Strategic approaches to minimising emissions trading scheme costs for waste producers

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Foreword

The expansion of the emissions trading scheme (ETS) to include energy-from-waste (EfW) has been described by the sector as a 'once in a generation policy shift'. Arguably, it is a shift that is much needed and somewhat overdue in the face of stagnating recycling rates and residual waste volumes creeping in the wrong direction.

As with any change, it brings with it a degree of uncertainty and this has been exacerbated by the protracted process of developing the regulations that will set out the fine detail of how the policy will operate. Chief amongst the detail, at least for operators and the primary customer of energy-from-waste facilities, local councils, is the key question of how costs will be calculated and passed on. Other items high on the agenda are putting protections in place to ensure that the policy doesn't inadvertently drive residual waste to other, less environmentally sustainable forms of treatment like landfill should they become more commercially attractive, and avoiding any risk that the costs associated with ETS fall hardest on those least able to mitigate their costs.

Ceres have been able to calculate the likely increase to the cost of managing residual (black bag) waste through energy-from-waste when the ETS takes effect in 2028, and as their work progressed, we were pleasantly surprised to find that the increase in costs didn't necessarily need to be significant for our local authority customers.

The majority of councils have opportunities to positively act in response to this policy reform, and they can be masters of their own destiny. This doesn't have to mean significant changes to service delivery, as many councils will be able to mitigate their ETS costs by doing more of the services they already provide and that are well understood and liked by their residents – kerbside recycling and household waste recycling centres – and by doing this at the earliest opportunity, the cost impacts can be minimised. Councils who are already planning how to roll out collections of flexible plastic packaging – a service that the SUEZ-managed FlexCollect project demonstrated was straightforward to incorporate into existing services and popular with householders – are already ahead of the game and should be far less impacted by the introduction of ETS in 2028.

For councils who already have comprehensive kerbside recycling services covering the full range of materials prescribed by Simpler Recycling, there is scope to further mitigate ETS costs by introducing collections for fossil carbon rich materials such as textiles.

Whilst there is cause for optimism, we need to temper this with some notes of caution – for certain local authorities, demographic challenges and transient populations will limit the scope to increase recycling rates, and they should not be unduly financially penalised for this by ETS. Equally, sorting and reprocessing infrastructure needs to be in place to handle an increase in recyclable materials (both volume and mix) – developing domestic capacity is good for economic growth, it will create much needed local jobs, support the development and delivery of critical skills and will keep valuable resources in the UK, driving circularity and reducing our environmental impact in line with the ETS goals.

I'd like to thank the Ceres team for this piece of work and the reassurance it provides the sector and local government that together we are well placed to rise to the challenge of implementing ETS in a way that is good for our environment and our economy.

John Scanlon
Chief Executive Officer
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Executive summary

Background

Emissions from the resources and waste sector (excluding energy-from-waste) equate to 5-6% of total UK CO_2 emissions, with the bulk of these generated by landfills. Energy-from-waste facilities also emit significant volumes of CO_2 and are included within the energy supply sector in the UK greenhouse gas emissions statistics. Each tonne of residual waste treated typically releases around 0.5 tonnes of fossil CO_2e, contributing to atmospheric CO_2 levels and to climate change.

The UK Government has made clear its intention to extend the UK Emissions Trading Scheme (ETS) to energy-from-waste (EfW) facilities in the UK from 2026 and has recently concluded its consultation on this proposal†. The Scheme is an important part of the Government's policy 'toolbox' to reduce fossil carbon emissions with the aim of achieving Net Zero in 2050.

Including energy-from-waste in ETS would require energy-from-waste operators to obtain sufficient ETS Allowances for each tonne of fossil carbon that is emitted. The price of allowances will be set by market demand and is expected to increase over time as the number of allowances available reduces as the cap is aligned to achieving Net Zero by 2050.

The uplift in gate fees is expected to be around £48/t at the start of the ETS for energy-from-waste and, in accordance with the 'polluter pays principle' (where 97% of emissions arise from the waste delivered to the energy-from-waste facility), operators will expect to pass through these costs to those feedstock suppliers, potentially increasing gate fees by around 50%.

Waste producers are concerned about the potentially significant increase in the cost of managing residual waste. Local authorities are currently the largest customer group for energy-from-waste facilities in the UK, supplying around 75% of total feedstock processed. With extremely tight budgets and practical challenges, any increase in costs that cannot be mitigated could have significant consequences.

However, investments through the new Extended Producer Responsibility for Packaging (pEPR) are intended to revitalise recycling rates that have stalled in recent years and help mitigate the increasing cost of managing residual waste.

Further, a general increase in residual waste costs will create the business case to invest in interventions that will prevent waste or push it higher up the waste hierarchy.

† https://www.gov.uk/government/consultations/uk-emissions-trading-scheme-scope-expansion-waste

Aims and methodology

SUEZ commissioned Ceres Waste Renewables & Environment to identify and evaluate potential interventions that waste producers, particularly local authorities, can make to reduce cost increases as a result of ETS, highlighting those that could have the greatest impact. The principles identified are also relevant to commercial and industrial waste producers.

The analysis uses a combination of publicly available data and information from the SUEZ 'Waste Data Book', a unique collection of granular data on waste arisings and composition that has been developed and used by SUEZ over many years to support policy development by Government, and to help customers understand the waste they produce to reduce cost and environmental impact.

The modelling is high-level and a number of assumptions have been made. Specifically, only the estimated cost of service change has been included. There may be additional costs for some authorities – for example, for new or changed infrastructure or for contractual changes etc. Authorities are advised to treat the results as indicative and to undertake their own modelling to confirm the business case for their own areas.

As part of the research, a small number of local authority officers responsible for the provision of waste and recycling services were interviewed.

Those interviewed represented authorities that ranged in size and circumstances, with the aim of collecting insights from authorities with differing levels of rurality and deprivation.

Questions were provided in advance and sought to understand the level of engagement and preparation for ETS, and the benefits and challenges that officers had identified.

The analysis uses a combination of publicly available data and information from the SUEZ 'Waste Data Book', a unique collection of granular data on waste arisings and composition

Findings

The analysis demonstrates that the carbon cost of ETS will significantly increase the cost of managing waste unless actions are taken.

Taking action to improve the recycling rates for fossil-based materials will reduce costs and help insulate against future price rises. The actions that will minimise the uplift in residual waste management costs due to ETS, do not require new technology or innovative approaches. Instead, they are effectively centred on improving the services that are already available, i.e. the separation of materials for recycling and activities that promote waste reduction and re-use. Design changes to products that become waste are another important element, but fall out of scope for this report.

To mitigate ETS costs, the focus should be on material streams with the greatest fossil carbon content – i.e. plastic items, plastic packaging, waste electrical and electronic equipment (WEEE), synthetic textiles and for their weight and fossil content, absorbent hygiene products (AHPs).

The actions that will minimise the uplift in residual waste management costs due to ETS, do not require new technology or innovative approaches.

Local authorities

The key insights that came out of the assessment for local authorities are:

1 It is not inevitable that the carbon cost of ETS will significantly increase the cost of managing waste. Taking action to improve the recycling rates for fossil carbon-based materials will reduce costs and help insulate an authority against future price rises. We do not consider it possible to mitigate all of the costs from ETS at this time.

2 ETS costs can be reduced by 37-56% through proven interventions to increase diversion rates of fossil carbon-based materials. Authorities with lower recycling rates have greater scope to improve capture rates and thus the potential to avoid a greater proportion of 'business as usual' ETS costs.

3 Local authorities would avoid ETS costs by improving waste minimisation, re-use and recycling rates. Based on the scale of avoided gate fees and ETS costs and assuming the price of allowances follows the expected trajectory, they could invest up to the following without increasing their overall service costs. If service improvements can be implemented at cost lower than this, net savings will be achieved:

+ ~£154 to prevent 1 tonne of waste through minimisation or re-use in 2028. This will increase to ~£175 in 2040 as the carbon price is expected to increase.

+ ~£102 to divert 1 tonne of waste to recycling in 2028. This will increase to £122 in 2040 as the carbon price is expected to increase.

Taking these insights, the key messages for local authorities are:

1 **Implement Simpler Recycling well with a focus on participation, capture rates and material quality to mitigate ETS costs and improve recycling rates**

By the time ETS payments are proposed to start in 2028, recycling rates for fossil-based materials should have increased because of Extended Producer Responsibility for Packaging, Deposit Return Schemes, Simpler Recycling and other devolved authority recycling programmes.

2 **Reduce residual waste to invest in recycling more fossil carbon intensive materials**

Reducing the access to residual waste bin capacity through either frequency of residual waste collections or bin/bag volume for those authorities that have not yet done so is an obvious next step. This could reduce the overall tonnage by up to 6%, saving not only ETS cost but also collection costs and gate fees.

3 **Early investment in service improvements and residual waste reduction is cost-effective in the short and long-term**

Acting early is crucial, as savings made early in the scheme could be invested in delivering further service improvements that will generate even more savings in later years.

4 There are opportunities to reduce ETS costs beyond kerbside recycling

Changing practices at household waste recycling centres to intercept recyclables in black bags is a cost-effective way to improve recycling rates at these sites.

5 **Secondary sorting** may be part of the solution for authorities with difficult catchments, but will not be as cost effective as investing in separation at the kerbside.

6 **Implementing separate collections** for fossil-carbon intensive materials such waste electrical and electronic equipment (WEEE) and absorbent hygiene products (AHPs) is not immediately cost effective, but will offer greater savings as ETS costs grow over time.

Local authorities can take the following steps to support their plan for a service change to mitigate ETS costs:

1 **Invest in a regular sampling programme** to understand the composition of their residual waste, key fossil-carbon containing materials and how it changes over time. This will inform proposals for service improvements and build the business case for change.

2 **Review local data** to calculate potential ETS exposure both in 2028 and as the scheme develops should 'business as usual continue'. This will provide the 'do nothing' baseline against which potential interventions to reduce fossil carbon in residual waste can be measured.

Other waste producers (e.g. businesses)

Although the modelled examples in this report are based on local authorities responsible for large-scale waste management services, a number of the insights and messages from the analysis are also applicable in principle to business and other waste producers:

1. Increases in waste management costs as a result of ETS can be significantly mitigated by **diverting fossil carbon plastics from residual waste through minimisation, re-use and recycling.**

2. Reducing the quantity of waste produced is the biggest driver of cost savings – **waste producers should therefore prioritise actions that reduce waste generation and increase re-use.**

3. Separating recycling at source is the most cost-effective way of reducing the fossil carbon intensity of residual waste. **Implementing the requirements of Simpler Recycling in a business will create the opportunity for segregation at the point of production.**

4. **Adopting or expanding sustainable procurement practice** will promote waste minimisation and advance the reduction of fossil carbon in residual waste.

5. **Maximising staff, customer and visitor participation** will deliver the greatest impact and mitigate future cost increases.

UK ETS Authority

Whilst waste producers and waste managers have an obvious role in ensuring ETS delivers carbon reductions, the scheme must be implemented in a way that will maximise environmental outcomes without unintended consequences.

Research and interviews undertaken as part of this report identified six key messages for the UK ETS Authority:

1. **Provide regulatory certainty around ETS as soon as possible**, particularly regarding the measurement of fossil carbon in residual waste.

2. **Zero rate wastes that must only go to energy-from-waste to protect the environment**, such as those containing persistent organic pollutants (POPs).

3. **Recognise that some local authorities cannot improve recycling rates significantly due to the nature of their areas** and ensure they are not disproportionately penalised by ETS.

4. **Support local authorities to invest in carbon reduction** by ensuring that extended producer responsibility funding and any other potential funding from ETS revenue is 'additional' beyond the first year of the scheme and leads to a real terms increase in waste management budgets that can be planned for.

5. **The Government should look at how both mechanical and chemical recycling markets can be supported and delivered to align with the introduction of ETS** – none of the improvements to divert fossil carbon materials from residual waste will be possible if there is not suitable and sufficient infrastructure to recycle it.

6. **Consider supply chain solutions for difficult-to-recycle fossil carbon materials.** This may include material substitution, a switch to non-fossil plastics and extended producer responsibility for a wider range of wastes, particularly synthetic textiles.

Introduction and overview

The UK Emissions Trading Scheme (ETS) Authority intends to extend the UK ETS to the energy-from-waste (EfW) sector from 2026. This will substantially increase the cost of residual waste treatment for customers from 2028 when payments are expected to begin.

While this will challenge budgets, it will also strengthen the business case to invest in interventions that reduce the carbon impact of products and packaging and support activities at the top of the waste hierarchy (waste reduction, repair and re-use), reducing emissions of fossil carbon and diverting more recyclable material back to the supply chain.

This report aims to present evidence-based, cost-effective interventions that local authorities and waste producers can take to minimise ETS costs and deliver wider environmental benefits to the UK.

The analysis targets the diversion of materials containing significant amounts of fossil carbon and considers interventions at several points in the resources and waste management system. In addition to the modelling, several local authorities have contributed insights into the practical and financial barriers to implementing changes. This has identified several issues that the UK ETS Authority may wish to consider when confirming the implementation details of the Scheme.

