	Plastics Recycling (sometimes Recovery) Facility - further processes plastics which have been partially sorted in a MRF with the aim being to increase the quality and value of plastics by removing non-target material and contamination. The output are single polymer streams.
Sorting	Mechanical separation of material for recycling
Sorting capacity	MRF and PRF capacity
Re-processing capacity	Plastics recycling capacity (extrusion to pellet)
Secondary materials	Raw materials prepared for recycling and recycled into new products.
Mechanical recycling	The mechanical processing of plastics to create a pellet for the manufacture of new plastics products. Mechanical recycling processes involve heating and extruding mostly single polymer feedstocks. The polymer chains are not broken in these processes.
Chemical recycling	The thermal processing of plastics to remove impurities and create a feedstock for new plastic manufacture. This encompasses a range of technologies that break the chemical bonds in the polymers to varying degrees and include purification, decomposition and conversion.
GVA	Gross value added (GVA) is an economic productivity metric that measures the contribution of a corporate subsidiary, company, or municipality to an economy, producer, sector, or region. It is the output of the country less the intermediate consumption, which is the difference between gross output and net output. It can also be used to measure how much money a product or service has contributed toward meeting a company's fixed costs. (Source: Investopedia)

Glossary of plastics acronyms

Acronym	Name
HDPE	High Density Polyethylene
LDPE	Low density polyethylene
PP	Polypropylene
PO	Polyolefins
PE	Polyethylene (member of the PO group)
PET	Polyethylene terephthalate
PVC	Polyvinyl chloride

EXECUTIVE SUMMARY

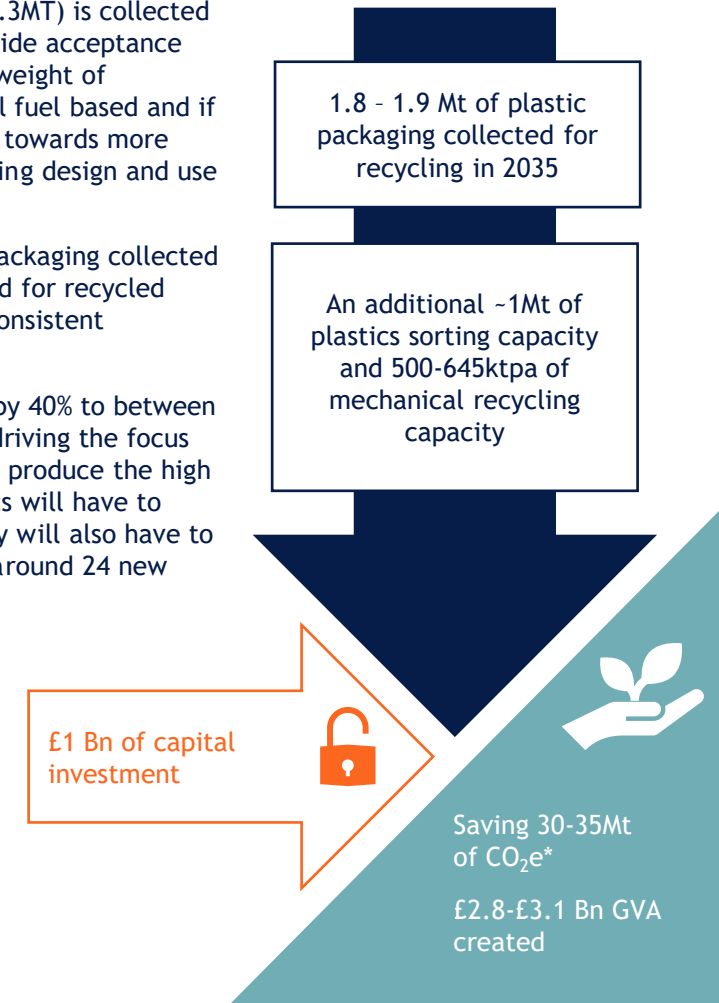
At present, approximately 2.36 Million tonnes of plastic packaging is placed on the market and used in the UK. Of this, ~54% (1.3MT) is collected for recycling. Not all of this packaging is recycled in the UK as we export approximately 0.5MT overseas each year. There is wide acceptance that the recycling rate for plastic packaging must increase. Despite having some environmental benefits such as reducing the weight of packaging for transport, giving products a longer shelf life and protecting against food waste, plastics are most commonly fossil fuel based and if mismanaged, can persist in the environment creating blight, breaking down into microplastics and harming wildlife. The drive towards more sustainable plastics is multifaceted with action being driven by Government policy, corporate commitments to improve packaging design and use recycled content, and public action.

Defra and the devolved administrations have set the framework for new legislation which will increase the amount of plastic packaging collected for recycling, the way it is collected and also provide the ‘pull’ through the resource management system by increasing demand for recycled content. Key proposals include Extended Producer Responsibility for packaging, the introduction of a deposit return scheme, consistent collections of recyclables from householders and the Plastics Packaging Tax which came into force in 2022.

This study has shown that if the UK meets the recycling targets, the amount of packaging collected for recycling will increase by 40% to between 1.8Mt and 1.9Mt by 2035. Importantly, the way this is collected will change, with consistent collections and quality concerns driving the focus away from co-mingled recyclates to separate collections which will equate to between 1.15Mt and 1.20Mt by 2035. In order to produce the high quality, separate polymer streams required for mechanical recycling in the UK, the capacity to sort, refine and upgrade plastics will have to increase from that available today - approximately 0.3Mtpa, to around 1Mtpa by 2035. Similarly, mechanical recycling capacity will also have to increase by between 0.5Mtpa and 0.64Mtpa to process this material in the UK and avoid the need for exports. This equates to around 24 new plastics sorting facilities and 18-22 mechanical recycling facilities.

In order to deliver this infrastructure and ensure that recycling targets are met, investment of approximately £1 Bn is required. Whilst investors have become comfortable with investment in energy from waste assets in recent years, plastics sorting and recycling infrastructure does not benefit from the same level of confidence. This is because it doesn't have the same ‘infrastructure-like’ characteristics that deliver long term, stable and certain cashflows. Plastics sorting and recycling facilities will be vital infrastructure for the UK if we are to meet our circular economy goals. Policy makers can play a role in dampening volatility and creating the long term certainty required to secure investment and the economic and environmental benefits this investment would unlock.

The study has concluded that delivering this infrastructure would create significant economic and environmental benefits across the UK and particularly areas of the North West and South East where the capacity gaps are more pronounced. Overall, investment is expected to deliver between £2.8 Bn and 3.1 Bn GVA over the lifetime of the facilities, create 1,100 jobs directly and another 975 in the supply chain and importantly, reduce carbon emissions by 30-35Mt of CO₂e* by recycling an additional 14-16 Mt of plastic packaging.



*Closed loop recycling compared to incineration, over 25 years lifetime of a treatment facility

Bridging the gap: ending Britain's reliance on plastic waste export

THE CHALLENGE

The UK uses enough plastic packaging to fill

34,285

Olympic swimming pools each year!
(2.4Mt)

We collect just **54%** (1.3Mt) for recycling

OF THIS...

Almost half is recycled in the UK (0.6Mt)

The other part is exported overseas for recycling =
870 The weight of
Airbus **870** Airbus A380 aircraft

THE JOURNEY



New policy and corporate commitments will increase the amount of plastic packaging collected for recycling and make it easier to recycle.



+45%

by 2035
(1.8-1.9Mt)



WHAT DO WE NEED TO MEET THE RECYCLING TARGET FOR THE PLASTIC PACKAGING WE GENERATE IN THE UK BY 2035?



24 new plastic sorting facilities (total capacity of 1Mtpa)



UP TO 22 plastics recycling facilities (total capacity of 500-645Mtpa)

THE OPPORTUNITY TO INVEST



= **~£1Bn**

The investment required to deliver **40+** plastics sorting and recycling facilities is comparable to the cost of **4 - 5** medium sized energy from waste facilities.

THE BENEFITS

The investment will unlock significant economic and environmental benefits across the UK and contribute to the Government levelling up agenda.

~975 jobs in the supply chain

~1100 jobs in direct employment

£2.8-£3.1 of GVA for the UK over 25 years of facility operation

~35MT of CO₂e avoided and an additional 14-16Mt of plastic packaging recycled

MAKING IT HAPPEN - UNLOCKING INVESTMENT



Infrastructure investors look for certain and stable returns and plastics recycling infrastructure does not fit the criteria currently. Long-term policy and interventions are required to create more 'infrastructure-like' conditions for cashflow forecasts.

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01

OBJECTIVE & INTRODUCTION

INTRODUCTION & OBJECTIVES

Only half of all plastic packaging placed on the market in the UK is currently collected for recycling and of this, around 40% is exported. This highlights a significant missed opportunity to maximise the collection of packaging plastics for recycling and the production of recycled polymer to meet recycling targets, increase the availability of high quality recycled polymer to help businesses avoid the Plastics Packaging Tax and meet the wider requirements of the circular economy.

Consumer concern about plastics pollution, the Government's objective for greater investment across the UK (Levelling Up*) and the forthcoming recycling policy reforms including Extended Producer Responsibility (EPR) and the introduction of Deposit Return Schemes (DRS), are coming together to create an opportunity to address this challenge. Investing in plastics recycling infrastructure is not something that can be ignored and unless capacity is increased, exports of waste plastics are likely to grow significantly.

The Government has recognised the importance of growing plastics recycling capacity in the UK and new policy aims to stimulate an increase in domestic reprocessing capacity for packaging material. DEFRA has been explicit that it expects current or planned policy to provide sufficient clarity and incentives for the market to provide the necessary scale and quality of recycling and reprocessing capacity. However, to date, the recycling market has delivered limited infrastructure measured by both capacity and quality. There is little to indicate that current reforms will address this issue without additional intervention.

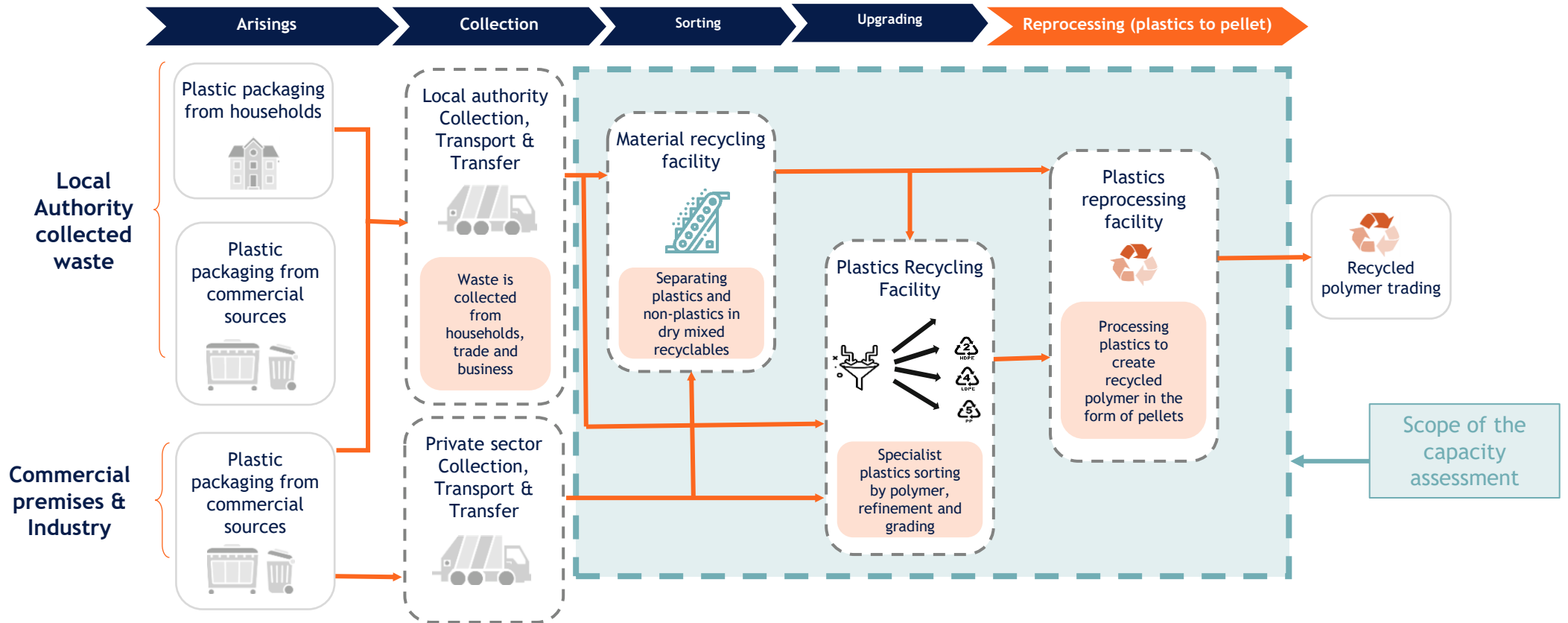
Ensuring that this infrastructure is attractive to investors is vital to ensuring the facilities that are built are of the quality required to meet recycling targets. Experience suggests that the investment risk created by short to medium term feedstock contracts and volatile offtake markets (amongst other factors), limits the pool of investors that are comfortable with this level of risk, leads to high cost of capital and limits the initial capex investment resulting in lower quality infrastructure.



