Title: Reforming the UK packaging producer responsibility system **IA No:** **RPC Reference No:** RPC-DEFRA-4343(2) **Lead department or agency:** Department for Environment, Food and Rural Affairs **Other departments or agencies:**	Impact Assessment (IA) **Date:** 18/01/2021 **Stage:** Consultation **Source of intervention:** Domestic **Type of measure:** Secondary legislation **Contact for enquiries:** packaging@defra.gov.uk
Summary: Intervention and Options	**RPC OPINION:** GREEN

Cost of Preferred (or more likely) Option 3(2019 prices, 2020 present value)

Total Net Present Value	Business Net Present Value	Net cost to business per year	One-In, Three-Out	Business Impact Target Status
£275.4m	**-£9,532.5m**	**£1,131.0m**	**In scope**	**Qualifying provision**

What is the problem under consideration? Why is government intervention necessary?

A producer responsibility (PR) system for packaging has been in place since 1997. Over this time, it has helped businesses across the UK to meet their packaging waste recycling obligations and the UK to achieve its and the EU packaging waste recycling targets whilst keeping the cost of compliance to businesses low compared to EU Member States. As the current system is designed to enable producers to meet (not exceed) their recycling targets it provides little incentive for producers to design their packaging to be more recyclable or encourage the use of reusable or refillable packaging. In addition, a range of environmental externalities (e.g. greenhouse gas emissions and disamenity impacts from littering) are not fully accounted for in packaging producers' and users' decisions. Other issues of the current system include stakeholders' concerns over system transparency; limited direct financial support for local authorities (LAs) managing packaging waste and that recycling that can be done at a lower cost overseas resulting in a lack of a level playing field for domestic reprocessors. Without a change in government intervention these problems will persist. The UK Government together with the devolved administrations are looking to reform the UK packaging producer responsibility system. It is proposed that the full net financial costs of managing packaging waste will be placed on those producers who are best placed to influence the design of packaging. (Social costs like environmental damage will be reduced by the intervention but are not covered by full net cost recovery). This is consistent with the 'polluter pays' principle and the policy approach of extended producer responsibility (EPR)**.** Reform is also required as the existing framework was introduced prior to devolution in Scotland and Wales and since 1999 this is a devolved matter but without a legislative framework that reflects the accountability of the devolved administrations.

What are the policy objectives and the intended effects?

The objective is to reform the current packaging producer responsibility system and to introduce EPR for packaging. This will help to deliver commitments made by the UK Government and the devolved administrations in various policy documents to maximise value from our resources and minimise waste through the circular use of materials (e.g. to work towards all plastic packaging placed on the market being recyclable, reusable or compostable by 2025), and to better incentivise producers to manage resources more efficiently. This includes placing responsibility on businesses for the environmental impact of their products and for the costs of managing products at end of life (i.e. EPR). The new regulations should incentivise recyclability and reusability of packaging by rewarding/penalising producers according to specified criteria. Money raised through the system should fund better and consistent recycling collections and encourage more domestic recycling and reprocessing and will deliver overall system savings. Payments to LAs will take account of equity and regional consideration by looking at rurality and level of deprivation and performance expectations. Consumers should find it easier to recycle packaging due to clear labelling, and measures related to the presentation of evidence relating to the export of packaging waste for recycling will be tightened. The proposals set out in the initial 2019 consultation received strong support.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

We have considered 3 options. A non-regulatory option was not appraised. A key outcome of the policy is that packaging waste is managed in a way that all companies that use or place packaging on the market take on their relevant responsibilities. A voluntary approach would not ensure that this could be achieved. Industry recognises this and supports government's[1] proposals to reform the existing regulations which have been in place for over 20 years. The current regulations need reforming to meet government ambitions for more recyclable and sustainable packaging, to drive higher recycling of packaging, to embrace the principles of EPR, and to reflect devolved accountability for this policy area. The IA represents an assessment of the possible impacts of a reformed packaging producer responsibility scheme. It illustrates how a reformed system would work. The options we have considered are:

Baseline – Do Nothing – do not reform the packaging regulations but implement the changes in municipal recycling collections in England as set out in the Consistent Municipal Recycling Collections IA and introduce an 'all-in' Deposit Return Scheme (DRS) for drinks containers in England, Wales and Northern Ireland). **Option 1** – Reform the packaging producer responsibility system towards full net costs covered by producers and introduce modulated fees on packaging and mandatory recycling labelling of packaging. This is assumed to incentivise the correct behaviours to deliver the policy objectives. **Option 2** – As option 1 but including plastic film packaging collected for recycling in kerbside collections from households and in non-household municipal waste collections (with full implementation in 2025) **Option 3** – As option 2 with single use paper cups collection, with additional reporting requirement. This option is our preferred option.