Ceres Waste Renewables & Environment (Ceres) has been given access to the industry-leading waste data held by SUEZ recycling and recovery UK. The data in their unique 'Waste Data Book' has been collected over 14 years and contains over 30 million records of granular data on waste collected from customers, including composition, treatment and associated information for both commercial and industrial (C&I) and municipal waste streams. Ceres used this data to model outcomes for several intervention opportunities and combined this with third party data sources such as operational service costs from WRAP, and lessons learned from the implementation of earlier fiscal instruments. This comes together to present informed actions for stakeholders seeking to minimise their exposure to ETS costs and deliver greater environmental benefits.

What is ETS?

The UK ETS is an important part of the Government's strategy to reduce emissions of fossil carbon to net zero by 2050. It is a 'cap and trade' system in which the total emissions from a sector are limited or 'capped' and this limit is reduced each year towards the goal of net zero emissions. Emitters covered by the scheme must purchase or obtain an 'ETS allowance' for every tonne of fossil carbon emitted, and the price of allowances is determined by the balance of supply and demand. Local authorities and waste producers that act to reduce emissions can significantly reduce costs and insulate themselves against further rises in the carbon price as the supply of allowances reduces year on year in line with the cap. The Department of Energy Security and Net Zero (DESNZ) published projections for the cost of ETS allowances for modelling purposes and between 2028 and 2038, they could increase from £88 per tonne to £130 per tonne[1].

The energy-from-waste sector generates approximately 15%[2] of the UK's renewable energy, contributing to the decarbonisation of the energy grid. However, each tonne of residual waste treated also typically releases around 0.5 tonnes of fossil CO_2e, which contributes to atmospheric CO_2 levels and contributes to climate change. The UK ETS Authority has made clear its intention to bring energy-from-waste into the scope of the ETS from 2026. Two years of monitoring, reporting and data validation will follow before ETS allowances must be purchased from 2028.

The cost of allowances will ultimately be met by waste producers in some form of 'cost-pass-through'. The UK ETS Authority has not yet specified the mechanism for this, and operators are likely to take differing approaches if a common method is not specified in regulation or statutory guidance. However, with 97% of emissions from energy-from-waste estimated by the industry to be attributed to feedstock and only around 3% from the operation of the facility, energy-from-waste feedstock customers will face potentially significantly increased prices if no action is taken to decarbonise their waste. Based on the central modelling assumption published by DESNZ[3], the central price estimate for 2028 is £98/t (2023 prices). Assuming that 50% of residual waste contains fossil carbon, this would add £48/t to gate fees, increasing the cost of residual waste treatment by around 50%.

1 https://www.gov.uk/government/publications/traded-carbon-values-used-for-modelling-purposes-2024/traded-carbon-values-used-for-modelling-purposes-2024

2 https://www.ons.gov.uk/economy/environmentalaccounts/datasets/ukenvironmentalaccountsenergyconsumptionfromrenewableandwastesources The number is the percentage of renewable energy generated in 2022

3 https://www.gov.uk/government/publications/traded-carbon-values-used-for-modelling-purposes-2023/traded-carbon-values-used-for-modelling-purposes-2023

It is a 'cap and trade' system in which the total emissions from a sector are limited or 'capped' and this limit is reduced each year towards the goal of net zero emissions.

ETS – one measure in a package designed to deliver the circular economy and net zero

The extension of ETS to energy-from-waste is part of a package of policy measures aiming to deliver higher recycling rates and reduce the environmental impact of waste, and to support delivery of the Environment Act target to halve residual waste arisings per capita by 2042. ETS is a performance based economic instrument designed therefore to reward more decarbonisation and make less more expensive.

Others (in England particular, although we recognise other devolved administration have/ are introducing similar policies) include:

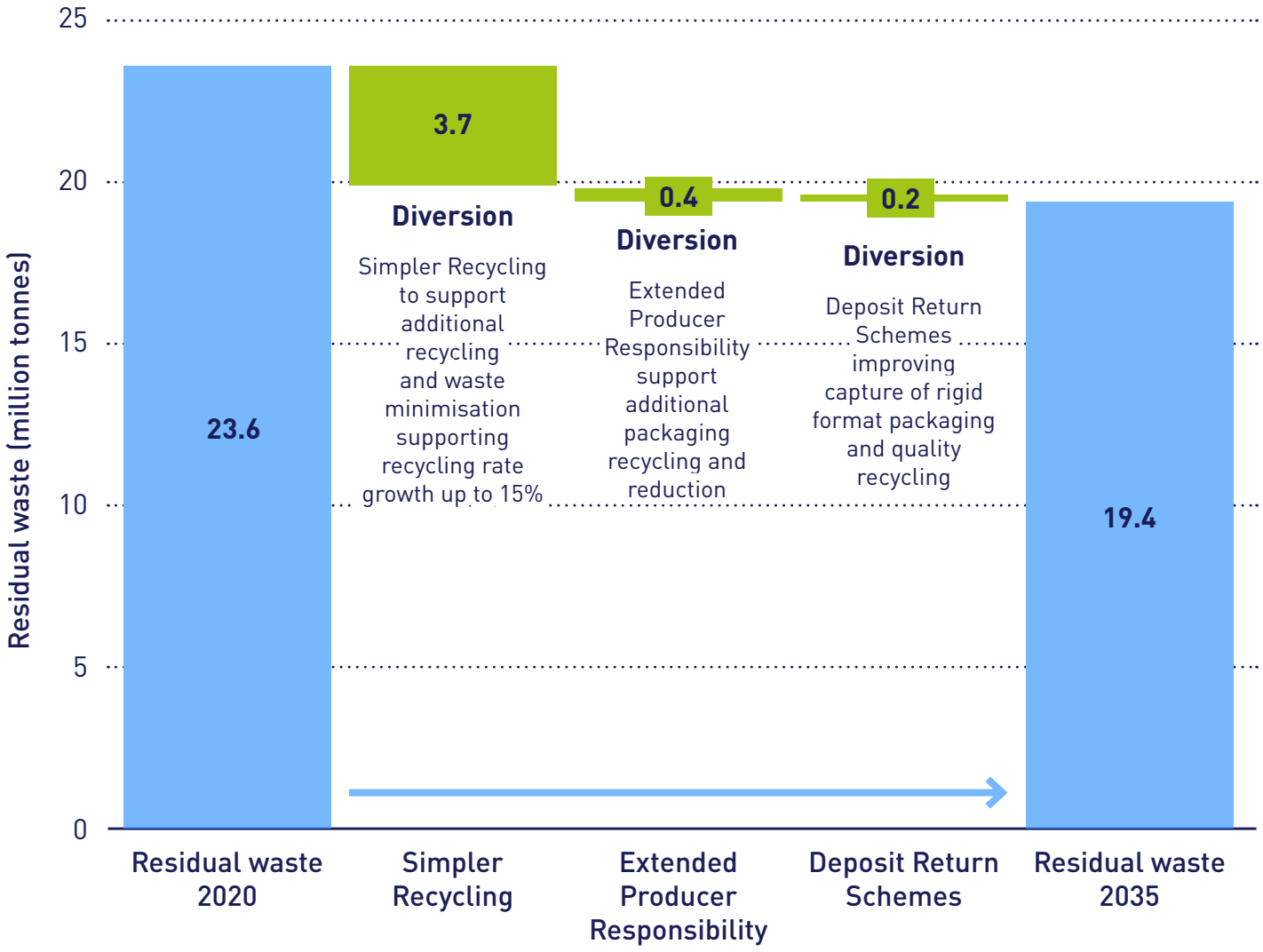
- **Simpler Recycling**
  Aiming to improve recycling rates by standardising collection schemes and mandating food waste collections. This will apply to most businesses from 31 March 2025, to local authorities from 2026 and will be extended to include the collection of plastic films and flexible packaging from March 2027.

- **Extended Producer Responsibility (EPR) for packaging from 2025/26**
  Making brands and manufacturers responsible for the cost of packaging they place on the market and that passes through the local authority waste collection and management systems. Those that use recyclable packaging will face lower costs.

- **Deposit Return Schemes (DRS)**
  Increasing the quality and quantity of packaging collected for recycling. It also aims to reduce litter by providing a facility to return drinks containers 'on the go'. The deposit return scheme system is scheduled to go live in October 2027, before the proposed date that ETS costs would be incurred.

Figure one shows the total household and 'household-like' (from municipal and businesses sources) residual waste arising from homes and businesses and the anticipated diversion of materials from residual waste by each of the three policy interventions.

Figure one • Anticipated impact of new policy measures on UK household and 'household-like' residual waste tonnages[4]



4 Source of residual waste tonnages: https://www.gov.uk/government/publications/residual-waste-infrastructure-capacity-note/residual-waste-infrastructure-capacity-note
Source of the regulatory impact data: https://consult.defra.gov.uk/waste-and-recycling/consistency-in-household-and-business-recycling/supporting_documents/Collection%20and%20packaging%20reforms%20summary%20of%20impacts.pdf
(ratio of impacts applied to residual waste reduction forecast in Defra capacity note)

ETS will impose significant additional cost on waste producers and local authorities

Local authorities are the largest customer of UK energy-from-waste facilities, supplying approximately 75% of all waste currently sent for energy recovery. Most operate with extremely tight budgets. After Simpler Recycling, extended producer responsibility and deposit return schemes are implemented – and assuming that no action is taken to reduce the fossil carbon content of residual waste – they may face a combined ETS cost of around £660 million per annum[5].

The funding from extended producer responsibility and food waste in Simpler Recycling is expected to drive four million tonnes of waste away from energy-from-waste and decarbonise the residual waste by 3-7%, saving a combined total of £495Mpa[6]. Decarbonising residual waste requires a focus on waste reduction, re-use and diverting materials such as plastics of all types, textiles, waste electrical and electronic equipment, and absorbent hygiene products away from thermal treatment and further up the waste hierarchy.

Commercial and industrial waste producers could face a greater scale of cost rise as in addition to ETS costs, more commercial and industrial waste is expected to be diverted away from landfill to energy-from-waste as the cost of landfill tax rises annually[7]. For example, the landfill tax increase in April 2025 added another £22.45/tonne to the cost of landfilling waste. As such, waste producers will have to consider similar interventions to reduce waste and increase the diversion of fossil containing materials streams to recycling. Simpler Recycling, which is already a legal requirement for all businesses with more than 10 full time equivalent staff, will support this change.

This report considers the interventions that will result in the largest reductions in ETS costs for local authorities and that are cost effective in terms of investment. The principles are also relevant to commercial and industrial waste producers.

5 https://www.tolvik.com/published-reports/view/uk-energy-from-waste-statistics-2023/
6 https://www.circularonline.co.uk/wp-content/uploads/2025/03/Systemic-impacts-of-the-ETS-on-the-recources-waste-sector-Final.pdf
7 https://www.gov.uk/government/publications/rates-and-allowances-landfill-tax/landfill-tax-rates-from-1-april-2013

Actions to drive systemic benefits

Reducing ETS costs – the basics

Based on the current implementation timetable, energy-from-waste customers will start paying for fossil CO_2e emissions created by the treatment of their waste in 2028. The ETS cost will be determined by the fossil carbon content of their waste, assuming the method of allocating costs back to customers reasonably and pragmatically reflects the general composition of their waste. Therefore, customers can reduce costs by reducing, re-using or separating waste that contains fossil carbon and diverting it for treatment further up the waste hierarchy.

Although this principle is clear, different approaches to minimising ETS costs might be more beneficial than others, whilst savings should increase further as waste is moved up the waste hierarchy and other costs are avoided.

For example, avoiding waste or re-using items delivers the greatest potential savings as both the gate fee and ETS cost are avoided. As such, waste producers could save around £154 plus collection costs if waste can be avoided.

Diverting material from residual waste to recycling also delivers savings, although not of the same order. Based on the average composition of residual waste, every tonne diverted to recycling would save £102 in 2028.

In both cases, these savings are expected to increase over time as the traded carbon price is expected to rise.