[*https://www.gov.uk/government/publications/levelling-up-the-united-kingdom](https://www.gov.uk/government/publications/levelling-up-the-united-kingdom)

SCOPE OF THE ASSESSMENT

This report considers the plastics recycling capacity required in the UK to manage plastics packaging. Non-packaging plastics are not included in the assessment, nor are chemical recycling technologies given that they are not currently investable by mainstream funds and mechanical recycling remains the most energy and carbon efficient way of manufacturing recycled polymers. The boundary of the assessment is shown in the diagram below.



TYPES OF PLASTIC RECYCLING INFRASTRUCTURE

Materials Recycling Facility (MRF)

Material recycling facilities sort mixed waste streams into separate fractions in preparation for recycling. Waste passes through a series of mechanical and manual sorting with some technical steps that can include screens, eddy current separators and optical sorters. MRFs typically sort dry mixed recycling collected from householders and commercial businesses. 'Dirty' MRFs sort residual waste to separate some recyclable material and are typically associated with mechanical and biological treatment (MBT) facilities, where they provide the mechanical element of processing.

The majority of feedstock contracts for MRFs are short to medium term. Contract lengths have typically shortened to around 2 years from predominantly longer-term contracts of up to 20 years, which were often linked to PFI contracts and in some cases it is reported that there is pressure from contractors for contracts to be even shorter.

MRFs have been impacted by volatile offtake markets, leading to very short term offtake contracts. As a result, risk and reward share feedstocks contracts are common. The contractual arrangements cover the operational costs and then share material revenue risks and also link gate fees to incoming feedstock quality and processing cost to maintain margins and reduce operational risk. This has led to MRF and associated PRFs to become 'fixed' margin businesses with profitability linked to the negotiated bilateral terms.

Plastics Recycling Facility (PRF)

Plastics recycling facilities sort and separate mixed plastics into single polymer streams. The extent to which polymers are upgraded varies between facilities with some PRFs including washing and grinding steps to produce flake. Some take plastics through the complete recycling process to create pellet. PRFs can be stand alone facilities, or part of a larger MRF.

UK plastics sorting capacity in the UK is estimated at 300 - 400 ktpa, however the type of facilities differ and there are only a handful of fully automated PRFs operational in the UK. An est. 0.5 million tonnes are exported to date due to a lack of capacity.

PRFs operate similar business and revenue models to MRFs, however most PRFs are paying for incoming material from MRFs and therefore operate a more traditional manufacturing approach, creating value by selling outputs to mechanical recycling facilities or directly to plastics manufacturers.

The existing PRFs are owned by large waste management companies and are therefore part of an integrated waste system linked to MRF contracts with est. 10 - 20% spot market contracts. These specialist plastics upgrading facilities are needed for most mechanical plastics recycling facilities and some chemical plastics recyclers, however there is a trend for more mixed plastics being processed with innovative technologies to reduce the requirement for sorting and separation upfront and improve the value chain of plastics.

Plastics Reprocessor

Plastics reprocessing is the point at which waste plastics are recycled into recycled polymers that can be used in product and packaging manufacture.

These businesses require high quality waste plastics as feedstock and can tolerate only very low levels of contamination from either non-target polymers or other sources. For this reason, many have 'mini-PRFs' at the front end of their process. Plastics are washed and then shredded or ground to produce a flake in preparation for the final stage in which they are heated to melting point and forced through an extruder before being cut into pellets.

There are approximately 20 plastics reprocessors currently operating in the UK.



02

THE POLICY LANDSCAPE FOR PLASTICS IN THE UK

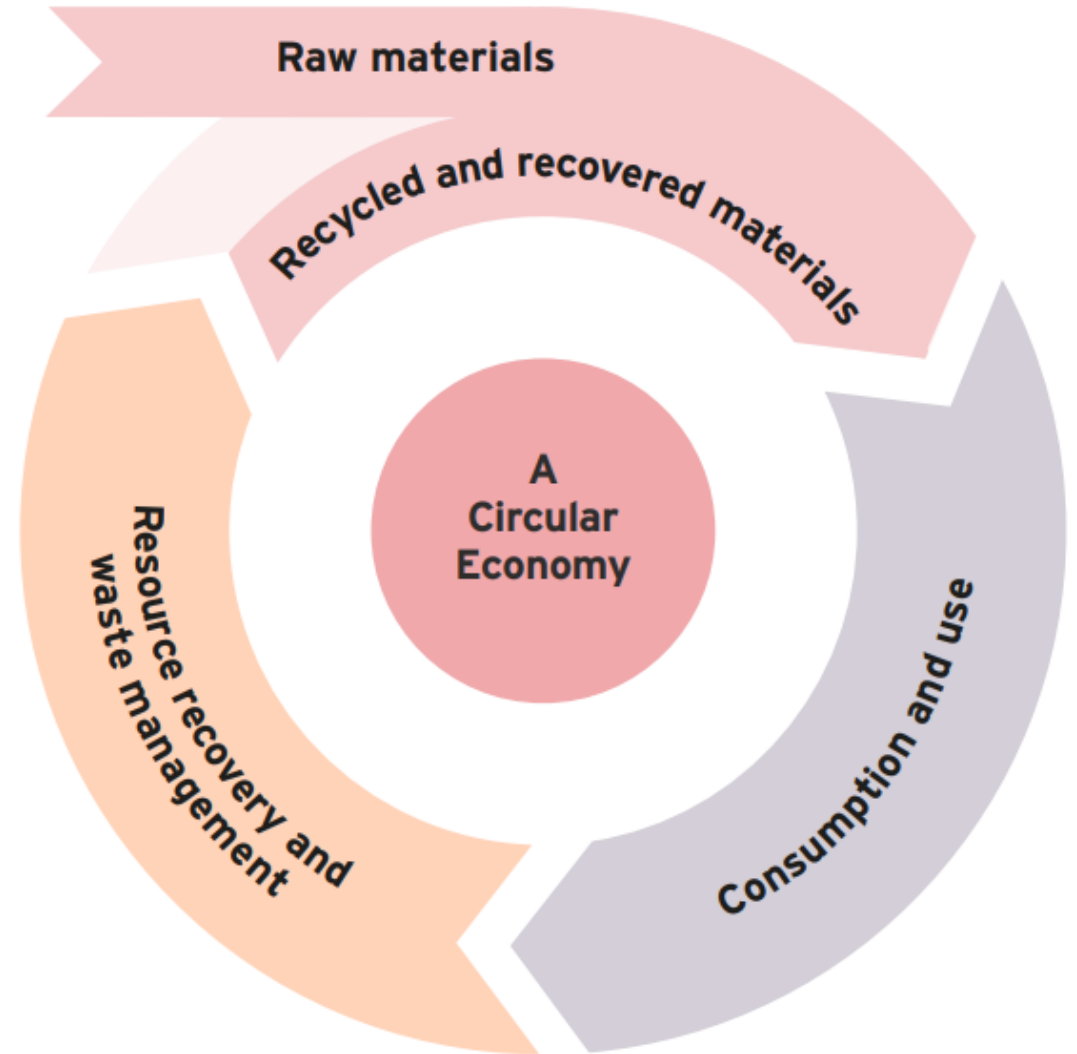
POLICIES IMPACTING PLASTIC PACKAGING AND WASTE MANAGEMENT

The high level of public interest in the use of plastics, particularly single use plastics, and their impact on the environment is being reflected in increasing policy targeting plastic materials. There are a suite of new regulations, targets and fiscal measures set both at a national and international level, that are driving changes in how plastic waste is managed and increasing the demand for recycled material in local and global commodity markets.

In response to the increasing public concern about the environmental impact of plastics, large brands, NGOs, and other actors in the supply chain have made commitments to reduce plastics consumption, replace plastics materials and increase recycled content in products through initiatives such as WRAP's Plastics Pact*. This is expected to introduce considerable change on the quantity, design and polymer mix of plastics packaging placed on the market in the UK.

Added to this is the Government action to create supportive policies and legislation that will improve the sustainable use and recycling of plastics. Several significant policies and new recycling targets were proposed in the Resources & Waste Strategy (RWS) for England (2018)** and which will be adopted by other nations of the UK including Extended Responsibility, Deposit Returns Scheme for packaging and consistent collections for household recycling. Provisions for these were made in the Environment Act 2021 which received Royal assent in November 2021. The introduction of a plastics packaging tax, payable on any plastic packaging that does not contain at least 30% recycled polymer, came into force in April 2022.

All of these policies and initiatives will drive up collections for recycling, increase recyclability and create a 'market pull' for recycled polymer. The UK must ensure that there is sufficient high quality plastics recycling infrastructure to meet demand.



* <https://wrap.org.uk/taking-action/plastic-packaging/initiatives/the-uk-plastics-pact>

**https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/765914/resources-waste-strategy-dec-2018.pdf



UNITED KINGDOM:

‘PUSH’ FROM POLICY

The UK is implementing **Circular Economy principles** by driving improved resource efficiency and reducing the amount of value and material lost by linear economic models in parallel to the European Union. This includes a focus on plastics. Potential measures currently under consultation include the introduction of **EPR**, introduction of a **DRS**, **material bans to landfill** (biodegradable material to landfill bans) and **systematic changes to the collection system** (mandatory food waste collections, consistent collection schemes). The proposed consistency in household waste collection schemes aims to ensure the collection of a range of material categories, including plastic bottles and pots, tubs and trays.

The individual impact of these policies remains unclear; however, it is anticipated that they will deliver:

- An increase in recycling rates and quantities of recyclable material (as per the RWS, although more ambitious targets of 70% by 2025 have been highlighted in the Net Zero report); and
- Changes in the way plastics are collected with greater proportions potentially collected source separately, either via the implementation of consistent collections or DRS.

All nations in the UK have set themselves stretching recycling targets. England 65% by 2035 (current 45%), Scotland 70% by 2025 (current 46%) and Wales 80% by 2035 (current 63%).

In addition, the UK government has increased funding to reduce plastic waste, providing businesses, NGO’s, research institutions etc. grants for innovative recycling and circular economy solutions for plastic waste. Funds include the Plastics Research and Innovation Fund (PRIF) and the Industrial Strategy Challenge Fund’s Smart Sustainable Plastic Packaging Challenge. The latter has awarded £20 million to develop plastic recycling facilities.

A further push towards higher recycling ambitions might derive from a change in recycling tonnage calculations, which have historically been based on the tonnage of material being collected for recycling. In line with changes in the EU, this definition is likely to change to instead calculate the tonnage of material actually being recycled. The change in calculation and definition is currently still in consultation, but a drop in the recycling rate is expected once the definition change has been implemented.

In addition to the increase in recycling targets, the government has published targets under the **Environmental Act**, which includes halving the waste going to disposal by 2042. This will create an additional push towards more recycling and the need to increase investment in recycling infrastructure to enable this goal to be achieved.

Drivers for change

The UK is one of the most progressive countries in the plastic, packaging and product regulatory landscape. Although the UK has recently exited the European Union, it has stated an ambition to at least match EU environmental legislation.

The *Resources and Waste Strategy*, *25 Year Environment Plan* and the *Environment Act* are the pillars which guide the UK Government’s contribution to a circular economy and environmental protection.

Traditionally the main drivers for change were the targets set by the Government related to recycling rates and to reduce the contribution of landfill to climate change. However, in more recent years, consumer behaviour has become one of the greatest drivers for sustainability changes.

It should be noted that waste & recycling policy is devolved to the administrations of Scotland, Northern Ireland and Wales who set their own direction and have their own variations of legislation.

UK recycling & recovery targets

- 50% recycling rate for household waste by 2020;
- 75% recycling rate for packaging by 2030 (subject to consultation);
- 65% recycling rate for municipal waste by 2035



UNITED KINGDOM:

'PULL' FROM MARKET

The public “war on plastics” through growing consumer awareness and the introduction of the **Ellen MacArthur Foundation’s** initiatives as part of the *New Plastics Economy* has led to a growing number of leading manufactures and brands committing to make changes to their plastic products and packaging leading up to **2025**. **Voluntary commitments** in the UK include **EMF’s Global commitment** and the **UK’s Plastics Pact** which bring together signatories ranging from organizations, governments, NGOs and universities who are encouraged to make more ambitious commitments. These commitments are expected to lead to the:

- Removal of unnecessary or difficult to recycle plastic types;
- The switch to alternative material types or potentially degradable plastics;
- An increase in recycled content in products and packaging, and therefore, driving the demand for recycled polymers for use in textiles, packaging and products.

To do this, voluntary targets are set. In the case of the **UK Plastic Pact**, these include 100% of packaging to be reusable, recyclable or compostable by 2025; 70% of packaging being effectively recycled or composted and 30% average recycled content across all packaging by 2025.

As a result of commitments to plastic and packaging leading up to 2025, it is expected that the composition of plastic packaging, and therefore plastic waste composition will change. Impacts include:

- A reduction in the quantity of plastic deemed as problematic, such as PVC, EPS and black plastics.
- Material change towards easily and widely recyclable polymers, such as PET or HDPE.

Drivers for change

Hundreds of companies in the UK are committing to make changes to their plastic products and packaging leading up to 2025.

These changes are largely driven by growing consumer awareness and the introduction of voluntary commitments led by the Ellen MacArthur Foundation and WRAP creating ambitious targets for plastic waste in the UK.

As a result of these commitments, polymer use is expected to shift towards materials that are more easily recyclable and away from ‘problematic plastics’ such as PVS and PS and demand for recycled content is expected to increase as a result of these targets.