Will the policy be reviewed? It willwill be reviewed. If applicable, set review date: Month/Year				
Does implementation go beyond minimum EU requirements?		**Yes**		
Are any of these organisations in scope?	**Micro Yes**	**Small Yes**	**Medium Yes**	**Large Yes**
What is the CO_2 equivalent change in greenhouse gas emissions? (Million tonnes CO_2 equivalent)		**Traded: 3.1mt**	**Non-traded: 1.3mt**	

I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.

Signed by the responsible Minister: **Rebecca Pow** **Date:** **23rd March 2023**

[1] Unless otherwise stated "government" refers to the UK Government, the Scottish Government, the Welsh Government and the Department of Agriculture, Environment and Rural Affairs in Northern Ireland

Policy Option 1 full net cost recovery, with modulated fees and new labelling requirements

FULL ECONOMIC ASSESSMENT

Price Base Year 2019	PV Base Year 2020	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -10,087.5	High: 10,494.9m	Best Estimate: 157.2

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	97.6		1,295.2	11,198.8
High	97.6		2,491.6	21,414.3
Best Estimate	97.6		1,905.6	16,416.3

Description and scale of key monetised costs by 'main affected groups' (all costs discounted) and for the 10-year appraisal period

Obligated packaging producer costs: Familiarisation and packaging technologist transition costs (£91m); Administrative costs of running a Producer Responsibility Management Organisation (£134m); Full net costs to packaging producers of the collection, recycling and management of municipal packaging waste, paid to local authorities (LAs) (£9,223m) and wider municipal sector (£2,955m), labelling costs (£29m); litter costs (£841m).

Cost to other businesses: loss of Packaging Recovery Notes (PRN) income to current compliance system beneficiaries (£4,313m); Landfill tax transfer from HM Government to waste holders (£79m).

Other key non-monetised costs by 'main affected groups'

Potential price impacts on consumers. Possible loss of business to compliance schemes.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0		1,322.1	11,326.8
High	0		2,536.8	21,693.7
Best Estimate	0		1,936.8	16,573.6

Description and scale of key monetised benefits by 'main affected groups' (all benefits discounted)

A transfer of costs for the collection, sorting, treatment and disposal of packaging waste from LAs and wider municipal sector organisations to producers (£12,178m); additional material revenue sales by reprocessing and recycling industry (£132m); avoided residual disposal costs from diverting packaging waste from incineration and landfill treatment into recycling, including landfill tax savings (£306m); avoided greenhouse gas emissions from diverting waste from landfill and incineration to recycling (£238m); avoided costs of complying with the current system (PRN costs) by packaging producers (£4,313m).

Other key non-monetised benefits by 'main affected groups'

Domestic reprocessing market might benefit as a result of more material being recycled. Non-greenhouse gas environmental benefits from reduced reliance on virgin materials, of waste going to landfill and incineration, benefit to consumers of clearer recyclability labelling and communications on how to recycle and dispose of packaging waste. There are also several system-wide benefits including increased transparency in the system.

Key assumptions/sensitivities/risks **Discount rate (%)** **3.5%**

Packaging placed on the market ('POM') data might be higher than currently estimated, affecting recycling rates and sectoral costs. We conducted sensitivity analysis on non-household municipal packaging waste arisings. Material prices (including reprocessed and recovered prices) as well as landfill gate fees are assumed to be constant. The analysis is sensitive to the growth of POM, assumed baseline which assumes that both consistency and the deposit return scheme (DRS) policies are in place, POM split between HH (household), NHM (non-household municipal or household-like) and C&I (commercial and industrial) packaging; prices paid for recycled materials sold into primary and secondary markets, and the carbon price assumptions provided by BEIS.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £5,518.6m:
Costs: 1,897.4	Benefits: 793.6	Net: 1,103.7	

Policy Option 2 full net cost recovery, with modulated fees and new labelling requirements, plus plastic film and flexible packaging collections