Figure two • The scale of avoided costs mirror the waste hierarchy

Recover

Every 1 tonne of waste sent to energy-from-waste will cost approximately:

- £110 in 2025
- £154 in 2028
- £165 in 2035
- £175 in 2040

Recycle

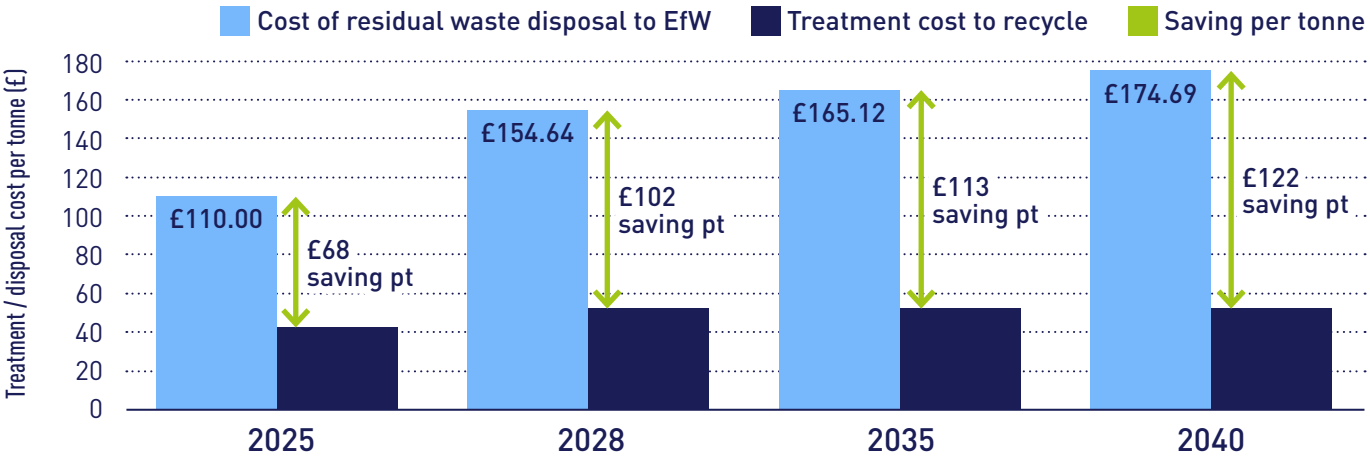
Every 1 tonne of waste diverted to recycling will save approximately:

- £68 in 2025
- £102 in 2028
- £113 in 2035
- £122 in 2040

Reduce and re-use

Avoiding or re-using 1 tonne of waste will save approximately:

- £110 in 2025
- £154 in 2028
- £165 in 2035
- £175 in 2040



Assumptions for figure two

Figures are indicative and illustrate the relative benefits of waste minimisation and recycling to ETS. It does not take account of contract penalties if the minimum guaranteed tonnage is missed. All prices are 2025 uplifts in price are resultant of additional ETS fees only. Assumptions used to generate the figure are:

- Costs comparison is for treatment and disposal only.
- Energy-from-waste gate fees assumed to be £110 per tonne.
- Recycling treatment costs are based on gate fees net of material values / revenues.
- Figures based on average UK waste composition with a fossil carbon content of ~46%.
- There is no change in composition or fossil carbon content over time without service change. Variations due to service changes are assessed later in the report when different interventions are assessed.
- Projected carbon prices from DESNZ, Trading Carbon Values for Modelling Purposes[8].

It is also the case that diverting different materials from residual waste will deliver different levels of savings. Diverting materials with the highest fossil carbon content, such as plastic packaging, films, synthetic textiles and waste electrical and electronic equipment, will deliver the greatest savings in ETS costs per tonne. Removing absorbent hygiene products and other textiles will also have a minor impact on carbon reduction and therefore ETS costs, but the majority of the avoided cost results from the weight reduction. Diverting other materials, such as wood, to alternative treatment routes will also generate savings as the gate fees are lower than that of energy-from-waste.

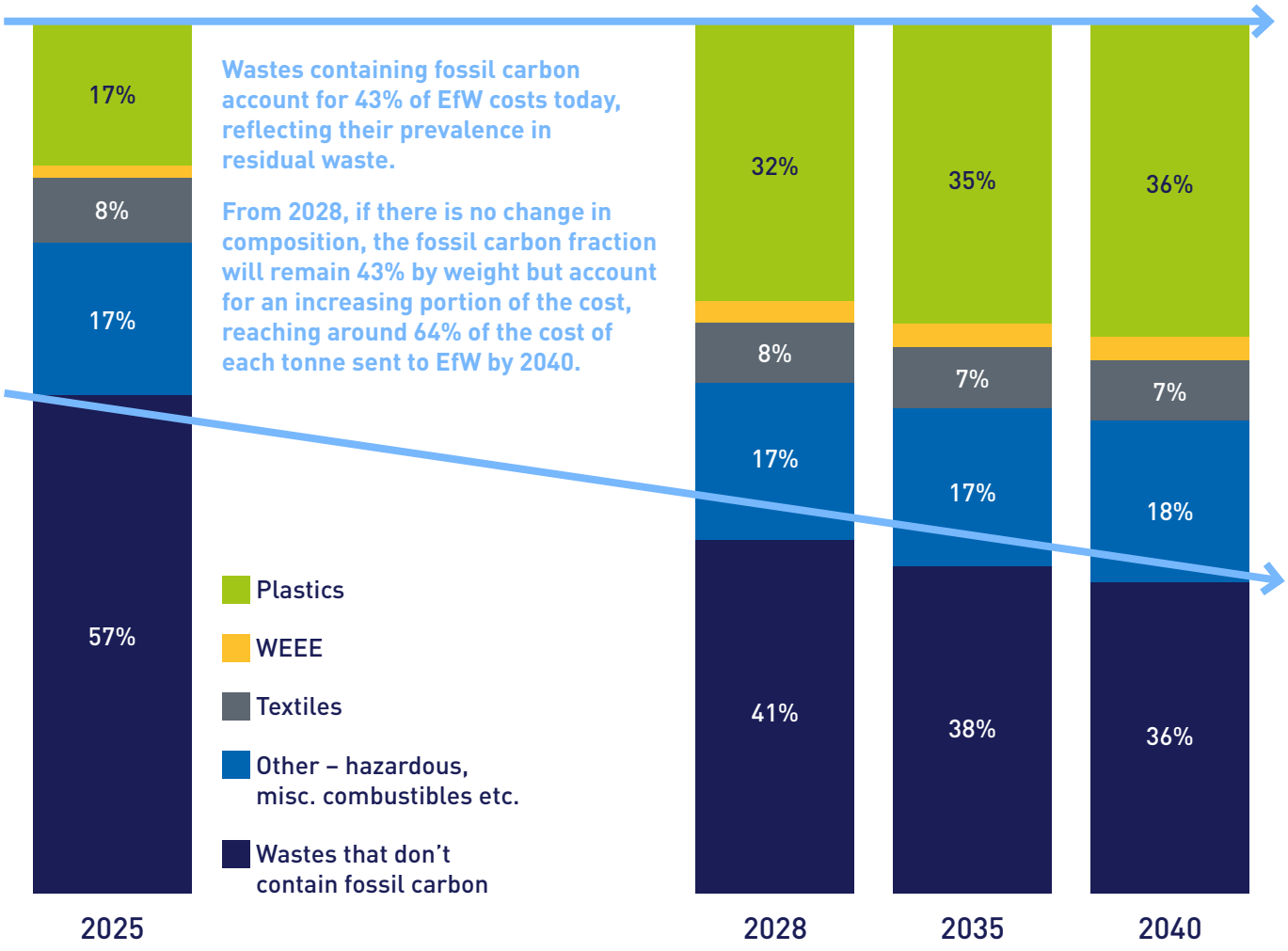
If the price of ETS allowances increases year on year as expected, materials that contain the most fossil carbon will account for a larger proportion of energy-from-waste gate fees from 2028 onwards. If the composition of residual waste does not change, in 2028 they will account for 43% of the gate fee. By 2035, this would increase to 62%. This illustrates the important role Simpler Recycling, extended producer responsibility and other recycling policies in the UK have in increasing recycling rates for rigid and flexible plastics and strengthens the business case for waste producers to invest in increasing recycling rates.

This illustrates the important role simpler recycling, extended producer responsibility and other recycling policies in the UK have.

8 https://www.gov.uk/government/publications/traded-carbon-values-used-for-modelling-purposes-2024/traded-carbon-values-used-for-modelling-purposes-2024

Figure three shows the relative contribution of different fossil carbon containing wastes in residual waste to ETS costs by combining carbon intensity factors with current data on waste composition. This determines the quantity of CO_2e emissions to which the increasing ETS costs are applied.

Figure three • **Contribution to energy-from-waste cost by material type.**



All materials get a share of the energy-from-waste gate fee based on composition by weight, plus allocation of ETS fees based on the contribution to fossil-based carbon emissions. WRAP's carbon WARM tool[9] used to indicate fossil-based emissions by key material group at energy-from-waste.

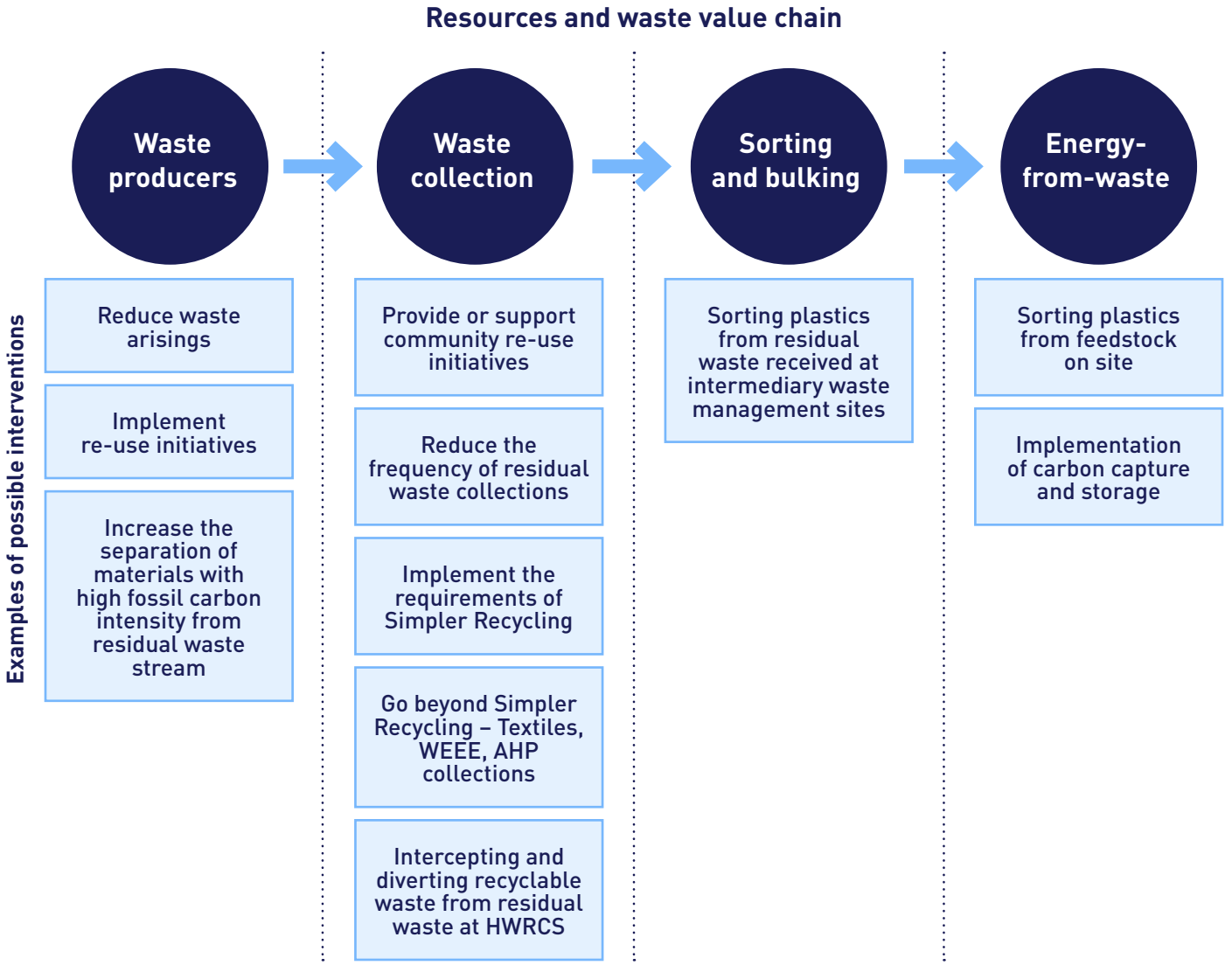
9 https://www.wrap.ngo/resources/report/carbon-waste-and-resources-metric-carbonwarm2

Identifying the interventions with the potential to deliver the greatest environmental benefits

There are several points in the resources and waste management system where fossil carbon intensive materials can be targeted.

Figure four shows some of the interventions that can be considered:

Figure four • Intervention points in the resources and waste management system



This report focuses on the actions that local authorities, as energy-from-waste's biggest customers, and commercial waste producers can take to reduce ETS costs and, as a consequence, move more waste up the waste hierarchy. These actions are not novel or untested, rather they focus on improving the services already delivered by many authorities and waste producers, and for which the skills and expertise already exists.

The analysis

Given that around 75% of waste treated at energy-from-waste originates from local authorities, high-level, indicative analysis has been undertaken for the purpose of modelling how two authorities, could alter their service provision to mitigate impacts of ETS. The authorities were chosen for their different characteristics, one with a mix of urban and rural areas with low deprivation, and the other being predominantly urban with a mid-level of deprivation. For each authority, service performance is based on actual data, while service cost is based on WRAP's estimated cost per household. Both datasets are available from WRAP's Local Authority Portal[10]. In both examples, the results of the modelling have been normalised to 100,000 households to compare outcomes at scale. Although the modelling has used data from authorities in England, the results are transferable to authorities in the devolved administrations of Scotland, Wales and Northern Ireland.

The results of the analysis are indicative only and have been used to evaluate the potential to invest in interventions to mitigate ETS costs, while also improving recycling performance.