At least 80% of the UK’s plastic packaging supply chain has signed up to the UK Plastic Pact, and 30 UK businesses have made bold pledges for 2025, including some of the largest, retailers and manufacturers in both the UK and global markets.

POLICY SUMMARY

The diagram shows how the numerous policy developments and new legislation will come together and act across the value chain for plastics.

Whilst many will incentivise a reduction in the use of plastics for packaging, all target an increase in the quantity collected for post-consumer recycling. This will drive up demand for mechanical sorting and upgrading capacity through PRF for plastics in preparation for recycling. Consistent collections may also change the composition of material streams collected for recycling and, depending on the choices made by Local Authorities, generate separately collected plastic streams or streams in which they can be separated from other recyclables more easily and by using simple mechanical sorting techniques.

The increase in demand for sorting and upgrading will be matched by that required for reprocessing capacity. This will be driven by policy, legislation, corporate commitment and consumer pressure to use more recycled polymers in plastic packaging and reduce the export of lower quality material by creating the infrastructure required to process and benefit from the value of this in the UK.

Policy	Volume & type of plastic waste	Volume segregated for plastic recycling	Demand for recycled plastics
The Circular Economy Package	Decrease	Increase	Increase
Resources and Waste Strategy	Decrease	Increase	Neutral
Extended Producer Responsibility	Decrease	Increase	Increase
Consistent collections	Neutral	Increase	Neutral
Deposit Return Schemes	Neutral	Increase	Neutral
Plastic packaging tax	Decrease	Increase	Increase
Bioplastics	Decrease	Increase	Neutral

Regulatory Impact ■ Increase ■ Decrease

03

THE CASE FOR PLASTICS RECYCLING IN THE UK

03.a Plastic packaging waste today

PLASTIC WASTE ARISING IN THE UK

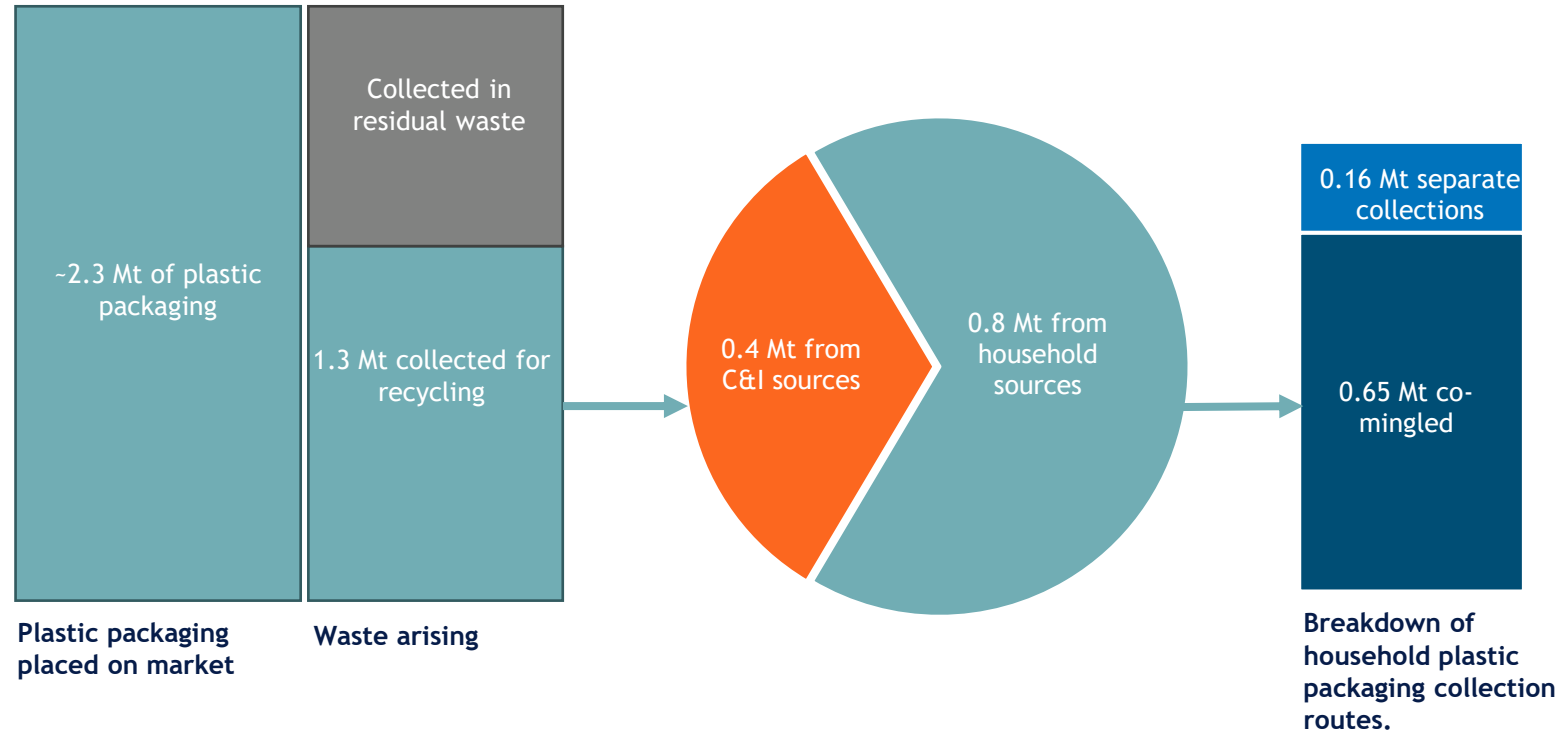
Of the ~2.36 million tonnes of plastic packaging placed on the UK market each year, 54% is collected for recycling. Of this, around 0.8Mt arises from household sources, with the majority (74%) collected in co-mingled dry mixed recycling streams.

Plastic packaging collected for recycling in the UK 2019

Approximately 2.3 - 2.4 million tonnes of plastic packaging is placed on the UK market each year (baseline 2019)* by companies that are obligated under the Producer Responsibility Obligations for packaging waste. The total tonnage of plastic packaging will be higher when that from companies below the obligation de minimis is also included.

Of the 2.3 million tonnes from obligated businesses, approx. 54% is separated by the consumer and collected for recycling, with the remaining plastic waste being disposed of and collected within the residual waste stream. This includes plastic packaging collected from both households and commercial and industrial (C&I) businesses, but does not include any plastic from construction and demolition activities.

The recycling stream can be divided into co-mingled collected material, where plastic is part of the general dry mixed recycling collection, or source-separate collection, such as plastic bag collection points at retail outlets.



*WRAP

Source: Based on Waste Data Interrogator and Waste Data Flow

PLASTIC WASTE ARISING IN THE UK

Plastic waste arises via a range of different sources and waste streams, from separately collected plastic packaging waste streams and dry mixed recycling, to residual municipal waste and street-cleaning residues. A significant proportion of plastic packaging currently remains in the residual waste stream and is therefore sent for energy recovery or landfill.

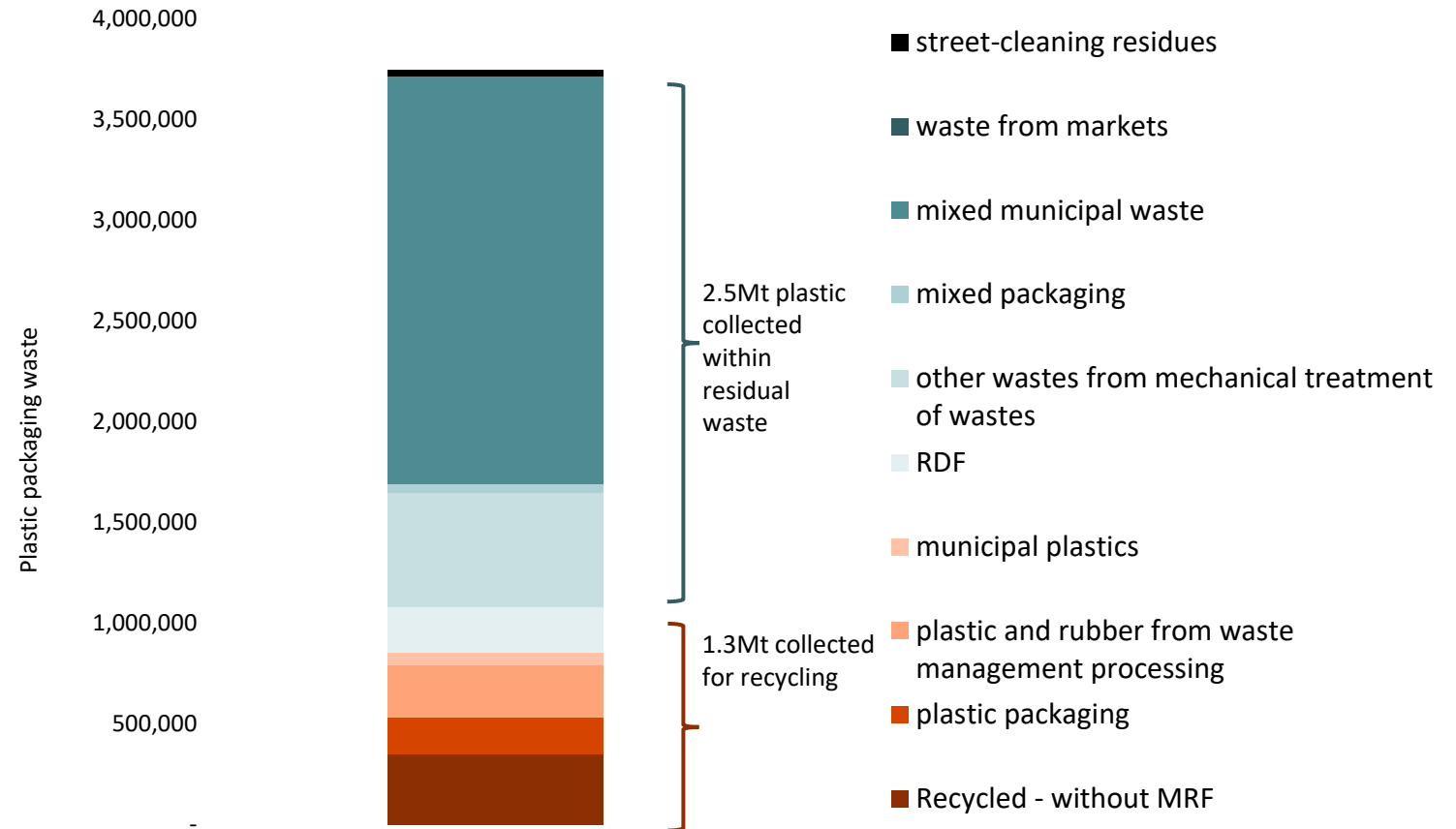
It is the higher-quality (cleaner and easier to sort) plastic waste which is collected through recycling schemes, that goes through material recycling facilities (MRF) and plastic recycling facilities (PRF) to ultimately be recycled for use as a recycled polymer. Currently, this is mostly rigid plastic packaging. While flexible plastic packaging is increasingly collected for recycling at bring points and collections by supermarkets, it remains difficult to recycle from household sources and therefore the majority goes for energy recovery and some to landfill.

Only around 5% of the plastic packaging collected for recycling is flexible plastic or film, with 95% being rigid plastic packaging*.

*WRAP

The majority of all plastic waste arising in the UK is collected within mixed municipal waste. This includes recyclable packaging incorrectly disposed by the consumer, hard-to-recycle plastic packaging such as films and flexible and non-packaging plastics.

Breakdown of national plastic waste arisings by waste stream*, 2019



Source: Based on Waste Data Interrogator

*Note: This not only includes plastic packaging, but plastic waste arising more generally, as a detailed breakdown of waste return data by plastic packaging / non-packaging is difficult to distinguish.

03.b

Current recycling capacity for packaging plastics

DRY RECYCLING MATERIAL SORTING CAPACITY IN THE UK (MRFS & PRFS)

Material recycling facilities (MRFs) can be separated into two main groups, covering clean MRFs with high-quality outputs and dirty MRFs, where the outputs are usually used for refuse derived fuel (RDF) production or as feedstock for energy from waste facilities. Outputs for mechanical recycling facilities usually arrive from clean MRFs as plastics from dirty MRFs is typically heavily contaminated and not as suitable for mechanical recycling.