FULL ECONOMIC ASSESSMENT

Price Base Year 2019	PV Base Year 2020	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	High: Optional	Best Estimate: 218.0

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	Optional		Optional	Optional
High	Optional		Optional	Optional
Best Estimate	97.6		1,961.1	16,858.3

Description and scale of key monetised costs by 'main affected groups'

Same as option 1 except for full net costs to packaging producers of the collection, recycling and management of municipal packaging waste, paid to local authorities (LAs) which is £9,257m and wider municipal sector now at £3,069m which are slightly higher due to the inclusion of the additional costs to packaging producers of the collection and sorting of plastic film and flexible packaging for recycling. In option 1 it is assumed that these packaging materials are not recyclable and hence would be disposed of in residual waste and would be subject to higher modulated fees by virtue of them being deemed non-recyclable.

Other key non-monetised costs by 'main affected groups'

Same as option 1 above.

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional		Optional	Optional
High	Optional		Optional	Optional
Best Estimate			2000.7	17076.3

Description and scale of key monetised benefits by 'main affected groups'

Same as option 1 with the addition of recycling of plastic film and flexible packaging which is in scope under this option. This is because with plastic film being collected separately for recycling there will be an increase in recycling rate for plastic packaging as this material is currently not widely recycled in the UK. This material will be diverted from landfill and incineration, generating GHG emission savings and wider benefits for the environment. Material revenues for reprocessors will increase as more material will be reprocessed.

Other key non-monetised benefits by 'main affected groups'

Same as Option 1

Key assumptions/sensitivities/risks **Discount rate (%)** **3.5%**

Same as Option 1 with the addition of assumptions made to calculate POM data for plastic films as well as collection for recycling and sorting costs. Results for plastic films are indicative at this stage

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m: £5,625.3
Costs: 1,946.4	Benefits: 821.4	Net: 1,125.1	

Policy Option 3: EPR with modulated fees and new labelling requirements, plus plastic film and flexible packaging collections for recycling and mandatory takeback of single use disposable paper cups[1]

FULL ECONOMIC ASSESSMENT

Price Base Year 2019	PV Base Year 2020	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	High: Optional	Best Estimate: 275.4

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	Optional		Optional	Optional
High	Optional		Optional	Optional
Best Estimate	107.0		1,970.5	16,948.4

Description and scale of key monetised costs by 'main affected groups'

Same as option 2 above with the inclusion of the additional costs to sellers of filled disposal paper cups of a mandatory takeback scheme. These costs include:
Costs borne by sellers: cup collection costs (£74.2m), cup bin costs (£9.7m), cup training costs (£6.8m) and cup familiarisation costs (£0.7m).
Transfer of landfill tax costs as a result of less cups going to landfill (£8.5m).

Other key non-monetised costs by 'main affected groups'

Same as Option 2 plus there might be small costs to consumers to find a bin to dispose of the cup or go back to the store where they purchased it**.**

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional		Optional	Optional
High	Optional		Optional	Optional
Best Estimate			2,017.9	17,223.8

Description and scale of key monetised benefits by 'main affected groups'

Same as option 2 with the addition of increased recycling of paper cups. This will divert this material from landfill and incineration, generating GHG emission savings and wider benefits for the environment. Material revenues for reprocessors will increase as more material will be reprocessed. Benefits for reprocessors and recyclers from the cup material revenue (£26.7m).
Benefits for obligated packaging producers in terms of decrease in residual waste costs as cups waste will now be collected for recycling (£21.3m), Reduction in cup litter clean-up costs that is currently borne by LAs (£98.8m), Landfill tax reduction which is a transfer and not a benefit (£8.5m), Societal benefits in terms of carbon emissions reduction (£8.4m)

Other key non-monetised benefits by 'main affected groups'

Same as option 2 plus recycling rate for paper might increase as a result of this policy.

Key assumptions/sensitivities/risks **Discount rate (%)** **3.5%**

Same as previous option with the addition that paper cups collection data is very weak in this area. Without evidence on a reasonable level to set a fibre-based composite packaging recycling target, we are not able to provide realistic estimates on the costs/benefits associated with this measure. We have therefore only monetised the impact of mandatory takeback. We have commissioned further research in this area in order to improve the evidence base for the final IA.