This modelling approach also has some limitations that should be noted:

- It has been assumed that there is no cost uplift when increasing the scope of dry mixed recyclables collected at the kerbside, as in most cases the materials can be collected by existing vehicles and crews. Service provision is calculated based on the cost per household x 100,000 households. Individual Kerbside Assessment Tool (KAT) assessments would be required to confirm the impact for individual local authorities.
- No capital costs, other than those annualised within the service costs, have been included and as such the analysis has assumed that this remains constant in the worked examples below. For example, investment required to increase the capability of a materials recycling facility to sort a more complex mix of materials is not included.
- Dry recyclables are modelled net of commodity value at materials recycling facilities. This assumes that viable end markets exist for onward sale, rather than incurring a payment for disposal or other forms of management.
- For many of those authorities that will have to implement food waste collections to meet Simpler Recycling requirements, the Government has provided funding to cover much of these costs. However, it should be noted that costs were agreed some time ago, and the effect of inflation may mean that 100% of costs will no longer be covered.

The result of the analysis is discussed in the next section of this report.

10 https://laportal.wrap.ngo/uk/auth/login

Key messages for local authorities and other waste producers (businesses)

This section describes the potential impact of different interventions to reduce the fossil carbon content of residual waste. It uses data from local authorities to illustrate the savings that can be made, but the same principles can be applied to the waste businesses produce to mitigate ETS costs.

1

Implement Simpler Recycling well to mitigate ETS costs and improve recycling rates

Simpler Recycling was introduced in March 2025 to increase household recycling rates by standardising kerbside collection schemes and introducing food waste collections. Local authorities and businesses (except for micro firms) are required to arrange for the separate collection of dry recyclable waste streams (paper and cardboard, glass, metal, plastics) and food. Whilst most businesses must comply from 31 March 2025, local authorities have until 31 March 2026 to implement these measures. The separate collection of plastics films for recycling will also be required from March 2027. Micro firms (less than 10 employees) must collect all these waste streams by March 2027. Devolved authorities have introduced different requirements, but they all drive similar outcomes that supports the analysis presented herewith.

Importantly for ETS, the range of plastics that must be collected via Simpler Recycling is broad, potentially diverting more plastics from the residual waste in authorities where current collection is limited – for example, to plastic bottles only. The plastics that must be collected are:

- Plastic bottles
- Pots, tubs and trays
- Plastic tubes larger than 50mm x 50mm
- Cartons for food, drink and other liquids
- Plastic film packaging and plastic bags (from 2027)

The analysis, summarised in figures five and six, shows that increasing the range of recyclables collected, particularly those with a high fossil carbon content, can reduce the ETS burden on local authorities from 2028 when payments start. When considered alongside packaging extended producer responsibility payments, the two combined could cover a significant proportion of the ETS cost in the early years of the scheme and help insulate authorities from significant cost increases in the future.

Importantly, the extent to which authorities can mitigate ETS cost is linked to their current recycling performance:

- Lower performing authorities will have a higher ETS bill, but will be able to offset a larger proportion of this with system performance improvements as they have a larger scope for improvement (more ‘low-hanging fruit’).
- Higher performing authorities will have a lower bill, but have less scope to reduce it without more significant service change that targets materials which are harder to recycle practically and in a cost-efficient way.

CASE STUDY

A predominantly urban authority with mid deprivation in the north of England

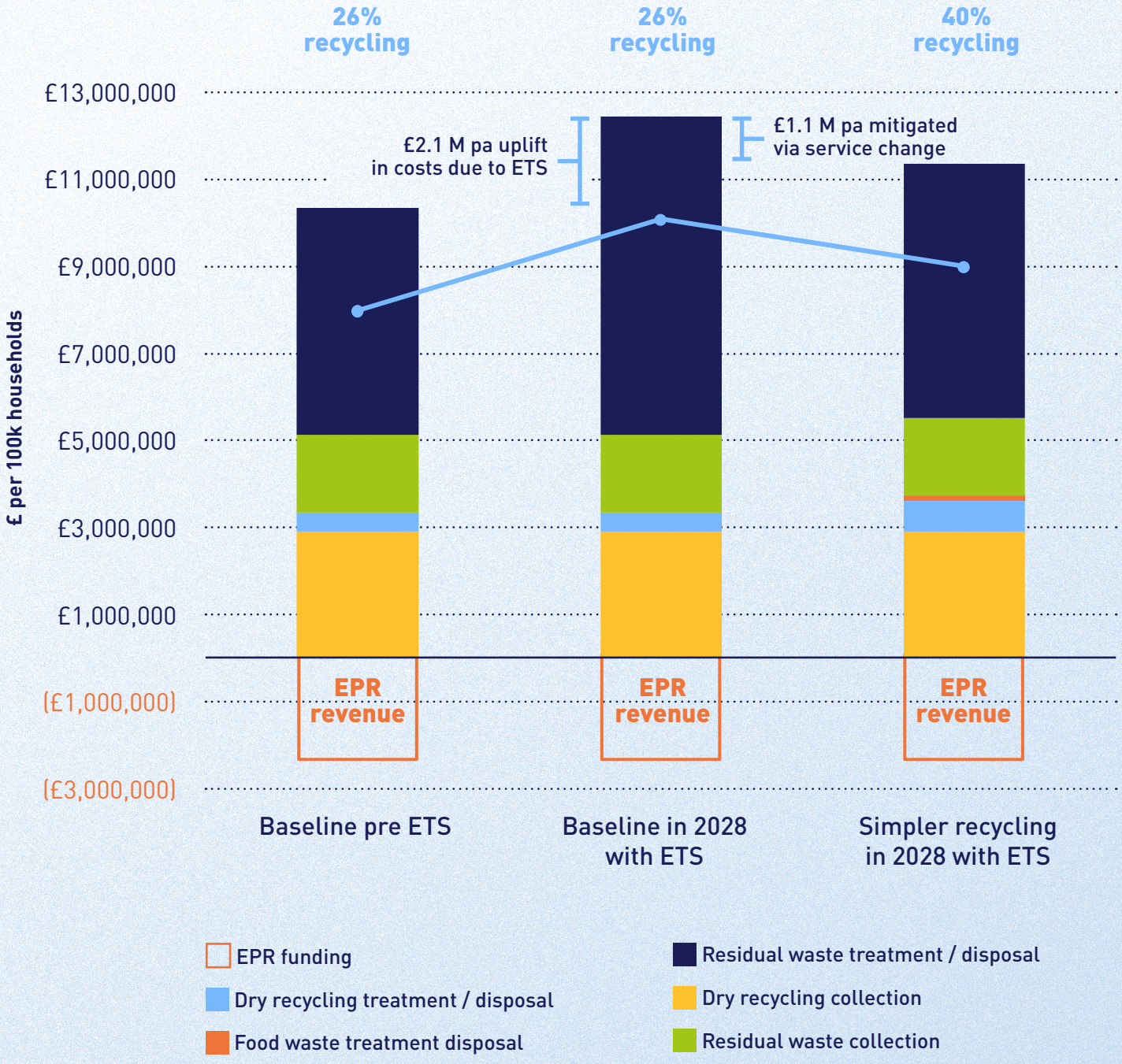
This authority currently operates a dual stream kerbside collection system for dry mixed recyclables (paper/card, plastics and cans) with glass collected separately. With a fortnightly residual waste collection, the current cost of delivering the service is £10.3M per 100,000 households. If there is no change in waste arisings and composition, the introduction of ETS payments in 2028 would add an additional £2.1M per 100,000 households to the service cost, taking the total cost to £12.4m per 100,000 households.

Simpler Recycling could increase recycling rates from 26% to ~40% in this authority, based on benchmarking against high performing authorities with similar characteristics. This would divert an additional 9,000 tpa of recyclable or compostable materials from residual waste, reducing the service provision costs by £1.1M per 100,000 households in 2028, a reduction of 52% relative to the estimated additional ETS burden in 2028.

In the same year, extended producer responsibility revenue for the fossil carbon-based packaging alone should provide approximately £2.4M for the collection, sorting and management of plastic packaging. Based on the modelling, assuming there is no change in service cost for dry recycling, and the food waste collection is funded by the Government grant, this offsets the entire ETS bill in 2028 (assuming that this is additional to existing funding and remains so). Extended producer responsibility funds for other packaging materials, could be invested in service improvements without increasing the overall cost of service provision.

CASE STUDY

Figure five • Breakdown of service cost per 100,000 households in an authority with a low recycling rate



CASE STUDY

A mixed urban/rural authority with low deprivation in the south of England

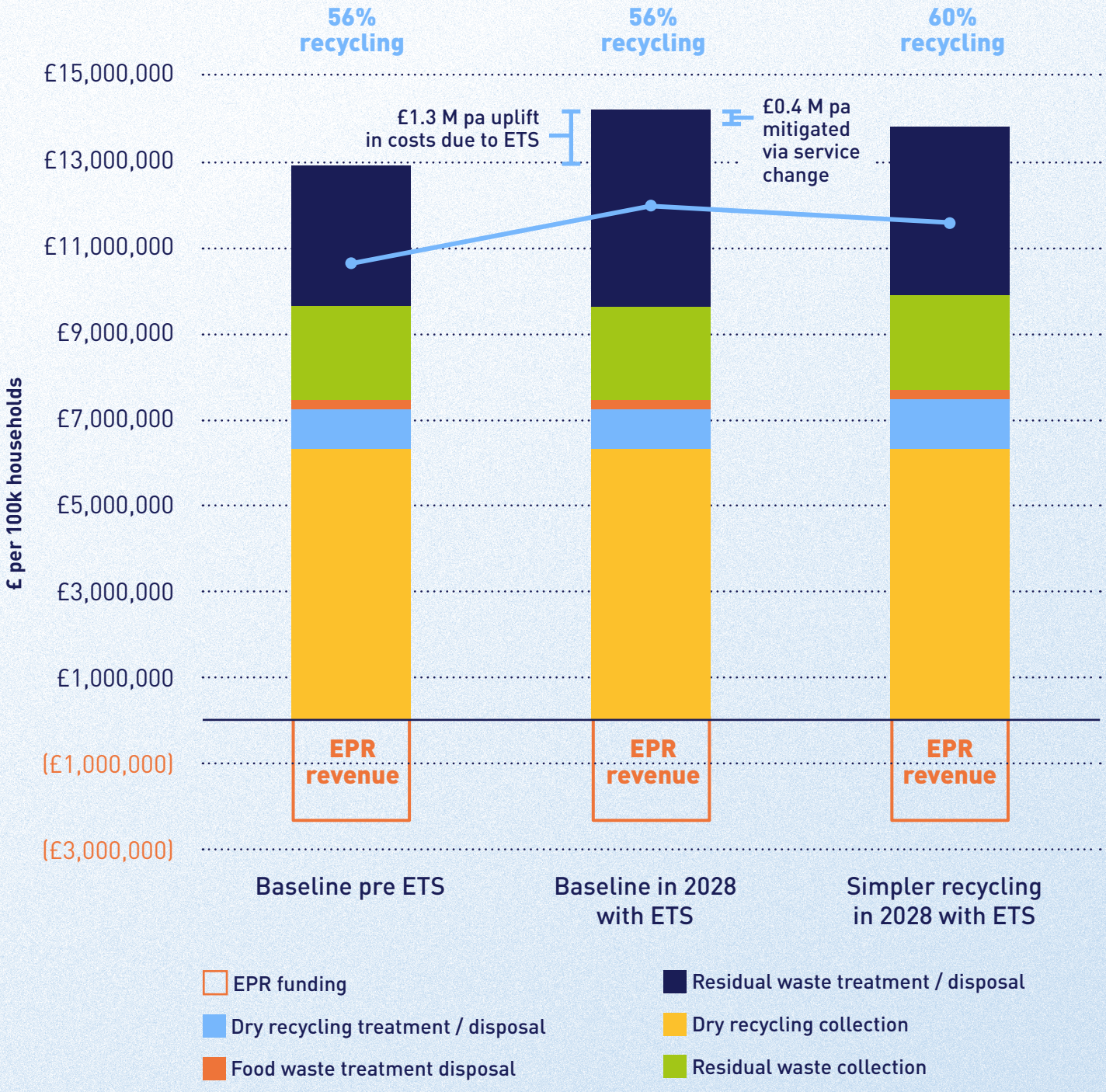
A higher performing authority in the south of England operates a multi-stream kerbside collection system for dry mixed recyclables with two containers at the kerbside (paper and glass together and plastics/cans/card together) and operatives sorting single streams into the kerbside vehicle. With a fortnightly residual waste collection, the current cost of delivering this service is £13.1M per 100,000 households. If there is no change in waste arisings and composition, the introduction of ETS payments in 2028 would add an additional £1.3M per 100,000 households to the service cost taking the total cost to £14.4M per 100,000 households.

Simpler Recycling is assumed to increase recycling rates from 56% to 60% in this authority, based on benchmarking against high performing authorities with similar characteristics. This would divert an additional 3,100 tpa of recyclable materials from residual waste, reducing the ETS bill by £0.4M per 100,000 households in 2028, a reduction of 37% relative to the estimated additional ETS burden in 2028.