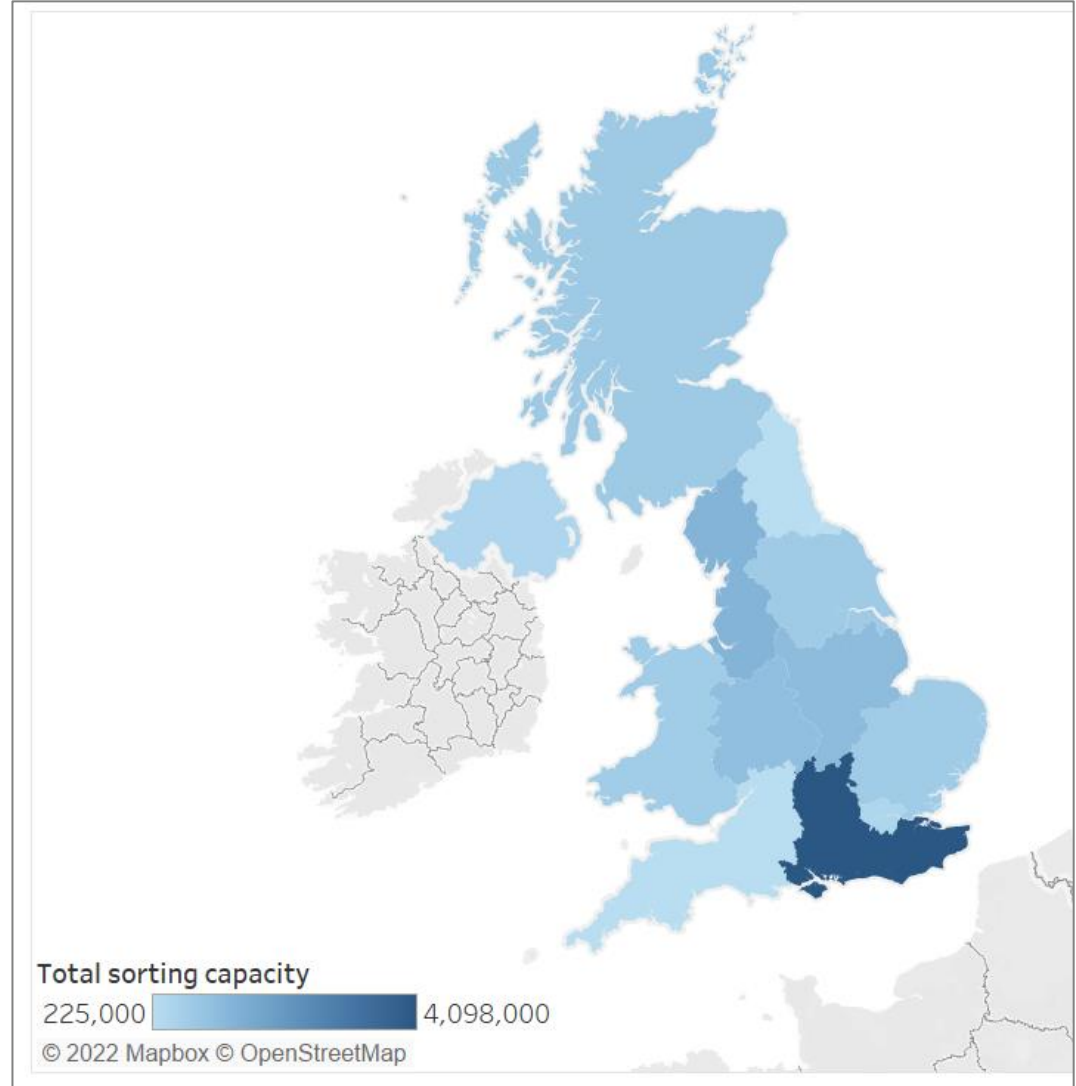
MRF facilities vary in their size, from smaller basic processes where metals are separated from the remaining waste stream, to highly sophisticated and technological sorting processes. In terms of quantity, combined dry mixed recycling streams are sorted at around 150 MRFs in the UK. MRFs have a combined permitted capacity of approximately **12 million tonnes per year**, PRFs around **0.3Mt per year**, although it should be noted that permitted capacity can be significantly higher than actual operational capacity at some sites. **The typical capacity of the UK's MRFs tends to be between 0.1 - 0.13 Mtpa** with only a few in excess of 0.35 Mtpa capacity.

Currently, 13-17% of MRF feedstocks are plastics e.g. bottles, pots, tubs and trays mixed with other recyclable materials. The most commonly separated plastic polymers at MRFs are PET, HDPE and PP, with some facilities also segregating PVC, LDPE and PS. The degree of segregation is dictated by market prices. Flexible plastics typically remain in the mixed plastics fraction or rejects and are not typically targeted.

Many MRFs are owned by Local Authorities and are contracted to waste operators. The top 5 MRF operators hold ~35% of the total capacity. Key players include, Viridor, Biffa, Veolia (Suez), Grundon and JWS Waste and Recycling.

Mixed plastics and single polymer streams that require upgrading can be processed at dedicated plastic sorting facilities to maximise value, where the incoming plastic stream is (further) sorted into single polymer streams to enable high quality mechanical recycling.

12 million tonnes dry recycling sorting capacity in the UK by region (in tpa)*



*Based on total sorting capacity, not solely the capacity for plastics separation.

PLASTIC REPROCESSING CAPACITY IN THE UK

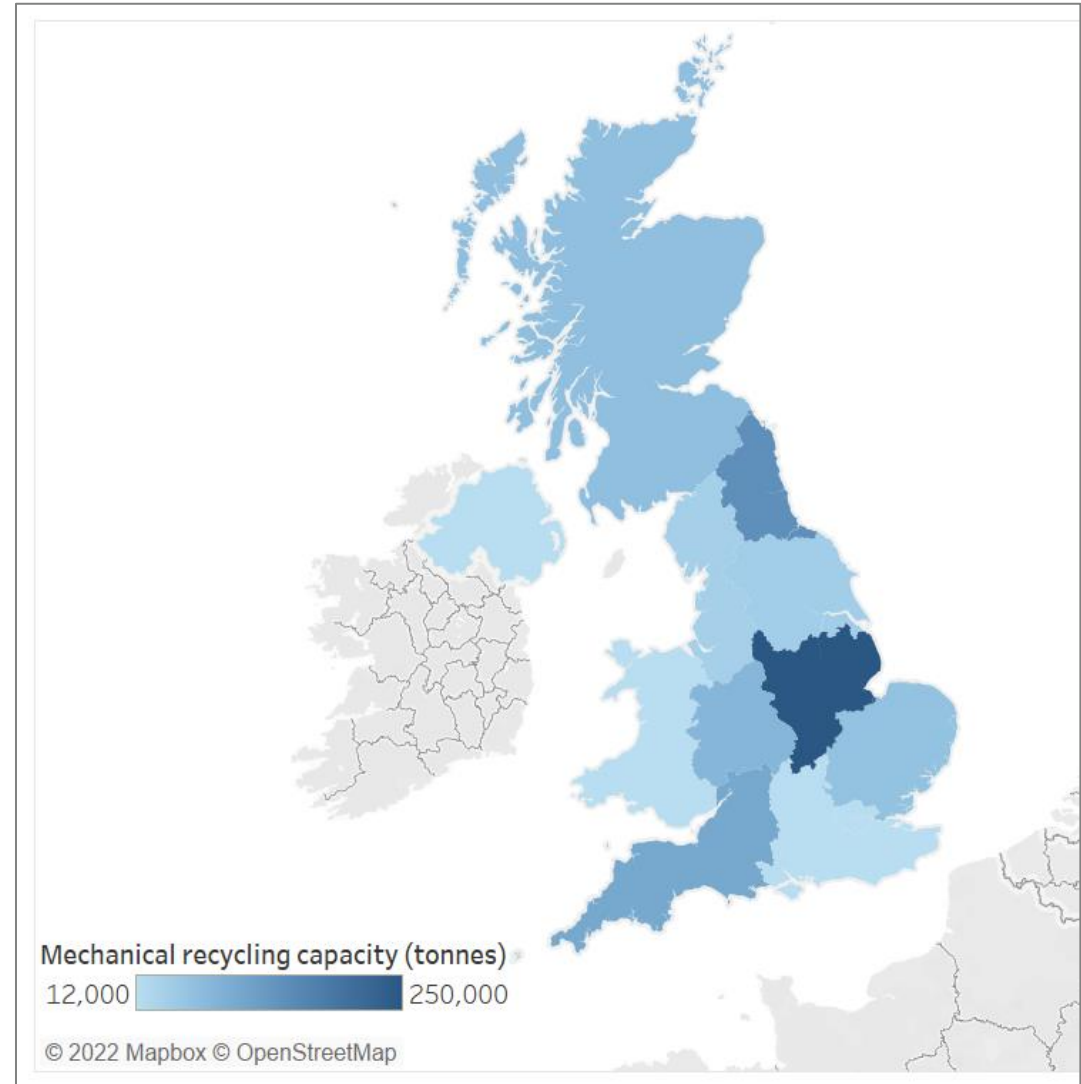
The UK is witnessing growth in its plastics recycling capacity (plastics to pellet) as a result of increased corporate and Government funding. Currently, the UK has approximately **1Mtpa of permitted plastics reprocessing capacity**. Similar to MRFs, the stated capacity is often higher than the actual operational capacity. Based on the assumption that throughput is likely to be nearer to 90%, the operational capacity of plastics reprocessing in the UK is likely to be around **0.9 Mtpa**.

This capacity describes mechanical recycling operations only (flake/grind, melt, extrude & pelletise). These activities focus on single polymer streams and HDPE/PP polymer recycling accounts for 36% of total capacity with PET being the third most commonly recycled polymer in the UK. Mechanical recycling capacity is significantly focused on rigid plastics. It is technically possible to mechanically recycle flexible plastics although most of this capacity uses material collected from the industrial supply chain as it is easier to separate polymers and it is less contaminated than post consumer films.

The North East has the highest number of facilities (4 operational, 2 planned) followed by the East Midlands (4 operational). The East Midlands has the highest reprocessing capacity at 0.25Mtpa of operational capacity. The North East has the highest planned capacity, with 146ktpa of operational capacity and 102ktpa of planned. The East of England has 60ktpa of operational capacity and 88ktpa of capacity under construction.

The UK has around 0.96 Mtpa of advanced chemical recycling capacity and 0.4Mtpa of mechanical recycling capacity in the development pipeline between now and 2025. It is hoped that chemical recycling technologies will be able to process 'hard to recycle', mixed plastics and flexibles with higher levels of contamination to further increase the UK's recycling rate. This however is not part of this assessment.

1 Mt Plastics Recycling Capacity in the UK broken down by region and polymer (in tpa)



CURRENT CAPACITY GAP FOR PLASTICS RECYCLING

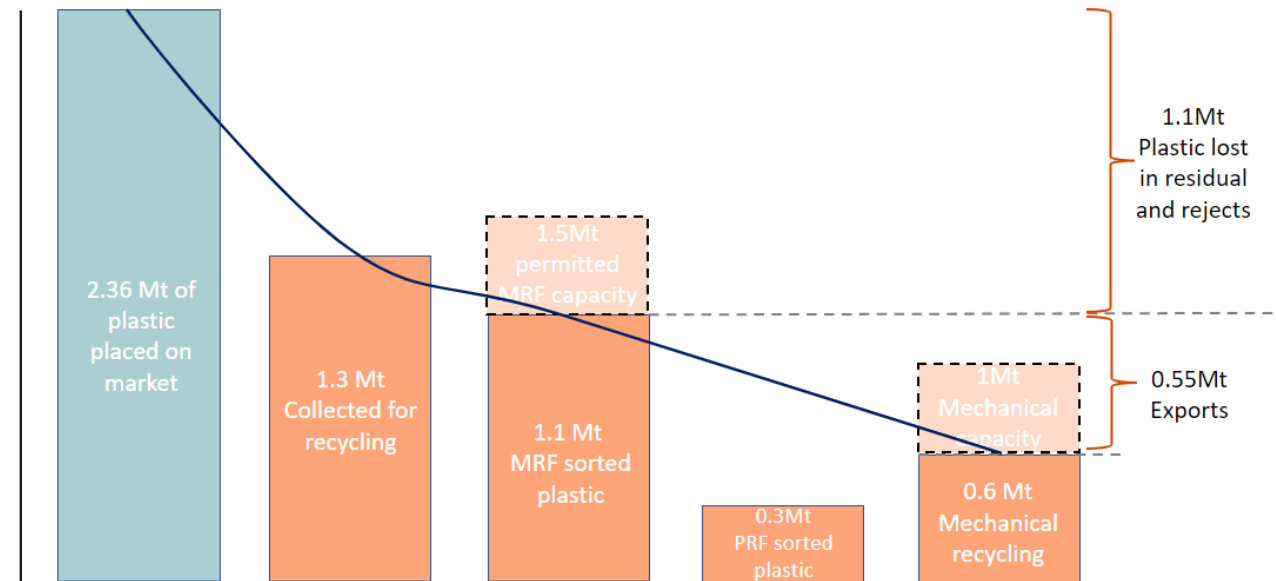
The UK currently has a capacity gap between the ~1.3 Mt of plastic packaging collected for recycling and the ~0.9 Mt of operational reprocessing capacity. This drives the export market of waste plastics, which has been problematic in the past.

There is currently a capacity gap of ~0.3 - 0.4Mtpa for plastics reprocessing. The capacity gap for recycling plastic packaging is defined by the delta in waste collected for recycling and the capacity of existing infrastructure to sort and reprocess this waste into recycled polymers. However, the actual waste flow is not solely due to a lack of infrastructure but is also driven by other factors such as cost and demand i.e., the cost of upgrading and reprocessing plastics overseas is typically less than in the UK.

Presenting the capacity gap at a national level is useful but can hide regional issues where demand and capacity may be out of balance leading to increased transport costs as waste has to travel further to be upgraded for recycling and/or reprocessing. In some cases, this additional cost may result in increased tonnages to energy recovery or landfill if the economic cost of transport becomes prohibitive. It should also be noted that reprocessing capacity is polymer specific in most cases which adds further complexity.