In the same year, extended producer responsibility revenue from fossil carbon-based packaging alone should provide approximately £2.25M for the collection, sorting and management of plastic packaging. Based on the modelling, assuming there is no change in service cost for dry recycling, this offsets the entire ETS bill in 2028 (assuming that this is additional to existing funding and remains so). Extended producer responsibility funds for other packaging materials, could be invested in service improvements without increasing the overall cost of service provision.

CASE STUDY

Figure six • Breakdown of service cost per 100,000 households in an authority with a high recycling rate



Whilst broadly positive, it must be recognised that not all authorities are able to improve recycling rates. In densely populated areas, particularly those with a high proportion of flats or multi-occupancy dwellings, and with more diverse populations, it will be extremely difficult to significantly improve recycling rates in a cost-effective way. As such these authorities are less able to mitigate costs, adding to often already stretched budgets.

2

Reduce residual waste to invest in recycling more fossil carbon intensive materials

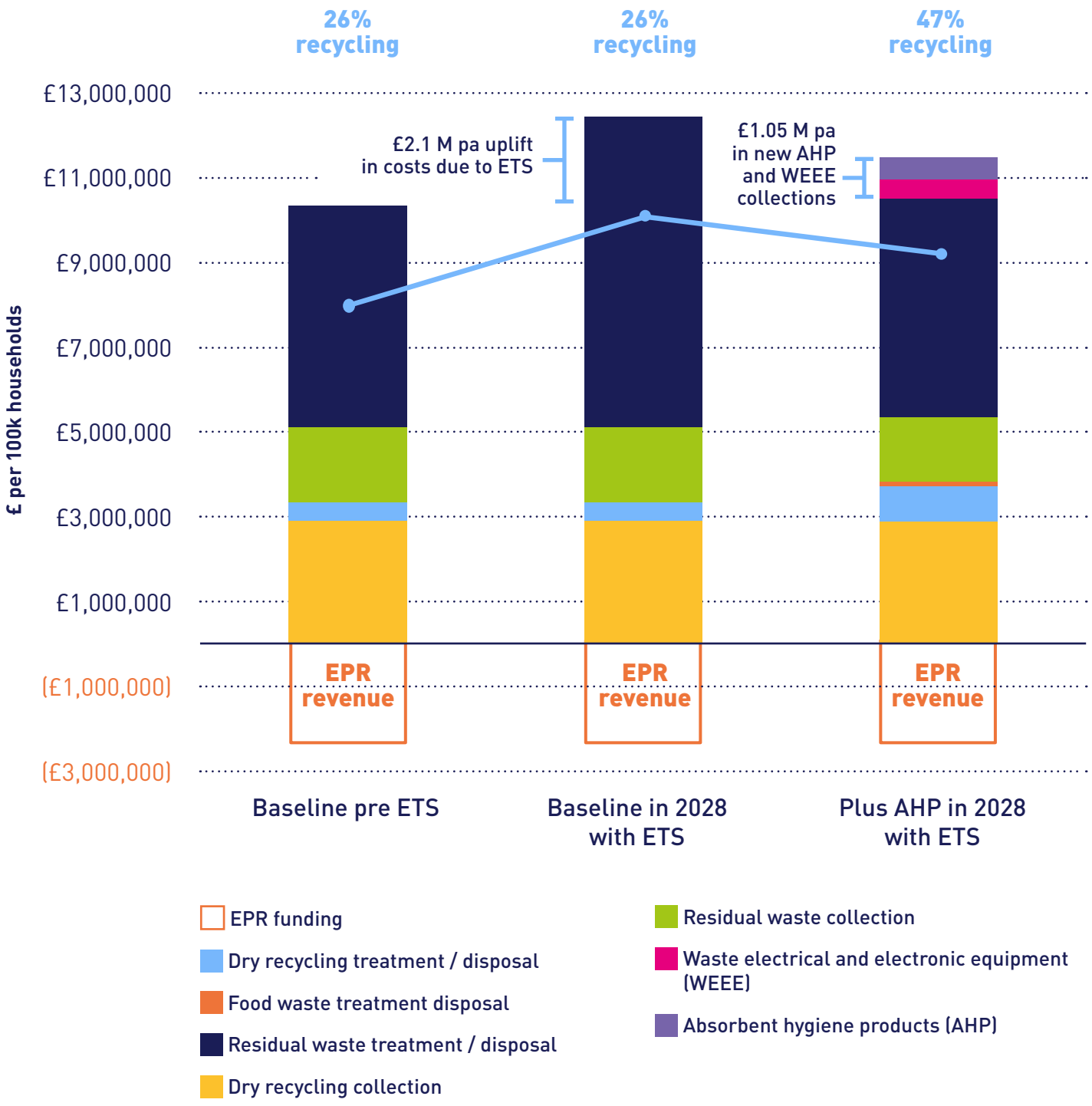
Reducing the tonnage of residual waste to energy-from-waste is the most effective way of reducing overall costs, as the savings are twofold, comprised of both avoided gate fees and avoided ETS costs. The significant impact that ETS costs could have on local authority budgets should incentivise interventions that seek to reduce residual waste arisings. A reduction in residual waste collection frequency is a proven method of achieving this. Analysis from WRAP based on 2021/2022 data shows that average residual yields for 3-4 weekly collections (with food waste) was on average 322kg/hh/yr whilst a fortnightly equivalent on average was 28% higher at 415kg/hh/yr[11]. Historically, this has been politically contentious in some areas. However, the introduction of Simpler Recycling and other devolved authority practice shows the potential for reduced collection frequency when supported by comprehensive recycling services.

Reducing the frequency of residual waste collections from once a fortnight to once every three weeks could deliver savings of approximately 4-6% to the total cost of service delivery (authorities moving from weekly to fortnightly may see higher savings and performance improvements). This figure is achieved through small reductions in the number of vehicles and crew collecting waste, and the avoided gate fees and ETS costs. For the predominantly urban and low performing authority example, this equates to a saving of £600,000 per 100,000 households per annum in 2028 (and post implementation of Simpler Recycling). This is likely to increase annually if carbon prices increase as expected.

The savings made from the reduction in residual waste collection frequency could be re-invested in new services to divert additional fossil carbon containing materials from energy-from-waste, and at almost net zero cost as shown in figure seven. Other sources of fossil carbon plastic include textiles, waste electrical and electronic equipment, and absorbent hygiene products such as disposable nappies, incontinence pads and feminine hygiene products, which are made primarily of absorbent tissue-fibre and plastic. Savings could be re-invested in separate collections for these fossil carbon intensive streams to further mitigate ETS costs.

11 https://www.wrap.ngo/resources/webinar/driving-recycling-and-reducing-residual-arisings-through-changes-residual-waste

Figure seven • For a low performing authority, the savings that would be made by reducing residual waste collection frequency may fund further service improvements



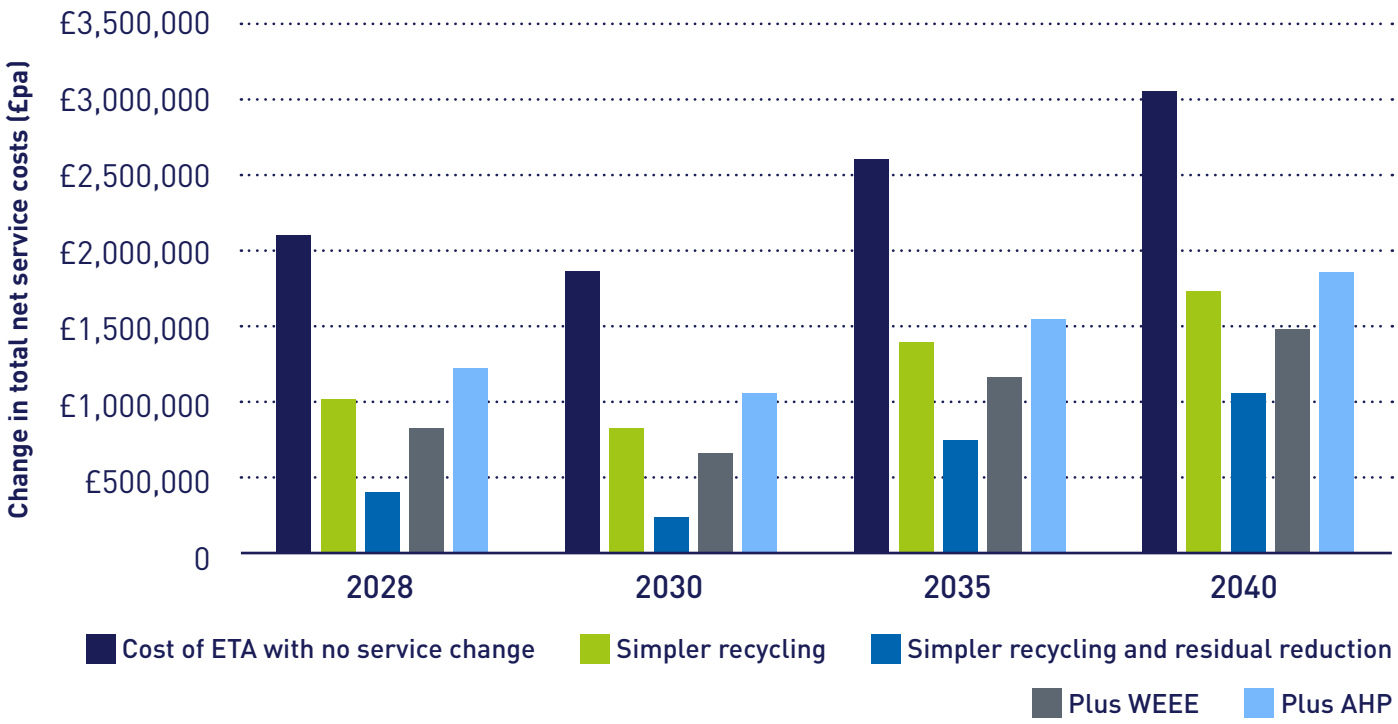
3

Early investment in service improvements and residual waste reduction is cost-effective in the short and long-term

Whilst analysis shows that for most authorities, Simpler Recycling has the potential to significantly reduce ETS costs, it assumes that recycling rates can be improved quickly. It is certainly the case that the greater the improvement, the greater the ETS cost avoided. However, acting early is crucial, as savings made early could be invested in delivering further service improvements that will generate even more savings in later years.

Figure eight shows the estimated ETS cost for the urban authority with a low recycling rate. In 2028, this starts at around £2.1M if there is no improvement in the recycling rate from today. If this continues and the carbon price increases as expected, the annual ETS bill may rise to just over £3M by 2040. Maximising the returns from Simpler Recycling has the greatest potential for savings but, if these are re-invested in additional services such as separate collection of waste electrical and electronic equipment, and absorbent hygiene products, the authority will realise greater cumulative benefits over time as shown in figure eight.

Figure eight • Net change in service costs for different improvement scenarios over time compared to a 'do nothing' baseline



All costs are modelled in line with the scenarios detailed. Service costs are modelled based on WRAP's local authority service cost data per household and treatment costs are based on WRAP gate fees net of material revenues. Waste electrical and electronic equipment, and absorbent hygiene product collections are modelled based on dedicated service (similar to food waste rounds), but at 25% operational costs to account for lower set out and participation rates. Treatment costs for absorbent hygiene products are assumed to be in line with energy-from-waste gate fees (no treatment savings), waste electrical and electronic equipment fees assumed at £50 per tonne.

There is an additional imperative to invest early. As ETS costs increase over time with the carbon price, it will add pressure on budgets and potentially limit an authority's ability to invest in the future.

4

There are opportunities to reduce ETS costs beyond kerbside recycling

Away from kerbside recycling, local authorities have other opportunities to divert fossil carbon materials from residual waste. The first of these focuses on the proactive management of waste placed in the residual waste containers at household waste recycling centres. Although some waste cannot be diverted, such as furniture containing persistent organic pollutants, there is potential to divert recyclable materials away from the residual stream.

In 2023, SUEZ recycling and recovery UK supported an audit of black bag waste received at household waste recycling centres in Cornwall[12], to determine the composition of waste within these sacks prior to the subsequent the roll-out of the new collection service and the implementation of the black bag sorting operation across six sites.

The analysis determined that 58% of this material is potentially recyclable, as shown in figure nine. For an authority managing 5,000 tpa of residual waste at household waste recycling centres with a similar waste composition, this could equate to savings of up to £112,000 per annum if 50% diversion is achieved (based on average local authority costs). These savings could be increased to £235,000 per year post 2028, when every tonne of waste diverted also avoids the ETS cost by reducing the fossil carbon fraction within the existing residual waste. The extent to which these savings can be realised will, however, depend on the level of investment and service change required at household waste recycling centres to enable residual waste minimisation and black bag sorting.

Figure nine •
Composition of black bags placed in residual waste at household waste recycling centres

Diverting 50% to recycling would result in savings of £162 per tonne received at household waste recycling centres (avoided gate fee and ETS cost)

- **42% rubbish**
- **58% recyclable materials**
  - **6.7% wood**
  - **7.9% paper**
  - **20.4% textiles**
  - **3.2% electricals**
  - **17% plastics**
  - **7.2% metals**
  - **6.8% cardboard**
  - **2.4% glass**
  - **8% vegetation and soil**
  - **13% rubble and plasterboard**
  - **7.5% other recyclable household items**

12 https://suezcornwall.co.uk/what-we-do/recycling/sorting-recycling-and-splitting-black-bag-waste/

CASE STUDY

Diversion of recyclables from Surrey County Council household waste recycling centres

SUEZ operates 14 household waste recycling centres in Surrey on behalf of the County Council and has implemented several measures to improve the re-use and recycling performance of the sites.

These measures have included:

- **Introduction of bicycle upcycling workshops**
- **Black bag sorting and residual waste monitoring**
- **Inert charging schemes with residents allowed to tip two bags of soil or rubble per week at no charge**
- **Opening re-use shops**
- **Working with partners to provide recycling and re-use for medical equipment for the NHS**

Since 2020, these measures have delivered a further 3% uplift in the recycling rate and diverted an additional ~1,000 t to re-use in 2024 alone. These efforts have resulted in operational cost savings to the council of £330,000 in 2024. The service changes required to implement black bag sorting have been delivered predominantly using existing resources managed under the contract. A key element is the re-direction of existing staff to greet and signpost customers to the appropriate recycling container. As a result, this additional diversion of residual waste has been delivered for an additional operational cost of just £35,000 in 2024, generating net savings of £295,000 for the council.

This example illustrates the benefits that can be delivered before ETS is implemented. Assuming the same diversion rate can be achieved post 2028 when ETS payments are proposed to start, these interventions would deliver a reduction in the ETS burden of £60,000 per year (assuming 46% fossil carbon).

5

Secondary sorting may be part of the solution for authorities with difficult catchments, but will not be as cost effective as investing in separation at the kerbside

For authorities with low participation rates in kerbside collection schemes, there is the potential to invest in pre-sorting of residual waste to remove plastics and other fossil carbon intense materials prior to treatment at an energy-from-waste facility. This can be achieved by existing and proven technology – i.e. a 'dirty MRF (materials recycling facility)' – and this type of processing is expected to increase for a wider range of wastes destined for energy-from-waste to reduce ETS costs.

However, it does present some challenges, such as:

- **Effectiveness** – the effectiveness of equipment to extract recyclable materials from more mixed residual waste streams is less than separating them from dry mixed recycling streams.
- **Quality** – Once materials are mixed within the residual stream, their quality and recycling potential are reduced. This is particularly true for fibres, films and other materials that are contaminated with organics. Processors would have to invest more in cleaning and refining these materials to find a market, which is commercially unviable for some.

As a result of these challenges, secondary sorting may prove less cost effective than investment in improving kerbside recycling rates due to the limited value and markets for more contaminated materials. Cost effectiveness is also impacted by the fossil carbon content and the price of ETS allowances. A lower carbon content makes cost effectiveness worse (due to less ETS cost avoidance) and high carbon content improves cost effectiveness (due to greater ETS cost avoidance).

For the predominantly urban, low performing authority, secondary sorting of residual waste to extract plastics and metals could result in an ETS cost reduction of £21.20 per tonne (not including implementation costs) for every tonne processed.

This compares to the service change option, resulting in improved dry recycling performance by 4.6% using existing service provision at no additional cost and generating net cost reduction of £19.78 per tonne.

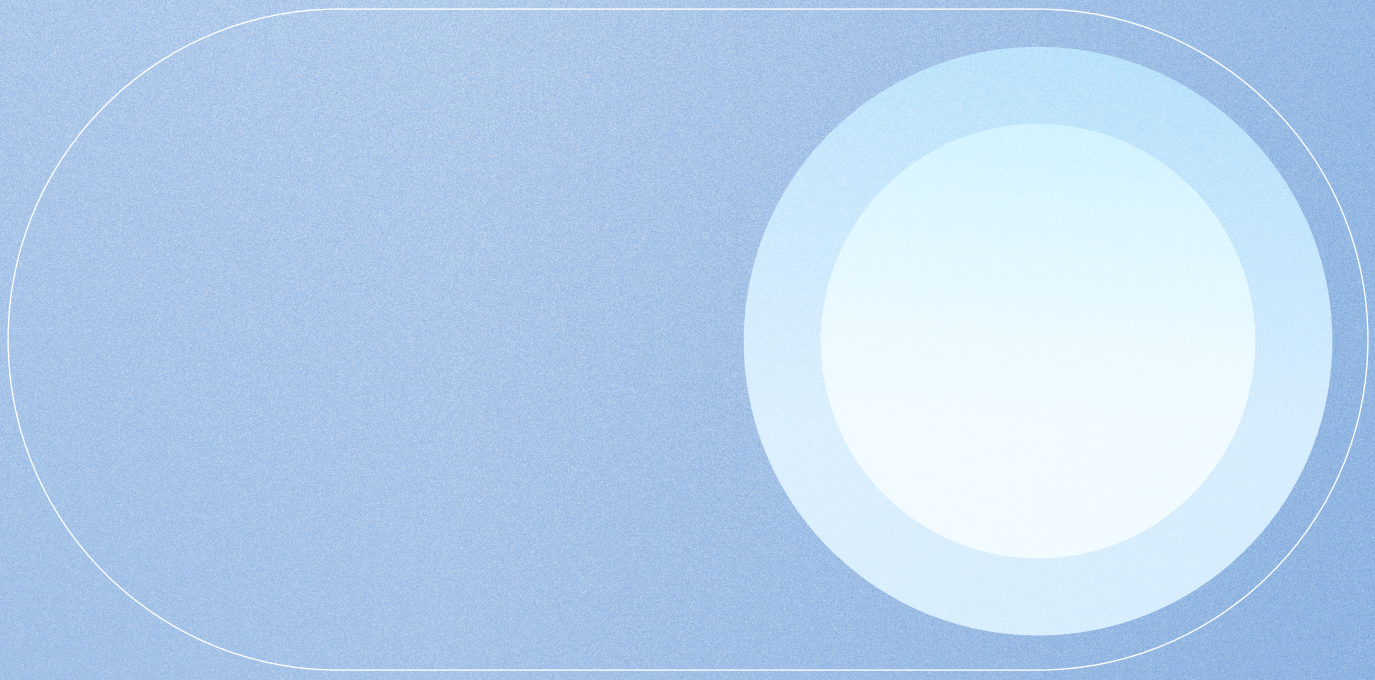
Currently the cost of secondary sorting is unknown, but based on the level of the potential savings that result from ETS avoidance, the cost of sorting could not exceed more than £1.50 per tonne before separation at source is a more cost-effective option.

Figure 10 • Example of applying secondary sort processing

Scenario	Residual waste (T)	Recycling recovered (T)	ETS cost post intervention	ETS Saving	Gate fee saving	Total saving per tonne
Baseline	29,601					
Service change	29,601	3,100	£1,013,721	£307,669	£277,946	£19.78
Secondary sort at an indicative cost of £15 per tonne	29,601	2,422	£960,349	£361,041	£-177,531	£6.20

There may be cost savings from secondary sorting focused on removing more plastics and critically this approach does not rely on householder behaviour change as part of system improvements. If it can be implemented effectively and efficiently, it may provide a cost-effective solution for authorities that have difficulties in improving participation their kerbside services. This would be particularly true for authorities with large proportions of flats or communal collections where influencing behaviour change is more challenging. However, the sophisticated sorting equipment required to separate high quality recyclates is costly and the investment required to produce valuable materials may be prohibitive. The table above shows the savings that may be achieved at the modelled ETS price and at a benchmark cost of £15 per tonne. Operators will need to balance the cost of sorting with the value of output materials in the recycling market.

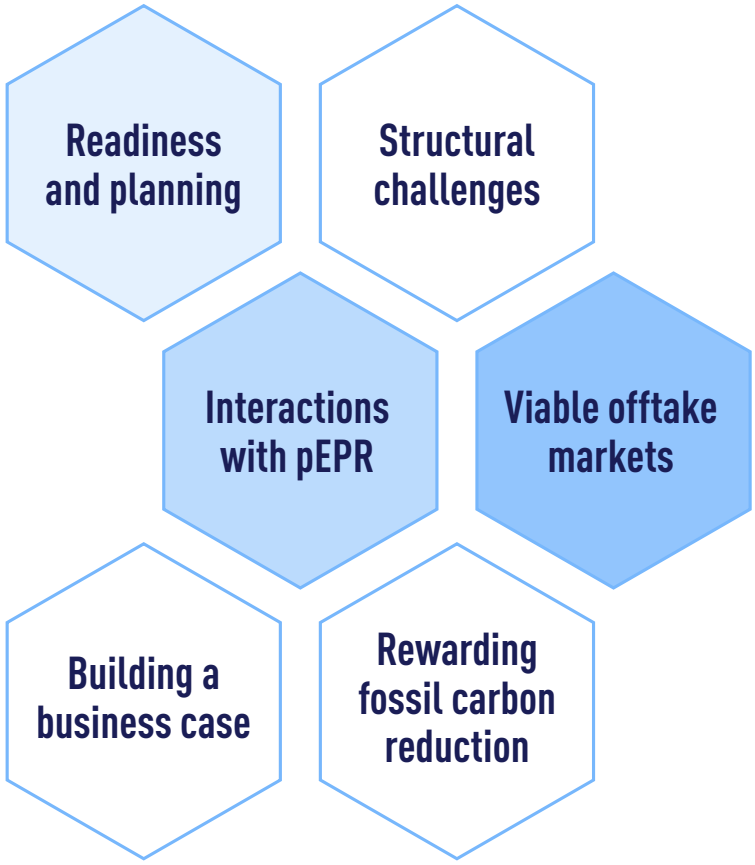
Implementing ETS to optimise impact, remove barriers and support a broader transition towards net zero



Although the analysis identified potentially cost-effective ways to minimise ETS costs, it is recognised that local authorities may face other non-financial barriers that impact their ability to make interventions.

As such, a small number of authorities were interviewed to understand more about the challenges they face and inform the recommendations of this report. The key themes that emerged from the interviews are discussed in the following paragraphs.

Figure 11 • Key themes



All of those interviewed believed that a policy lever to decarbonise residual waste is both positive and necessary, notwithstanding concerns about detailed implementation proposals.

Readiness and planning

ETS is a 'tomorrow problem' for some local authorities as they focus on delivering more urgent policy changes such as Simpler Recycling. This is a period of significant change for waste services, and in some cases, this is almost overwhelming against a background of resource and funding cuts. While others are engaging with the potential of ETS, this is primarily limited to calculating the potential cost of the scheme for their area and, in some cases, having initial discussions with residual waste treatment contractors.

With the details of how ETS will be implemented still to be confirmed, the uncertainty this creates makes it impossible for authorities to create detailed plans to minimise ETS costs. These plans cannot be finalised until the legislation is made. This means that conversations with internal and external stakeholders, such as the energy-from-waste contractor, can only be high level at this stage. Any further delay in finalising the details will also delay investment and the implementation of service improvements, hindering authorities' ability to benefit from early intervention.

Relationship between waste collection and disposal authorities

For two-tier authorities, there is added complexity in developing the business case for service improvements to lower ETS costs. Waste Disposal Authorities (WDAs) are responsible for disposal costs, they will be exposed to the cost increase but must manage residual waste delivered to them by the Waste Collection Authorities (WCAs), with no control over how and what is collected.

The WCAs must invest in service improvements to reduce the fossil carbon content to ultimately drive down costs for the WDA, although they would not directly see the benefit of doing so. In some authorities, the WDA has not started discussions with the WCAs about the impact of ETS however, acting together in the interests of the taxpayer should be the priority and drive collaboration. This is particularly important if the positive impacts of interventions are to be maximised, as extended producer responsibility fees will be split between both tiers, covering the cost of collection and disposal separately.

Whilst unitary authorities do not have this dichotomy, where they are part of wider procurement groups such as the East London Waste Authority, other issues emerge, such as how to allocate the cost of ETS between members with different collections systems and recycling rates.

Extended producer responsibility for packaging

Extended producer responsibility fees from brands and manufacturers to manage the post-consumer packaging they place on the market will be received this year onwards. Whilst this is obviously welcomed by local authorities, there is uncertainty as to whether this will be additional funding in real terms. It should replace funding previously provided by the taxpayer and could result in a net £0 gain for waste management services if funding from other sources is adjusted as a result. Those interviewed expressed concern that post 2025/26, the grant from central Government may be adjusted downwards to take account of the additional revenue. If this revenue does not increase the budget for waste management services, the ability to invest in service improvements would be significantly curtailed.

Even if extended producer responsibility fees are an uplift in funding, they are not guaranteed to be ringfenced for waste management budgets. With significant and potentially more urgent needs for funding from services such as housing and social care, it is challenging to retain what may appear to be a surplus for investment in service improvements. This is especially difficult when the funding is intended to mitigate the impact of an uncertain policy measure that may or may not begin to increase costs from 2028. Even if extended producer responsibility fees are ringfenced for waste management, budget setters may take the same approach as Central Government and reduce other funding, resulting in no net gain.