Currently in the UK, around 1.1 Mt of plastic packaging collected for recycling is sorted through MRFs. The fact that there is no capacity gap for this infrastructure is unsurprising given the close relationship between Local Authorities collecting the waste and the provision of MRF infrastructure. Investment in PRF capacity to upgrade MRF sorted plastics in order to increase their value and recyclability is linked more closely to market prices for the offtake i.e., the costs of upgrading must be justified by the uplift in material value.

Plastic material flow, UK



*<https://www.statista.com/statistics/1268923/annual-plastics-waste-exports-united-kingdom-uk/>

** Based on Waster Interrogator Data

03.c

How much plastic packaging will need to be recycled?

FORECASTING PLASTICS WASTE ARISING

The tonnage of plastic packaging presented for collection and recycling is driven by multiple factors. These include:

- The quantity of plastic packaging placed on the market by manufacturers and retailers;
- Consumer behaviour in relation to purchasing decisions and recycling.
- The impact of policies aiming to drive up the quantity and quality of plastics presented for collection i.e., the introduction of consistent collections which may include more separate collections, and how these are implemented by Local Authorities.
- The success of policies aimed at increasing the recycling rates and quality of plastics collected for recycling, such as Deposit Return Schemes and Extended Producer Responsibility

Rather than attempting to predict the individual impact of each of these drivers which cumulatively, would create a significant amount of uncertainty, the scenarios used in the assessment assume that the recycling target is either met on a national basis (65%) by 2035 or slightly undershot (62%).

Scope

The scope of the plastic forecast includes only plastic packaging that will be collected for recycling. It excludes non-packaging plastics and low-quality plastics within the residual waste stream which would be too contaminated to be suitable for mechanical recycling (although the separate collection of food would reduce contamination to some extent). It is assumed that non-packaging plastics and ‘hard to recycle’ plastics from sources other than household & ‘household -like’ C&I wastes would be target feedstock for advanced chemical recycling technologies as they develop in the UK. This aligns with the aim to maximise the tonnage of plastic which can be mechanically reprocessed and used again in the circular economy. This has the potential to increase recycling rates to 65% when combined with current policy however, it is likely that advanced chemical recycling infrastructure would be required to increase this further.

The ranges presented in the following slides refer to the medium annual growth scenario hitting either 62% or 65% recycling rate.

Assumptions used to establish future arisings of plastic packaging*

	Annual plastic growth Placed on the market (POM)	Scenario 1 - Recycling rate	Scenario 2 - Recycling rate	Co-mingled	Source-separate
Low	0%	62%	65%	35%	65%
Medium	1%	62%	65%	35%	65%
High	3%	62%	65%	35%	65%

*All rates achieved by 2035

FORECASTING PLASTICS WASTE ARISING

The amount of plastic packaging collected for recycling is expected to increase to between ~1.8 - 1.9Mtpa by 2035, due to both the change in packaging use by companies, as well as policy changes implemented by waste management companies. The policies expected to have the highest impact on the volume of plastic packaging waste collected for recycling are DRS, EPR and the introduction of consistent collections schemes.

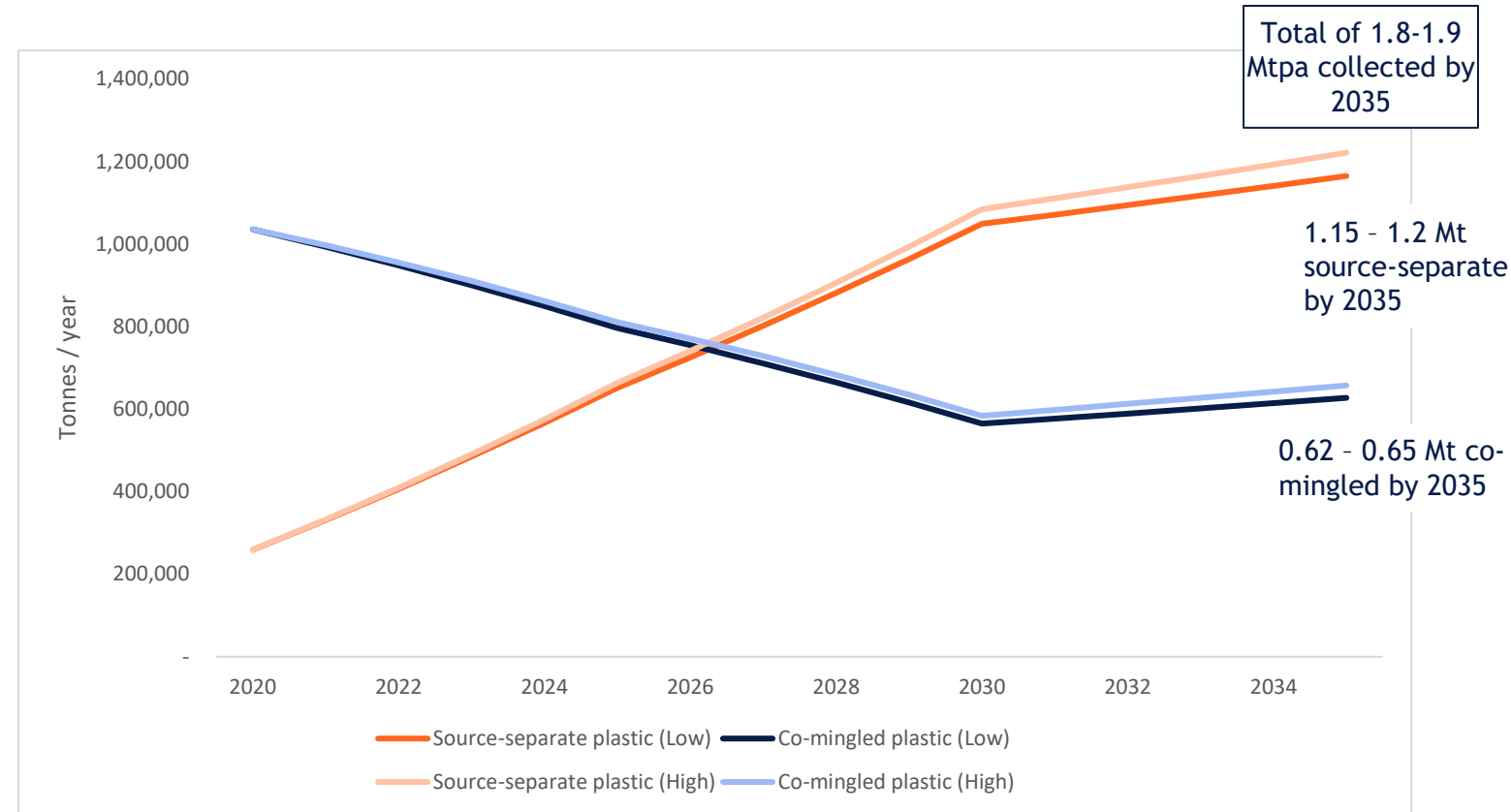
Following the implementation of the DRS system and consistent collection schemes across the UK with increasing the materials collected, a move towards more **source-separately collected materials** is expected, impacting the sorting activities that follow the collection stage.

Based on the increase in plastic packaging placed on the market, and policies driving recycling rates, an annual tonnage of ~1.8-1.9 Mt of plastic packaging is expected to be available for collection by 2035, with 65% being collected source-separately.

While the change of polymer mix collected for recycling is very difficult to estimate, based on the changes in packaging placed on the market, it can be expected that the proportion of flexible plastic within plastic collected for recycling will increase from 5% currently to around 20% by 2035.

By 2035, an increase of up to 45% of material collected for recycling can be expected. This equates to about 1.8 - 1.9 Mtpa of plastic packaging in total.

Forecasted tonnage of plastic packaging collected for recycling



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**How much more
recycling capacity is
required?**

INCREASED DEMAND FOR THE SEPARATION AND UPGRADING OF PACKAGING PLASTICS

The effect of new policies aimed at plastic packaging will create impacts across the value chain:

- **More plastic packaging will be collected for recycling** - driven by population growth, consistent messaging around household recycling and the increased recyclability of plastic packaging driven by modulated fees as part of EPR.
- **Plastic collected will be of higher quality** - more plastic packaging will be collected in separate streams or combined with easily separated material such as metals.
- **The demand of recycled polymers will increase** - driven by the Plastics Packaging Tax and increasing corporate commitments to increase the recycled content of packaging.

These factors will impact not only the scale of recycling capacity required but also the type. Depending on how Local Authorities implement consistent collections, MRF capacity aimed at sorting dry mixed recycling streams may experience less demand with greater focus being on separating polymers and upgrading them for mechanical recycling through single polymer sorting in PRFs.

The separation and upgrading of films is also likely to become more important to meet increasing recycling targets, requiring specialist sorting capacity.

Pressure and demand for plastics recycling infrastructure

- Increase in plastic packaging waste collected for recycling
- Increase in source-separately collected plastic and higher demand on dedicated plastic recovery facilities
- An increase from about 5% to 20% of flexible plastic packaging within collected plastic, based on the government's aim to include flexible packaging in core materials collected for recycling
- Change in polymer mix based on changing consumer demand and strict industry targets on polymer use



PLASTIC SORTING CAPACITY

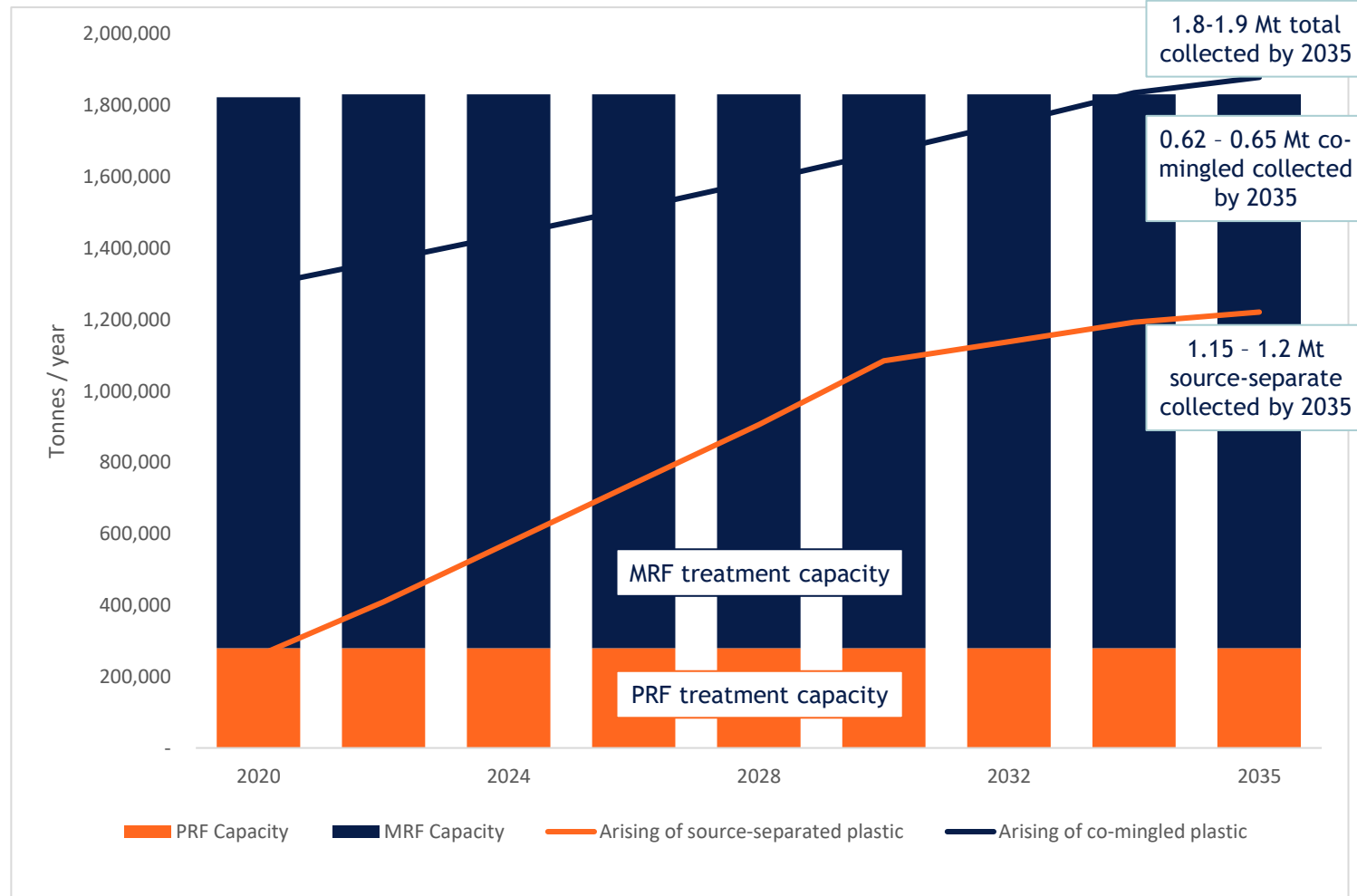
At present, the UK has sufficient sorting capacity for plastic packaging waste on a national basis.

As the collected quantity increases over time towards the 2035 recycling target, MRF sorting capacity remains sufficient until the early 2030's when this is likely to come under pressure. By 2035, an additional 80-100ktpa of material recycling facility capacity for plastic packaging will be required which equates to a total capacity of ~650 ktpa if plastics sorting accounts for 15% of MRF throughput.

However, the assessment shows that a significant increase in plastic recycling facility capacity will be required to separate polymers in single polymer streams. By 2035, ~1.2 Mtpa of plastic packaging could be collected separately, significantly more than the ~0.3 Mtpa capacity of PRFs in the UK today.

On a regional level, the North West of the UK as well as and the South West regions require the most development in order to treat the locally arising plastic packaging waste within the region. This is discussed in more detail on the following pages.

Capacity gap outline for UK plastic sorting

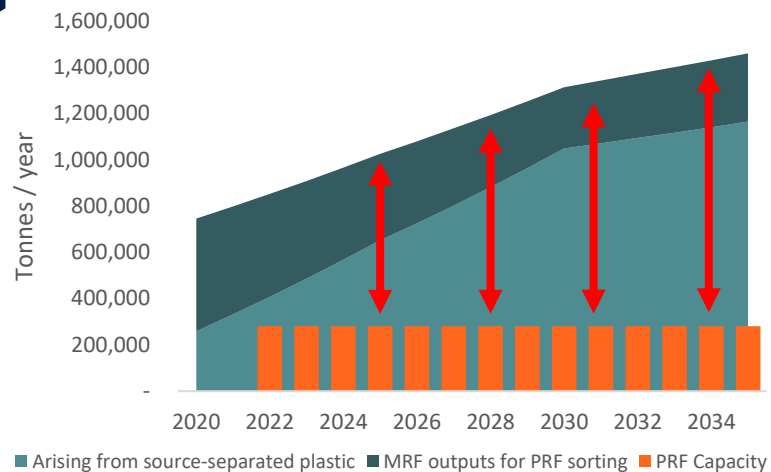


INCREASING DEMAND FOR PLASTIC SORTING

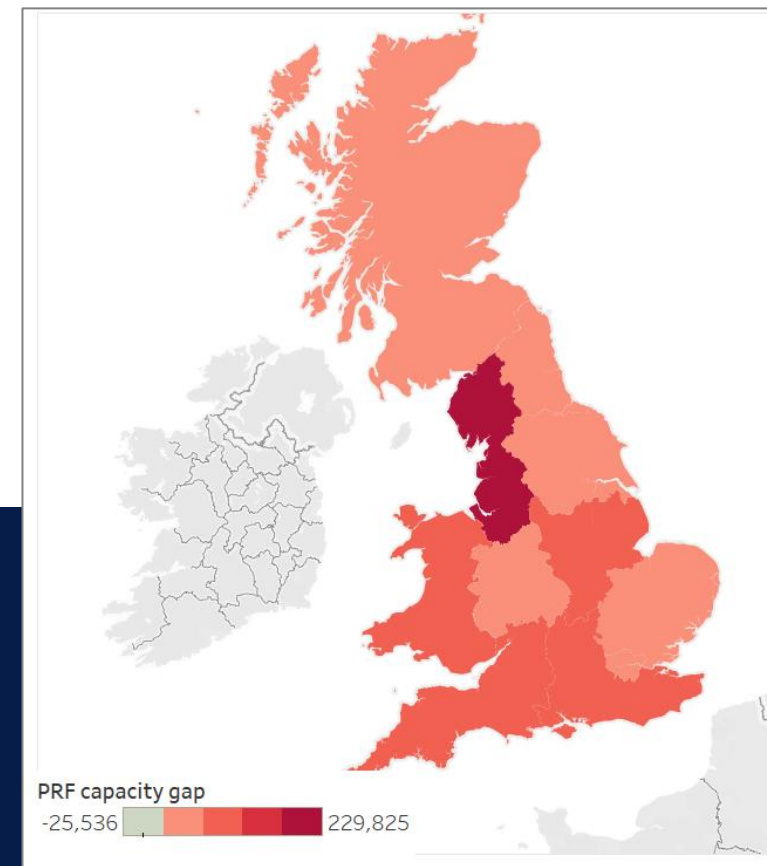
Up to 24 additional single polymer sorting facilities (PRF) could be needed by 2035, assuming that separately collected plastic packaging and parts of MRF outputs will require polymer separation to make them suitable for mechanical recycling. This will likely lead to a change in the balance between MRF and PRF capacity over the next decade due to changes in the way material is collected.

While additional MRF facilities will be required from around 2030 to process the overall increase in recycled material, the need for additional PRFs is more immediate. This is particularly the case in the North West of England where demand is likely to be strong

Capacity gap for polymer sorting & upgrading by 2035



Regional capacity gap for polymer sorting and upgrading by 2035



Plastic recovery facility need

Based on an increase of source-separated material to approximately 1.2 Mtpa by 2035, additional sorting capacity through dedicated plastic recycling facilities of around 1Mtpa would be required by 2035, an equivalent to about 24 facilities.

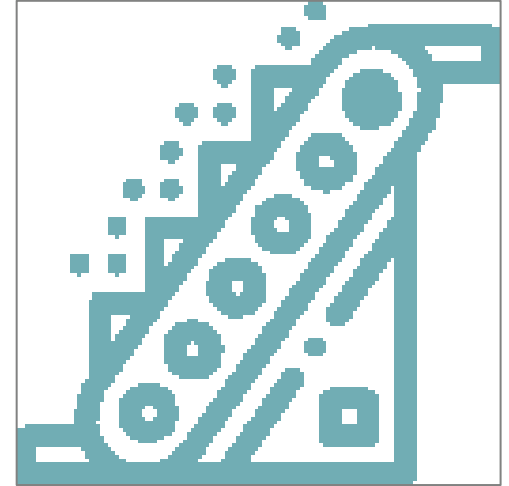
The feedstock for PRFs comes from two main sources, which include the source-separately collected plastic material, as well as the mixed polymer outputs from MRFs.

While material recycling facilities are mostly stand-alone facilities, additional post sorting, polymer separation capacity can be included or added. Similarly, upgrading equipment such as washing, and shredding/grinding lines can be added at mechanical recycling facilities to ensure quality. As such, additional capacity could be added at existing facilities (subject to the available space and authorisations) rather than having to be housed in stand-alone facilities.

SCALE OF INVESTMENT IN SINGLE POLYMER SORTING FACILITIES

The capacity gap for dedicated polymer sorting and upgrading can be met with up to 24 additional PRFs (based on an average processing capacity of 45ktpa per facility) by the year 2035. The infrastructure and process design must be led by the form and polymer types placed on the market. Form is likely to become increasingly significant as recycling plastics that have been more challenging in the past such as films and to some extent, ‘pots tubs and trays’, becomes more important if stretching recycling targets are to be met. Currently, the UK has very limited sorting infrastructure for films.

It is not only the ‘regulatory push’ that will drive demand for PRF capacity but also the ‘market pull’. The introduction of the Plastics Packaging Tax and increasing corporate commitments to increase the recycled content of packaging will drive demand for recycled polymers and support the business case for future investment.



**CAPEX
required** £ **365-385
million**

CAPEX of around £367- £385 million would be needed to obtain planning permission, an environmental permit and build the facilities required to fill the estimated capacity gap by 2035.

This investment will be needed on a phased approach to fill the slowly increasing gap based on an increase in material collected for recycling over the next decade.

BENEFITS OF INVESTMENT – POLYMER SORTING FACILITIES

£1.5 - £1.6 billion GVA added to the UK economy through directly & indirectly created jobs

Gross Value Added (GVA) through direct employment at additional PRF facilities (over 25-year facility lifetime)

Investment in dedicated polymer sorting and upgrading infrastructure will mean that more, higher quality plastics will be available for mechanical recycling in the UK and the reliance on exports will be reduced. Assuming that PRF capacity is built in the areas where capacity gaps will exist, to minimise transport distances, these regions will see the greatest benefits in terms of Gross Value Added (GVA).

The regions with the biggest capacity gaps and therefore the largest benefits in terms of GVA through additional employment are the North West and South East of the UK, followed by the South West & Wales. The additional facilities will generate jobs across all regions of the UK and deliver an additional **600 - 630 employees** at PRFs. Benefits flow not only from direct employment but also the additional jobs created throughout the value chain. With a multiplier of 0.84, an **additional 500-530 jobs** would be created in manufacturing, engineering, logistics and other associated sectors.

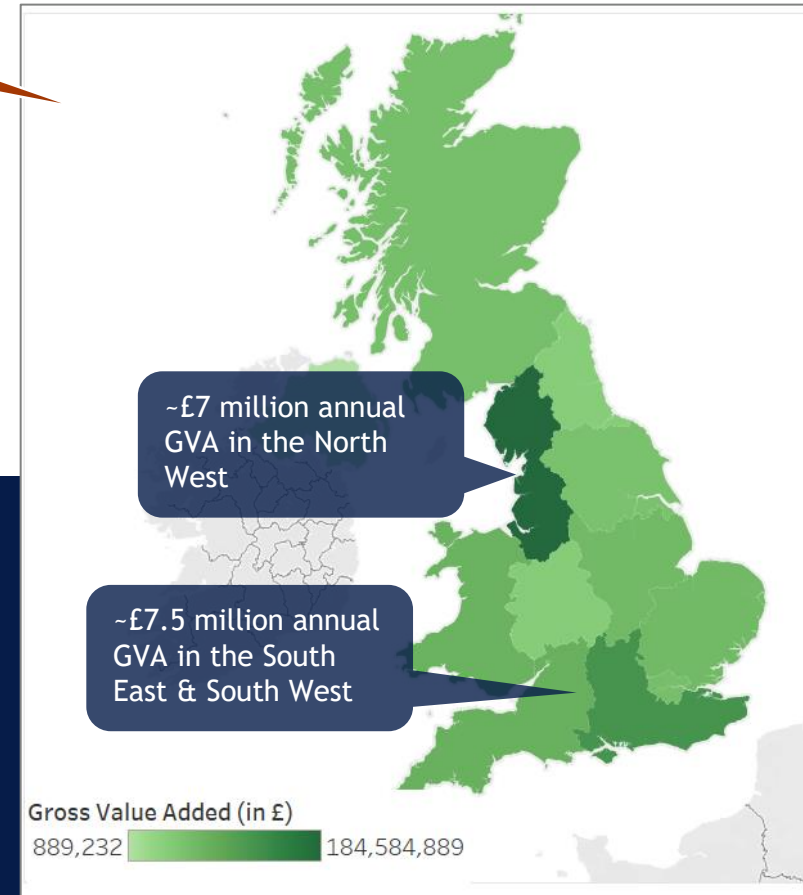
Economic benefits

Directly created jobs across the country will generate GVA in addition to that generated by the in-direct employment by the investment drive. While the direct employment adds around **£35 million GVA** per year to the economy, the indirect employment would generate an **additional £28- £30 million**.

Assuming a ~ 25-year facility operational life for each facility, this would equate to **£1.5 - £1.6 billion** additional value added to regional communities across the UK.

Environmental benefits

Additional investment into sorting capacity does not directly generate carbon savings, but it enables higher sorting quality and polymer sort, which leads to higher quality material for mechanical recycling and carbon savings through recycling over disposal or export.

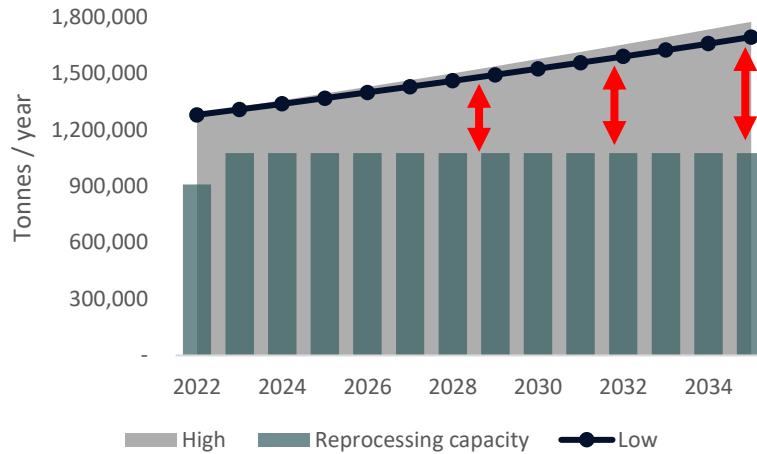


INCREASING DEMAND FOR MECHANICAL RECYCLING

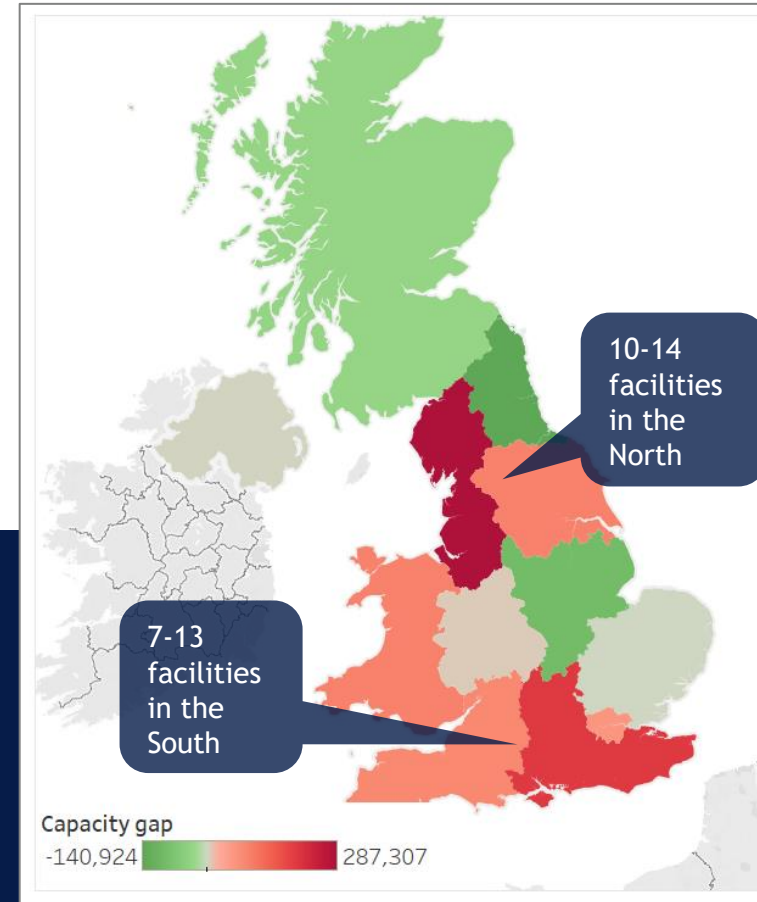
An additional 18-22 reprocessing facilities will become necessary by 2035, based on the projected increase of plastic packaging waste and assuming that the required polymer sorting and upgrading infrastructure is delivered. Around 560-645 ktpa of additional reprocessing capacity per year will be necessary by 2035 if all plastic packaging collected is to be recycled in the UK. This gap is based on the current available treatment capacity and known facilities currently planned.