Also in question were the mechanics of extended producer responsibility fees. Some authorities questioned whether the mechanism to set fees would be responsive enough to cover ETS fees in the following year if prices fluctuated. Others questioned whether authorities with low recycling rates and particularly challenging circumstances, such as a high density of flats or a very ethnically diverse population, would be unfairly penalised if they can't meet the benchmarked performance standards of an 'efficient and effective' service and receive reduced extended producer responsibility funding. In particular, it is unclear how the performance groupings will be structured and whether they will be sufficiently granular to reflect the different characteristics of local authority areas.

Whilst it is broadly anticipated that extended producer responsibility will cover ETS fees for the management of fossil carbon-based packaging, it was noted that other fossil carbon containing waste streams are not subject to extended producer responsibility and therefore, local authorities must cover this additional cost. Textiles were mentioned as an obvious candidate for extended producer responsibility as around 60-70% are fossil carbon based[13]. This material would be easy to collect separately with a potentially high participation rate from householders. It is also excluded from Simpler Recycling, meaning that authorities would have to justify going beyond policy requirements to invest in a separate collection. Although subject to Producer Responsibility, there is no mechanism for recovering ETS costs associated with managing waste electrical and electronic equipment placed in residual bins. This could be addressed in future reviews, with one suggestion being to move the point of compliance to the kerbside.

13 https://www.eea.europa.eu/publications/plastic-in-textiles-towards-a/file

The need for long-term, viable offtake routes for films and non-packaging plastics

There was a consensus that, excluding films, the recycling sector was adapting well to sort and process the wider range of recyclables that must be collected for Simpler Recycling. However, this is not the case for films and other low value plastics. All were concerned that identifying a viable offtake for these materials would be challenging, if not impossible in the short term. If this is the case, the separate collection of films would potentially add cost to local authorities without mitigating ETS costs if they had to be treated by energy-from-waste. The ability for local authorities to mitigate ETS costs will be significantly curtailed without a credible offtake for all plastics diverted from energy-from-waste.

Reductions in fossil carbon must be rewarded by the cost pass through mechanism

There is a lack of clarity regarding the determination of fossil carbon in residual waste and the potential for any approach to be at level that local authorities don't see a reduction in ETS costs that are commensurate with reductions in fossil carbon content. This is a significant risk to investment if the business case cannot guarantee that improvements in the recycling rate will result in reduced ETS costs.

Creating a business case for investment

Developing a strong business case and financial rationale for investing in service improvements is not possible at present due to the significant uncertainty around the details of ETS, particularly the cost pass through mechanism, and also due to practical considerations such as the lack of viable offtakers for 'hard to recycle' plastics that are diverted from the residual waste stream. Without certainty, local authorities lack the ability to plan and invest early, something that the analysis shows would help insulate them from significant ETS costs as the scheme is implemented and the carbon price increases.

Discussions with authorities also highlighted the challenge of gaining approval for a business case predicated on what is expected to occur in a 'do nothing' scenario, especially for a policy that will not impact for another 3 years. It can be received as being 'theoretical' and is therefore less likely to be prioritised against tangible and urgent issues such as housing.

Summary

All local authority officers that were interviewed for this project supported the objectives of ETS but highlighted issues that may impede their ability to mitigate ETS costs in the future. In summary, these are focussed around:

- **The additionality of extended producer responsibility funding** – if extended producer responsibility revenue does not result in a net gain in funding for waste services, the potential to invest in interventions that will mitigate ETS costs in the medium to long term will be severely compromised.
- **The lack of certainty regarding ETS implementation** – particularly details around the extent and mechanism of cost pass through. This makes early planning and investment challenging.
- **Viable offtake for difficult to recycle plastics** – particularly films and non-packaging plastic items such as toys and furniture.

Lessons learned from other fiscal measures targeting a reduction in carbon emissions

The UK has a track record of designing and implementing fiscal instruments aimed at driving environmental improvements. These use a range of mechanisms, from a straight tax on undesirable activities, to more flexible approaches that incentivise action and reward desirable outcomes.

The following paragraphs consider the positive and negative impacts of these policies, and identify lessons that may be useful when developing the detailed implementation plans for ETS.

Landfill Tax – its objectives, design, successes and failures

Introduced in October 1996, the Landfill Tax was the UK's first and arguably most successful environmental tax. Landfill is at the bottom of the waste hierarchy and has significant negative environmental and social impacts. The purpose of the tax is to incentivise the minimisation of waste and divert it away from landfill to waste management options higher up the waste hierarchy.

Benefits of the Landfill Tax:

- ⊕ Reduced the tonnage to landfill, instead mostly diverting it to energy recovery. The UK landfilled ~25MT of municipal waste in 2010. This fell to 13Mt in 2022[14].
- ⊕ Reduced emissions of methane, a potential total CO_2e emissions from a peak of 69.7MT to 14.5 MT in 2023[15] (some of this reduction will be due to the prohibition of open venting of landfill gas to the atmosphere).
- ⊕ For much of the time, generating revenue to fund local environmental projects - £43,066 M[16]
- ⊕ Encouraged behaviour change.

Disadvantage of the Landfill Tax:

- ⊖ Pushed waste to the next cheapest option, not necessarily the most sustainable option.
- ⊖ Created an opportunity for waste crime causing environmental damage and damaging legitimate businesses - HMRC estimated that 28% of landfill tax revenue was avoided by the deliberate mis-description of waste (£275 M)[17].
- ⊖ Difficult to enforce.
- ⊖ Increased fly-tipping (the extent has not been quantified).
- ⊖ Admin burden for landfill operators.

14 https://www.gov.uk/government/statistics/uk-waste-data/uk-statistics-on-waste#biodegradable-municipal-waste-bmw-sent-to-landfill
15 https://www.statista.com/statistics/1024518/landfill-waste-methane-emissions-uk/
16 https://www.ons.gov.uk/economy/grossdomesticproductgdp/timeseries/bkof/edp3
17 https://www.nao.org.uk/wp-content/uploads/2021/02/Environmental-Tax-Measures-Summary.pdf

Key learnings for the implementation of the Emissions Trading Scheme for energy-from-waste:

1 Increasing the cost of waste management creates a significant incentive for fraud and illegal waste management activities. Enforcement of the Landfill Tax by HMRC has been in places unsuccessful, undermining legitimate operators and reducing the funds available for environmental projects. ETS is expected to add 50% to the cost of energy-from-waste in the UK which will create an opportunity for fraud (claiming a lower fossil carbon content to reduce cost pass-through) and incentive for cost avoidance. In this case, the UK's environmental regulators will have responsibility for enforcing the scheme. These organisations have more experience of enforcing environmental legislation than HMRC and have previously fined businesses for breaches under the UK ETS, such as under-reporting emissions[18]. It is important that fines are proportionate to any offence to deter illegal activity.

2 The Landfill Tax has arguably been the UK's most successful environmental tax and has succeeded in diverting most residual waste to energy-from-waste, saving significant emissions of greenhouse gases. This was achieved by a clear trajectory of rising prices that were published years in advance (the Landfill Tax Escalator) and set sufficiently high to create the business case for change. The price of ETS allowances is set by market supply and demand, and although they are expected to rise over time, the variable nature makes business cases less certain.

3 The allocation of Landfill Tax is relatively simple to apply with the standard rate payable for wastes containing biogenic material and a lower rate payable on 'Qualifying Material', which are predominantly inert wastes that don't generate methane in landfill. This contrasts with proposals for ETS in which the costs are determined by the fossil carbon content of the waste and a market-based carbon price, and where the mechanism for determining this and the pass through of costs from the energy-from-waste operator are potentially complex.

18 https://www.gov.uk/government/news/more-than-30-companies-fined-as-part-of-efforts-to-reduce-emissions
https://www.iema.net/articles/drinks-giant-fined-for-emissions-breaches?t=156571

The limited success of ETS in the cement sector

The cement sector is one of the most carbon-intensive sectors in the UK economy. It has been included in the EU ETS since 2008, but the reduction in carbon emissions has been very limited. Across Europe, the carbon intensity of cement has remained stable since 2012[19]. This is because mitigation measures have been focused on increasing efficiency and switching to less fossil carbon intense fuels, including waste derived fuel. Fuels typically account for approximately 40% of emissions from the sector, whereas the remaining 60% of emissions are generated by the chemistry of the calcination process. Reducing the carbon emissions from the process is challenging and requires significant investment in technology development to reduce emissions further.

The ETS awarded cement producers free allowances up to a benchmark of good performance. This approach was established to combat the risk of carbon leakage if, for example, operators sought to relocate production outside the EU area covered by the ETS. Plants that operated efficiently and reduced emissions below the benchmark were free to sell unwanted allowances to generate revenue for investment. However, this softens the impact of carbon pricing and has led to the sector across Europe making approximately €3 billion in additional profits from the overallocation of free allowances between 2008 and 2019[13]. The system of free allowances will be revised when the EU and UK Cross Border Adjustment Mechanism comes into force, the latter scheduled for 01 January 2027. Although proposals to extend ETS to energy-from-waste do not include the allocation of any free allowances, the disappointing outcomes from ETS in the cement sector demonstrate the importance of price increases as a signal to stakeholders to invest in decarbonisation.

Figure 12 • The comparative advantages and disadvantages of a tax vs cap and trade schemes.

Tax	Cap and Trade
Direct charge with predictable costs	Prices are determined by demand and, as such are variable
Creates an investible business case if planned tax increases are published in advance.	Good performers should be rewarded by lower costs incentivising improvements
Impacts all customers equally	There is the potential for customers to be treated differently because of contracting mechanisms
Simple cost pass through	Cost pass-through is complex as CO_2e emissions must be apportioned back to different feedstocks

19 https://carbonmarketwatch.org/wp-content/uploads/2022/11/CMW_Decarbonising-Cement.pdf

Other fiscal instruments driving a reduction in carbon emissions

Climate Change Levy

Introduced in April 2001, the Levy aimed to reduce carbon emissions by incentivising businesses to become more energy efficient. It is payable on the use of electricity, gas and solid fuels and added to bills by the fuel supplier. The Levy has had mixed success at driving decarbonisation with businesses focused on reducing costs rather than systemic interventions to reduce the carbon emissions associated with energy use. It has failed to drive systemic change.

Carbon Price Support (CPS)

Introduced in 2013, the objective of CPS was to ensure a minimum carbon price for power generators using fossil fuels. Generators pay CPS by tonne of CO_2e emitted, meaning that if ETS prices are low, a minimum carbon price is maintained. The CPS has led to a substantial reduction in the amount of electricity generated by coal, which has fallen 93% between 2013 and 2019[20].

20 Annex: Impact of Carbon Price Support on British Energy bills, University College of London. Available here - https://www.ucl.ac.uk/bartlett/sustainable/sites/bartlett/files/annex_-_cps_-_final_-_20102019.pdf.

Summary

The examples discussed above show the different approaches policy makers can take to effect change. With many having been in place for several years, it is possible to identify aspects of policy implementation that would achieve the goals of including energy-from-waste in ETS.

In summary, these are:

1. The financial impact of ETS on energy-from-waste operators and their customers must be sufficient to incentivise systemic change. Introducing free allowance or a similar approach that would limit the costs to energy-from-waste customers would compromise the aim of the policy i.e. the decarbonisation of the sector. However, there are small number of circumstances where there will be limited opportunity to mitigate ETS costs and financial support may be required, such as for fossil carbon intense materials that can't be diverted from energy-from-waste (like POPs) and for Local Authorities with significant barriers to improving recycling rates at the kerbside.

2. Decarbonising interventions must be reflected in lower ETS costs. The methodology for allocating carbon costs must be granular and responsive to create the business case for investment.

3. Significant funding is required to drive systemic change and deliver a significant shift in carbon emissions. In Europe, the ETS Innovation Fund supports low carbon, innovative technology. The funding that is distributed is raised from the sale of 450 million ETS allowances. At present, the UK Government does not propose to ring-fence ETS revenue for low carbon innovation, but a dedicated fund would likely unlock interventions by significant stakeholder groups, including local authorities that have very limited budgets and where there are barriers to innovation. This would be a useful consideration in UK-EU ETS alignment discussions.

4. Proactive and effective enforcement is vital to maintain competition and prevent fraud. The financial costs involved in ETS will incentivise criminal behaviour that could undermine legitimate waste managers. This extends to the monitoring and reporting of fossil carbon content in waste across the value chain, in addition to the regulation of facilities within the scope of the scheme.

Recommendations for the effective implementation of ETS

Summary

This report has considered the most impactful actions that local authorities can take to minimise their ETS cost burden when the scheme is implemented in 2028 and beyond. Although the examples presented are local authorities, the basic approach to reducing ETS costs, i.e. prioritising waste reduction, re-use and recycling to divert fossil carbon materials out of the residual waste stream, also apply to businesses. Key target materials include plastics, synthetic textiles, waste electrical and electronic equipment, and absorbent hygiene products.

The analysis shows that service improvements to drive up the recycling rate for fossil carbon-based materials (and other recyclables) and reduce ETS costs can be delivered by investment in local authority waste management services. Importantly, success does not rely on innovative new technology or experimental approaches, it can be achieved with the services that local authorities have many years of experience in delivering.