Mechanical reprocessing lines are typically single polymer and therefore the mix of these facilities will depend on the composition of polymers used in packaging and to some extent, demand for recycled content.

UK reprocessing capacity gap up to 2035



Regional reprocessing capacity gap in 2035



National

The range of facility need and material available for recycling depends on the success of policies in the pipeline and whether the target recycling rate of 65% will be reached rather than stagnating at 62%. As the feedstock for the recycling facilities will not be available evenly across the UK, the location of the facilities should be located as close to the feedstock arisings as possible to minimise transport costs and environmental impacts.

Regional

On a regional level, the largest capacity gap for plastic reprocessing is in the North West (incl. Yorkshire) and South East, while the East Midlands and the North East have a small overcapacity based on the regional plastic waste arisings, the expected growth and the currently available infrastructure.

SCALE OF INVESTMENT IN MECHANICAL RECYCLING



On a national level, about **18 -22 reprocessing facilities** will be required to close the capacity gap for this step in the plastics recycling chain by 2035. Based on an estimated CAPEX per tonne of plastics recycled, this will require about **£560 - 650 million CAPEX** to obtain planning permission, environmental permits and construct the additional facilities. The planning and permitting costs are dependent on location and whether any pre-existing building and permits are in place. The average CAPEX required for one mechanical recycling facility treatment line can be expected to be around £30 million, depending on the size and throughput this can vary.

In mechanical recycling facilities, each processing line is dedicated to one polymer type. Any major changes in polymer use in packaging material will have to be addressed through adaptation of the processing lines. The exact change of polymer is difficult to predict and will become clearer over the next years once the industry targets and initiatives have been established.

The change in material form to include a higher proportion of flexible plastics in plastic collection streams is expected, in line with the government aim and the increase of collection consistency. It can be estimated that the split between rigid and flexible packaging within collected plastic waste streams is about 80% / 20%. The CAPEX per tonne for facilities treating flexible plastics is about 20% higher than for rigid as a result of the different technology that is required.

CAPEX
required

£

560- £650
million

BENEFIT OF INVESTMENT – MECHANICAL RECYCLING

£1.3 - £1.5 billion GVA added to the UK economy through direct & indirect created jobs

900 - 1200 direct and indirect created jobs

Investment in mechanical reprocessing infrastructure will generate economic and environmental benefits over the lifespan of a facility. The main driver for the economic benefits are the additional jobs created, and from the environmental perspective, the carbon benefits associated with the additional quantity of plastic recycled for a second life rather than going to energy recovery or landfill, as well as the offset of virgin material.

With recycling rates expected to increase from the current level of 54% to 62-65%, an additional 14 to 16 million tonnes of plastic packaging could be recycled over the lifespan of the facilities. This is equivalent to the weight of between 1.4 - 1.6 trillion PET water bottles (based on an [average weight of 9.9g](#)). Exports of plastics for recycling overseas could also be avoided, maintaining value in the UK and reducing the risk of environmental damage resulting from the potential for mis-management.

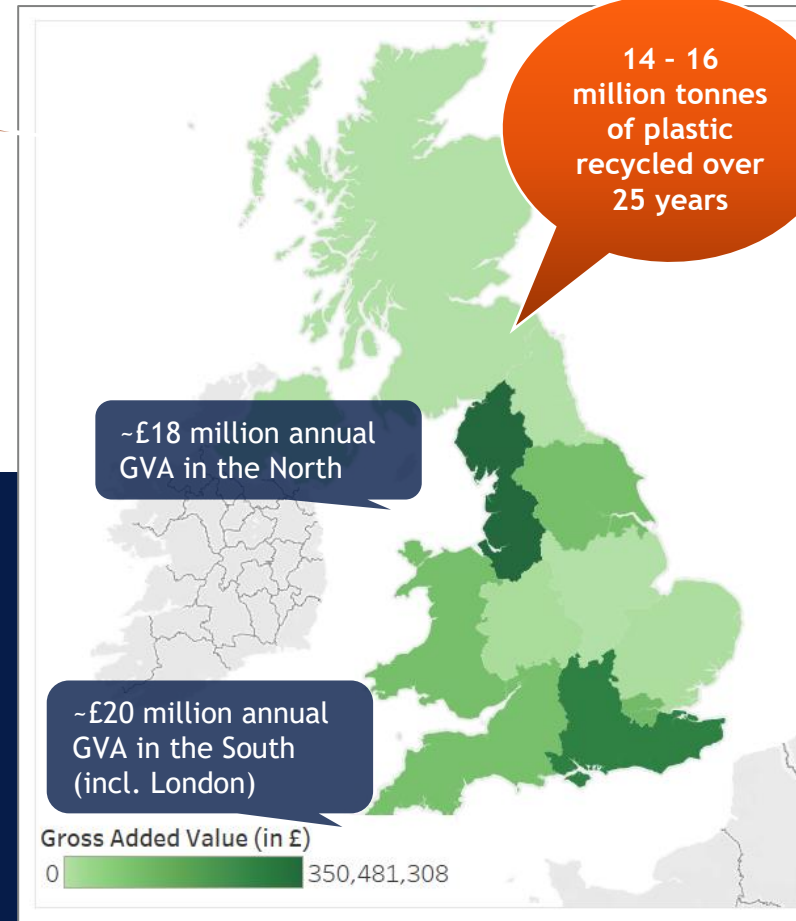
Economic

Investment would deliver ~ 500-600 jobs through direct employment at facilities, and an additional 430 - 490 jobs along the supply chain. An annual GVA of £28-32 Million is generated directly as a result, plus an annual £25-27 Million through the indirect jobs created. Over the lifetime of the facilities, this would equate to between £1.3 - £1.5 billion, with the largest benefits delivered in the North West, South East / London, and Yorkshire & the Humber.

Environment

The environmental benefits can be described in terms of carbon savings made as a result of more plastic being recycled rather than lost through energy recovery or disposal. In a closed-loop recycling scenario compared to incineration, the additional tonnage recycled over 25 years would lead to a carbon saving of up to 35 million tonnes of CO₂e. This is based on an additional ~16 million tonnes of plastic packaging recycled. The additional recycling capacity would enable the 30% recycled content need in new plastic packaging to be fulfilled.

Gross Value added based on additional mechanical recycling facilities (over 25-year facility lifetime)



*Carbon factors taken from [WRAP](#)'s Carbon Waste and Resources Metrics, comparing plastic being disposed through incineration with closed-loop recycling, including the offset through avoiding virgin material over secondary material.

SUMMARY OF INVESTMENT CASE

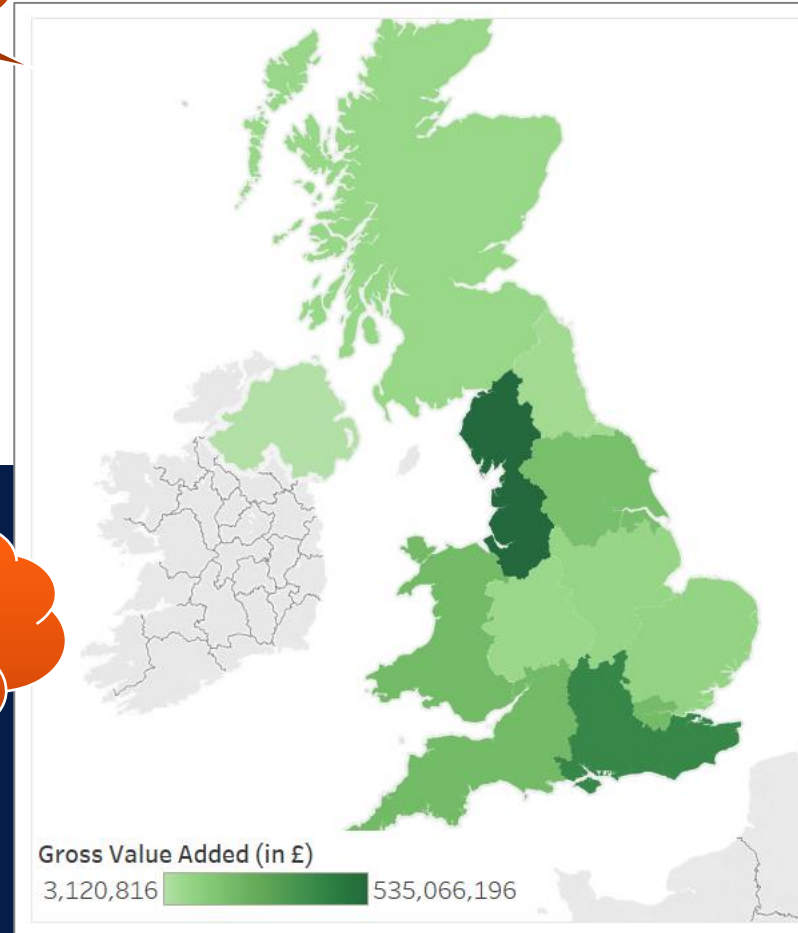
Additional infrastructure for the sorting, upgrading and mechanical recycling of plastic packaging will be required if the UK is to meet the 65% recycling target by 2035 and avoid plastics exports.

The overall investment required for both types of infrastructure is expected to be **£930 - £1,000 million**, based on current per tonne CAPEX required. With increasing costs of construction and inflation, these costs will increase over the next decade.

For a full breakdown of the benefits within each region, please see the Appendix.

40-50 additional treatment facilities can deliver up to £2.8-3.1 Bn GVA over their entire lifetime

Gross Value added based on additional treatment facilities (over 25-year facility lifetime)



Economic benefits

Environmental benefits



*Closed loop recycling compared to incineration, over 25 years lifetime of a treatment facility

** Equivalent to the weight of ~1.4 - 1.6 trillion 0.5l PET bottles (based on average weight of 9.9g per PET water bottle [Petresin](#))

05

SECURING INVESTMENT FOR PLASTICS RECYCLING

SECURING INVESTMENT FOR HIGH QUALITY PLASTICS RECYCLING INFRASTRUCTURE

The timely delivery of plastics sorting & recycling infrastructure in the UK requires capital. Infrastructure investors are comfortable with aspects of the waste and resources sector, particularly energy from waste (EfW) and waste wood fueled biomass facilities, but less so for waste sorting and recycling infrastructure.

To explore the reasons for this, understand their current thinking and explore potential options to make this type of infrastructure more ‘investment ready’, Anthesis interviewed a range of investors in the waste sector, these being:

- Hermes Infrastructure;
- Equitix
- First Sentier Investors (FSI)
- CPPIB (Canada Pension Plan Investment Board); and
- I Squared Capital.

With an increasing focus on the environmental, social, and governance credentials of investments and the circular economy, plastics recycling assets are attractive, but would need to be structured in the same way as the infrastructure assets investors understand and are comfortable with. However, plastics recycling infrastructure does not benefit from long term, stable revenues supported by long term contracts and a predictable cashflow model. Instead, feedstock contracts are typically short to medium term and offtake markets can be volatile.

What is infrastructure investment?

Infrastructure investments involve **physical** assets that have a strategic role in the development of a country such as road, rail and energy. **Investments involving infrastructure are attractive to investors as they are non-cyclical** (not affected by market fluctuations) and offers stable and predictable free cash flows.

EfW assets are considered to be infrastructure by investors as they have a role in generating renewable electricity for the national grid and they offer stable and predictable cash flows as gate fee revenues are secured by long term feedstock contracts and the power/heat offtake, by long term purchase agreements.

Plastics recycling assets do not fit the profile of an infrastructure investment as input material contracts are typically short or medium term and offtake markets can be volatile.

SECURING INVESTMENT FOR HIGH QUALITY PLASTICS RECYCLING INFRASTRUCTURE

The interviews identified common themes across investors in relation to plastics recycling infrastructure albeit with slightly differing approaches between some. These themes are set out below.

Investors are interested in the ‘plastics problem’

Some are watching new developments very intently, looking globally to understand how innovation may solve the plastics problem as the solution is likely to be different in different countries. Noted that plastics recycling metrics are very unreliable and it's difficult to compare them across countries. The ESG credentials of plastics recycling infrastructure makes this infrastructure attractive and are impacting how others value it but this alone is not sufficient to justify taking a less risk adverse approach, certainty and stability of cash flows are paramount.

Recycling assets are not ‘infrastructure like’ enough

Infrastructure investors look for ‘stability and certainty’ and plastics recycling assets do not mirror this model. They typically require relatively low CAPEX to build and as a result, there are low ‘barriers of entry’ for others in the market. They are also exposed to a cyclical market and offtakes can be subject to a high degree of price volatility. This risk is not mitigated by contracts for feedstock or offtake which are typically short to medium term. The profit margins of these businesses are also considered to be unfavourably low at (10-15%). The biggest risk overall was considered to be offtakes/commodity risks..

Investment in recycling infrastructure is possible

Single assets are not attractive but a portfolio approach may be. This could take the form of a ‘platform’ of similar facilities that could block competition or vertical integration across the plastics recycling chain, combining sorting and processing facilities to reduce risks around feedstock quality & quantity/offtake or link to other assets such as EfW infrastructure. The link to EfW infrastructure is of increasing interest as is MRF processing as an approach to reducing plastics in feedstock and therefore carbon emissions

The type of investor is important

Investors have different attitudes to risk. Those acting for pension funds, insurance companies or debt funders require long term, stable and certain cash flows but will accept lower profits of ‘low ‘teens’. Whereas, sophisticated infrastructure funds can take a more flexible approach but higher risk has to be offset by higher returns over a shorter period. The recycling sector is also considered to be a more specialist market and investors are less comfortable with it than that for EfW that they better understand.

The scale of investment can be a problem if it's too small

Scale is also an issue for different investors depending on the size of the fund and the number of investments they want to make. For one company, even a network of recycling assets would not meet the target size of each investment but another was able to be more flexible in terms of initial equity in a new platform with a view to increasing this to ‘hundreds of millions (£)’ over 5 years.

What does a ‘good project’ look like?

Ideally, more ‘infrastructure like’ e.g. long terms financial incentives or payment based on tones processed, favourable Government policy over the long term, proven EPC contractors with a good track record, tried and tested technology, ‘best-in-class’ assets, long term contracts for feedstock with a small number of parties with guarantees, index linked long term offtake contracts with a small number of parties. Scale is also important as it needs to be appropriate for the objectives of the fund and to justify transaction costs.

MAKING PLASTICS RECYCLING INFRASTRUCTURE MORE 'INVESTABLE'

Although the ESG credentials of such assets are welcomed, the fact that they do not have 'infrastructure like' qualities is a serious barrier and often results in a binary choice. Investors were asked what the waste and resources sector, policy makers and other stakeholders could do to make plastics recycling assets more attractive and the answers focused on actions that could create these conditions.

Guaranteed gate fee revenues

Guaranteed revenues are a characteristic of infrastructure projects. Whilst some investors discussed the potential for policies to encourage Local Authorities to place longer term contracts, it was acknowledged that this was unlikely to be achievable and Government would be motivated to maintain the lowest possible gate fees for the public sector. Downward pressure on gate fees does not encourage investment, particularly from funds that can offer a low cost of capital.

Create the conditions for long term offtake contracts

The volatility of the offtake markets makes negotiating long term prices challenging. Any action to dampen this volatility would be welcomed. Suggestions as to how this could be achieved included the introduction of policies that drive demand for recycled polymers for example, an extension of the Plastics Packaging Tax* to other plastic products. Making recycled content compulsory or making not using it economically unviable, would drive demand. This would create the long term, favourable conditions against which contracts with indexed pricing and predictable revenues could be negotiated. With this in place, recycling assets would begin to look more like strategic infrastructure, producing products that are vital to the economy and reducing the cyclical nature of the current market.

Increase barriers to entry

Increase the 'barriers to entry' to the market by requiring or creating processing/output quality standards and policies that support investment in sophisticated sorting and reprocessing plastics infrastructure to produce high quality outputs.

Setting out the long term trajectory for plastics in the circular economy

Although recycling infrastructure is a vital part of delivering a circular economy, it was suggested that investors may be wary of plastics recycling infrastructure specifically because of the significant consumer and commercial pressure to reduce its use. This may lead to a reduction in plastics arisings and therefore increasing competitive pressure for recycling facilities. Government leadership on their vision for the future of plastics and the positive role they can play in a sustainable economy would be helpful in this regard.



05

SUMMARY & CONCLUSIONS

SUMMARY OF FINDINGS

Plastics recycling in the UK today:

- Today, ~2.3Mt of plastic packaging is placed on the market each year.
- Of this, 1.3 MT is collected for recycling and sorted at MRFs with ~500ktpa exported for recycling overseas.

The future of plastics recycling infrastructure:

- By 2035, the impact of plastics growth and policies such as EPR, DRS and consistent collections will drive up collections of plastic packaging for recycling to 1.8 - 1.9Mtpa (a 45% increase on today's collections).
- ~65% of plastic packaging will be collected separately from other recyclable streams and flexibles will increase from 5% to 20% of plastic packaging collected for recycling.
- Additional facilities that upgrade incoming plastics into high quality single polymer streams (PRFs) and reprocessing capacity is required to reach the recycling target of 65% by 2035. This equates to ~24 new plastic recycling facilities (1.2Mtpa) and 18-22 mechanical reprocessing facilities (560-645 ktpa).
- The scale of investment required to deliver this capacity is £925M - £1Bn.
- Benefits delivered by this investment are estimated to be £2.9Bn - £3.1Bn of additional GVA, 2k-2.2k additional jobs and ~30-35Mt of CO₂e saved as a result of the 13 - 14Mt of plastics recycled over a 25 year period.
- The North West of England has the potential to realise significant benefits from investment in PRF and reprocessing capacity having the largest capacity gap for both in England. This would contribute to the Government's 'Levelling up' agenda.



UNLOCKING THE VALUE OF PLASTICS RECYCLING IN THE UK

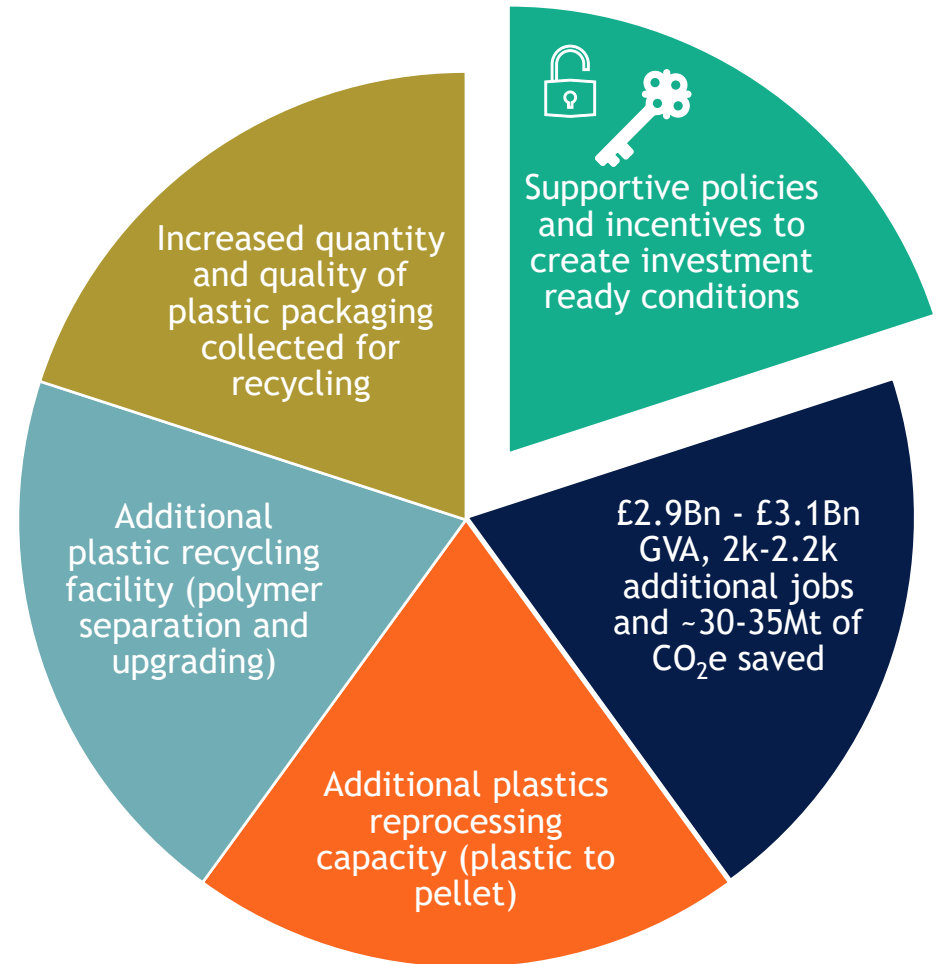
This findings of this assessment have demonstrated that there is a clear need for additional plastics recycling infrastructure in the UK if national recycling targets are to be met.

The Government has made a clear commitment to move towards a circular economy and achieve net zero carbon emissions by 2050. A number of proposals aimed at increasing the quantity and quality of plastic packaging are in development and key legislation implementing extended producer responsibility, deposit return schemes and consistent collections is expected from 2023/4 in England.

Whilst these policies will drive the collection of plastic packaging from householders and improve quality through increased separate collections, there now needs to be a focus on preparing for and delivering the infrastructure required to ensure it can be recycled in the UK to minimise exports and maximise GVA.

This assessment has shown that additional PRF and mechanical reprocessing infrastructure is the most pressing need. Although the Plastics Packaging Tax came into force in April 2022 and it is expected to increase the use of recycled polymers by 40% ([UK Government](#)), the short term nature of feedstock contracts and volatile offtake markets for these facilities means that, for investors, it does not have the characteristics of a traditional infrastructure investment. These investors can offer low cost of capital in return for stable and certain cashflow models but at present, this is not the case for 'stand-alone' plastics recycling assets.

The case for investment is clear with the potential to unlock £2.9 -£3.1Bn of GVA with capital of just 925M - £1Bn, but investors need the long-term confidence that can be provided by Government policy with a clear sense of the importance of this infrastructure to the economy of the UK and where possible, dampen the volatility of offtake prices and revenues.



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APPENDIX

SCENARIO MODELLING

The future of plastic packaging available for collection and recycling is by multiple factors. This includes

- Plastic packaging placed on the market
- The success of policies impacting the overall collection efficiency of plastic packaging, influencing the overall rate of collected for recycling tonnage.
- The success of policies changing the collection schemes, increasing separately collected material over co-mingled collected material.

The different parameters are influencing the total reprocessing capacity required, as well as influencing required sorting capacity necessary.

	Co-mingled	Source-separated	Scenario 1 - Recycling rate	Scenario 2 - Recycling rate
Low - 0% annual growth plastic POM	35%	65%	62%	65%
Mid - 1% annual growth plastic POM	35%	65%	62%	65%
High - 3% annual growth plastic POM	35%	65%	62%	65%

*All rates achieved by 2035

PLASTIC FLOW – MODELLING APPROACH

Waste type	EWC
plastic packaging	15 01 02
plastic and rubber from waste management processing	19 12 04
municipal plastics	20 01 39
mixed packaging	15 01 06
mixed municipal waste	20 03 01
waste from markets	20 03 02
street-cleaning residues	20 03 03
RDF	19 12 10
other wastes from mechanical treatment of wastes	19 12 12

Modelling approach and assumptions used

- List of EWC's covers the material in scope of post-consumer plastic packaging
- For EWC covering mixed waste, average proportion of plastic waste within residual waste streams has been applied (16%)
- For EWC's covering mixed dry recycling an average plastic proportion has been applied (18%)
- Plastic tonnage collected via Local Authorities calculated through Waste Data Flow reports based on material type
- Plastic tonnage treated overall through recycling as well as collected within residual waste calculated through Waste Data Interrogator returns data
- Volumes going to landfill under EWC 19 12 12 have been taken out, as it can be assumed that materials post-sorting process would not be disposed at landfill

REGIONAL SUMMARY

Region	Additional facilities	Directly created jobs	Additional created jobs	Total GVA created over 25 years (£million)	CAPEX required (in £million)	Carbon saved (over 25 years)
East Midlands	2	42-52	35-45	£95 - 11	£ 26 - 32	-
East of England	2	37-53	30-45	£92 - 130	£23 - 35	0.02 - 0.3 Mt
London	3	80-90	65-75	£290 - 320	£75 - 85	3.3 - 3.5 Mt
North East	1	25-30	20-25	£55 - 70	£15 - 20	-
North West	14-15	375-420	315-350	£880 - 1000	£360 - 400	15 - 16 Mt
South East	8-9	245-270	200-225	£680 - 750	£240 - 260	10 - 11 Mt
South West	4	125-145	100-120	£280 - 330	£115 - 130	4.5 - 5 Mt
West Midlands	1	30-40	25-35	£70 - 90	£20 - 30	0.3 - 0.5 Mt
Yorkshire and the Humber	4-5	120-135	100-115	£260 - 300	£115 - 130	5 - 5.5 Mt
Scotland	1	30-40	30-35	£85 - 100	£20 - 25	-
Wales	5-6	135-155	115-130	£290 - 330	£125 - 140	5 - 5.5 Mt
Northern Ireland	1	30-40	30-35	£70 - 90	£20 - 25	0.1 - 0.2 Mt