Diversion from energy-from-waste can only happen where there is a viable and long-term offtake for the materials that are diverted. Currently, recycling activities predominantly target relatively uncontaminated, rigid packaging waste. Even within this grouping, items such as pots, tubs and trays are considered lower value, and identifying a recycling offtake can be a challenge. Simpler Recycling will result in more of this material being collected, and films will be added by March 2027. It may be a challenge for the market to provide recycling outlets for this material as capacity is currently limited, particularly for chemical recycling, and the market for recycled polymers can be subdued.

If authorities are to maximise ETS cost reduction, even more difficult to recycle plastics such as waste electrical and electronic equipment plastics, absorbent hygiene products and large rigid items such a toys and furniture will need to be diverted to a thriving recycling offtake market, and need Governments to do more to ensure reprocessing infrastructure is available.

Local authorities are under significant budget pressure, with some on the brink of financial viability. As such, securing early investment for the improvements required to minimise ETS costs in the long term is a challenge, particularly when many of the details are still to be confirmed. Our analysis has demonstrated that extended producer responsibility revenue would provide a significant proportion of the funding required to raise recycling rates and reduce ETS costs. This early investment will be vital to insulate local authorities against future cost rises, and the analysis shows the importance of extended producer responsibility funding being additional to current budgets to enable this, rather than being 'netted off' against funding from other sources, resulting in no net gain. When considering the need to decarbonise waste management, interventions earlier in the value chain are easier to deliver and provide possibly greater environmental benefits than 'end-of-pipe' solutions such as carbon capture and storage. They are also better aligned with the waste hierarchy and likely to be more cost-effective. Unlocking these benefits through investment in local authority services should be considered a national priority.

Recommendations for local authorities

Key insights:

- It is not inevitable that the carbon cost of ETS will significantly increase the cost of managing waste. Taking action to improve the recycling rates for fossil carbon-based materials will reduce costs and help insulate an authority against future price rises. We do not consider it possible to mitigate all of the costs from ETS at this time.

- ETS costs can be reduced by 37-56% through proven interventions to increase diversion rates of fossil carbon-based materials. Authorities with lower recycling rates have greater scope to improve capture rates and thus the potential to avoid a greater proportion of 'business as usual' ETS costs.

- Local authorities would avoid ETS costs by improving waste minimisation, re-use and recycling rates. Based on the scale of avoided gate fees and ETS costs and assuming the price of allowances follows the expected trajectory, they could invest up to the following without increasing their overall service costs. If service improvements can be implemented at cost lower than this, net savings will be achieved:

  - ~£154 to prevent 1 tonne of waste through minimisation or re-use in 2028. This will increase to ~£175 in 2040 as the carbon price is expected to increase.

  - ~£102 to divert 1 tonne of waste to recycling in 2028. This will increase to £122 in 2040 as the carbon price is expected to increase.

Taking these insights, the key messages for local authorities are:

- Implement Simpler Recycling well with a focus on participation and capture rates and material quality to mitigate ETS costs and improve recycling rates – by the time ETS payments are proposed to start in 2028, recycling rates for fossil-based materials should have increased because of Extended Producer Responsibility for Packaging, Deposit Return Schemes, Simpler Recycling and other devolved authority recycling programmes.

- Reduce residual waste to invest in recycling more fossil carbon intensive materials – reducing the access to residual waste bin capacity through either frequency of residual waste collections or bin/bag volume for those authorities that have not yet done so is an obvious next step. This could reduce the overall tonnage by up to 6%, saving not only ETS cost but also collection costs and gate fees.

- Early investment in service improvements and residual waste reduction is cost-effective in the short and long-term – acting early is crucial, as savings made early in the scheme could be invested in delivering further service improvements that will generate even more savings in later years.

- There are opportunities to reduce ETS costs beyond kerbside recycling – changing practices at household waste recycling centres to intercept recyclables in black bags is a cost-effective way to improve recycling rates at these sites.

- Secondary sorting may be part of the solution for authorities with difficult catchments, but will not be as cost effective as investing in separation at the kerbside.

- Implementing separate collections for fossil-carbon intensive materials such waste electrical and electronic equipment (WEEE) and absorbent hygiene products (AHPs) is not immediately cost effective, but will offer greater savings as ETS costs grow over time.

Local authorities can take the following steps to support their plan for a service change to mitigate ETS costs:

1. Invest in a regular sampling programme to understand the composition of their residual waste, key fossil-carbon containing materials and how it changes over time. This will inform proposals for service improvements and build the business case for change.

2. Review local data to calculate potential ETS exposure both in 2028 and as the scheme develops should 'business as usual continue'. This will provide the 'do nothing' baseline against which potential interventions to reduce fossil carbon in residual waste can be measured.

Recommendations for other waste producers

Although the modelled examples are based on local authorities responsible for large scale waste management services, the key messages from the analysis are also applicable in principle to all waste producers.

The learning points are:

1. Increases in waste management costs as a result of ETS can be significantly mitigated by diverting fossil carbon plastics from residual waste through minimisation, re-use and recycling.

2. Reducing the quantity of waste produced is the biggest driver of cost savings – waste producers should therefore prioritise actions that reduce waste generation and increase re-use.

3. Separating recycling at source is the most cost-effective way of reducing the fossil carbon intensity of residual waste. Implementing the requirements of Simpler Recycling in a business will create the opportunity for segregation at the point of production.

4. Adopting or expanding sustainable procurement practice will promote waste minimisation and advance the reduction of fossil carbon in residual waste.

5. Maximising staff, customer and visitor participation will deliver the greatest impact and mitigate future cost increases.

Actions that the Government and stakeholders should take to support actions and reduce risk

Whilst the analysis shows that significant carbon savings are possible, there are several barriers that must be overcome before the full scope of benefits can be delivered. Central Government must be aware of these barriers and work to address them where appropriate. Figure 13 sets out the areas where Government intervention would unlock investment and create the certainty required by local authority waste management services.

Figure 13 • Areas of action for Central Government

Recommendation	Commentary
Provide regulatory certainty around ETS as soon as possible, particularly regarding the measurement of fossil carbon in residual waste	Without regulatory certainty, local authorities cannot effectively plan, invest, or implement service improvements. Early investment is the most cost-effective way of mitigating ETS costs in the short and long-term, but it cannot happen without certainty. The mechanism for determining and charging for the fossil carbon content must recognise improvements to fully incentivise intervention.
Zero rate wastes that must only go to energy-from-waste to protect the environment	Some waste streams are mandated for energy-from-waste disposal due to their hazardous nature, specifically items that contain toxic 'forever chemicals'. For local authorities, furniture containing persistent organic pollutants (POPs) fall into this category and therefore cannot be diverted to recycling. As local authorities cannot pass costs back to householders, these items should be discounted or compensated from ETS costs.
Recognise that some authorities cannot improve recycling rates significantly	Many authorities with low recycling rates have limited control over participation and capture rates from householders due to the characteristics of their areas. This puts them at greater risk of significant ETS costs without the ability to mitigate them.
Support local authorities to invest in carbon reduction	Most local authorities are severely financially restrained and securing investment for anything above statutory duties can be challenging. Extended producer responsibility revenue has the potential to fund investment in service improvements if it provides additional funding in real terms. 'Netting off' this funding against central Government funding will curtail the potential to invest and expose local authorities to greater cost increases in the long term. Supporting local authorities to improve services will deliver significant carbon reductions, is likely to be more cost effective than end of pipe solutions (i.e., carbon capture and store), creates more raw materials to deliver circular economy and Net Zero policy and importantly, is in line with the waste hierarchy.

The Government should look at how both mechanical and chemical recycling markets can be supported and delivered to align with the introduction of ETS	It is only possible to divert plastics and other fossil carbon intensive wastes if there is a practical and economic offtake for the material. The Government must support the recycled polymer market and support the development of chemical recycling infrastructure and markets in the UK.
Consider supply chain solutions for difficult-to-recycle, fossil carbon materials	Extended producer responsibility encourages brands and manufacturers to increase the recyclability of their products but currently does not incentivise fossil carbon reduction. There could be a role for this in establishing a carbon influence to 'modulated fees', in advance of ETS costs being incurred. Extended producer responsibility for waste electrical and electronic equipment should be reviewed so that the ETS cost of managing small waste electrical and electronic equipment in residual waste is recovered by local authorities. Extended producer responsibility for textiles could fund the separate collection of this material by local authorities and support a challenging recycling market as well as promoting and supporting wider re-use and repair. Local authorities see textiles as 'low hanging fruit' in terms of increasing recycling rates and diverting synthetic textiles to recycling will reduce ETS costs. Absorbent hygiene products may not be suitable for extended producer responsibility given the price sensitivity of the products. It is also the case that the collection and recycling of absorbent hygiene products is challenging given their nature and the amount of processing involved. As such, the Government should consider how support for reusable or better recycling market outcomes can be designed and/or delivered.

ETS is a performance based economic instrument designed to drive decarbonisation. UK Government has an opportunity to lever the current packaging extended producer responsibility and deposit return scheme systems as well as recycling programmes such as Simpler Recycling to not only further their decarbonisation agendas but to support local Government in their climate emergency plans and at the same time deliver significant mitigation to potential ETS costs.

Appendix 1: Assumptions

Trends in ETS costs

Data table for figure 5 and 7

	Baseline pre ETS	Baseline in 2028 with ETS	Simpler recycling in 2028 with ETS
Dry recycling collection	£2,900,000	£2,900,000	£2,900,000
Dry recycling treatment / disposal	£438,258	£438,258	£717,488
Food waste collection			
Food waste treatment disposal			£104,000
Residual waste collection	£1,800,000	£1,800,000	£1,800,000
Residual waste treatment / disposal	£5,204,865	£7,317,031	£5,842,187
Waste electrical and electronic equipment			
Absorbent hygiene products			
Total	£10,343,123	£12,455,288	£11,363,675
Baseline	£10,343,123	£10,343,123	£10,343,123
			-£1,091,613
Recycling rate	26%	26%	40%
Extended producer responsibility funding	-£2,362,814	-£2,362,814	-£2,362,814
Net position	£7,980,308	£10,092,474	£9,000,861

Residual reduction in 2028 with ETS	Plus WEEE in 2028 with ETS	Plus AHP in 2028 with ETS	
£2,900,000	£2,900,000	£2,900,000	Dry recycling collection
£821,235	£821,235	£821,235	Dry recycling treatment / disposal
			Food waste collection
£124,800	£124,800	£124,800	Food waste treatment disposal
£1,500,000	£1,500,000	£1,500,000	Residual waste collection
£5,407,669	£5,367,945	£5,169,167	Residual waste treatment / disposal
	£464,700	£464,700	Waste electrical and electronic equipment
		£513,700	Absorbent hygiene products
£10,753,704	£11,178,680	£11,572,902	Total
£10,343,123	£10,343,123	£10,343,123	Baseline
-£1,701,584	-£1,276,608	-£882,386	
44%	45%	47%	Recycling rate
-£2,362,814	-£2,362,814	-£2,362,814	Extended producer responsibility funding
£8,390,890	£8,815,866	£9,210,088	Net position

Appendix 1: Assumptions

Trends in ETS costs

Data table for figure 6

	Baseline pre ETS	Baseline in 2028 with ETS	Simpler recycling in 2028 with ETS
Dry recycling collection	£6,300,000	£6,300,000	£6,300,000
Dry recycling treatment / disposal	£926,100	£926,100	£1,177,990
Food waste collection			
Food waste treatment disposal	£206,180	£206,180	£206,180
Residual waste collection	£2,200,000	£2,200,000	£2,200,000
Residual waste treatment / disposal	£3,256,214	£4,577,605	£3,928,935
Waste electrical and electronic equipment			
Absorbent hygiene products			
Total	£12,888,494	£14,209,885	£13,813,105
Baseline	£12,888,494		
		£1,321,391	-£396,780
Recycling rate	56%	56%	60%
Extended producer responsibility funding	-2253814.137	-£2,253,814	-£2,253,814
Net position	£10,634,680	£11,956,071	£11,559,291

Residual reduction in 2028 with ETS	Plus WEEE in 2028 with ETS	Plus AHP in 2028 with ETS	
£6,300,000	£6,300,000	£6,300,000	Dry recycling collection
£1,256,590	£1,256,590	£1,256,590	Dry recycling treatment / disposal
			Food waste collection
£234,806	£234,806	£234,806	Food waste treatment disposal
£1,900,000	£1,900,000	£1,900,000	Residual waste collection
£3,611,260	£3,571,536	£3,372,759	Residual waste treatment / disposal
	£439,700	£439,700	Waste electrical and electronic equipment
		£488,700	Absorbent hygiene products
£13,302,656	£13,702,632	£14,071,855	Total
			Baseline
-£907,229	-£507,253	-£138,031	
63%	64%	66%	Recycling rate
-£2,253,814	-£2,253,814	-£2,253,814	Extended producer responsibility funding
£11,048,842	£11,448,818	£11,818,040	Net position

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September 2025 • SUEZETS2509/3