BUSINESS ASSESSMENT (Option 3)

Direct impact on business (Equivalent Annual) £m:			Score for Business Impact Target (qualifying provisions only) £m: 5,654.8
Costs:	Benefits:	Net:	
1,956.0	825.0	1,131.0	

[1] Our definition of paper cups includes disposable paper cups for hot drinks (tea and coffee) and cold drinks (milkshakes).

Glossary

Municipal sector: includes household (HH) collection and non-household municipal (NHM) sector. Both are in scope of EPR policy

Household collection: synonym of kerbside collection

Household-like: synonym of non-household municipal waste which is in scope of full net recovery EPR policy

C&I: Commercial and Industrial waste and transit / distribution packaging which is not included in scope of full net cost recovery fees.

EVIDENCE SUMMARY

Extended producer responsibility is a policy approach through which a producer's responsibility for a product is extended to the post-use stage; this includes financial responsibility. This incentivises producers to design their products to make it easier for them to be reused, dismantled and/or recycled at end of life. The UK Government committed to introduce EPR for packaging in the Resources & Waste Strategy 2018; the devolved administrations have made similar commitments to place greater responsibility on businesses for the environmental impact of their products and for the costs of managing their products at end of life.

The aim of this Impact Assessment (IA) is twofold. First it sets out to demonstrate the impacts of achieving higher packaging waste recycling rates under a reformed system that meets Extended Producer Responsibility (EPR) principles. Second, it estimates the scale of the cost transfer from LAs and non-household municipal sector (henceforth NHM) to packaging producers of managing household and household-like packaging waste and of meeting higher packaging waste recycling rates. The assessment is undertaken on a UK-wide basis.

Under the EPR system obligated packaging producers[1] will take responsibility for the financial costs of managing packaging waste generated by households and similar packaging waste generated in the municipal sector. The new system introduces modulated fees for packaging materials. These fees will be set to recover the costs of managing packaging once it enters the waste stream and modulated to encourage the outcomes government wishes to see achieved. Under a modulated fee system, the fees paid will vary according to specific criteria relating to aspects of the packaging's treatment cost including environmental impact. In this case, modulated fees should incentivise recyclability of packaging by rewarding good design and penalising poor design. The costs of managing industrial and transit /distribution packaging waste is not included as businesses that use or sell packaged goods already incur these costs incurred directly.

Producer funding will be used to make payments to LAs for the collection and management of household packaging waste and to support the collection for recycling of household-like packaging waste arising in the municipal sector. The approach to local authority payments will seek to fairly distribute funding to LAs whilst increasing the

[1] Obligated packaging producers under the current Packaging Waste Regulations (2007) include companies that produce or use packaging, or sell packaged goods, and have an annual turnover of more than £2m and handle more than 50 tonnes of packaging a year. The threshold which defines whether a producer is obligated could change under an Extended Producer Responsibility policy and the definition of obligated producers may also change.

proportion of packaging waste which is recycled and the quality of this material and encouraging good practice and efficiency. The IA covers:

- Recycling rates achieved for each packaging material; that is paper, glass, aluminium, steel, plastic and wood packaging placed on the UK market.
- Scheme Administration costs. These costs may need to be refined and further developed for the final version of the IA depending on feedback from the consultation and decisions on the final arrangement for scheme administration and governance.
- Costs to producers of recycling and managing packaging waste net of the income received from the sale of recyclable materials. This covers the costs of the separate collection and sorting of packaging materials for recycling minus the revenue received from the sale of these materials. In addition, we have also costed for household packaging waste sent to residual waste treatment and disposal facilities (e.g. energy from waste plants, landfill sites). We have developed an initial methodology to estimate these costs by sector:
    - Household (HH) packaging waste generated by households and managed by local authorities (LAs); and
    - Household-like packaging waste (non-household municipal (NHM) waste) generated by businesses and public organisations and collected and managed either by private waste management companies or by LAs.

  Transit/distribution and industrial packaging is not included as the costs of managing this packaging waste mostly is incurred directly by companies who either use or place packaging on the market.
- Material revenues to the reprocessing and recycling sector. These benefits are in addition to those received by LAs and the NHM sector from the sale of recyclable waste materials. We assume the secondary market buys untreated recyclable materials and profits by selling the reprocessed and treated materials at higher (reprocessed) prices. Our modelling captures just this profit to avoid double counting.
- Landfill tax impacts. This is a transfer payment and will account for the fact that diverting packaging materials to reprocessing and recycling would reduce the amount of packaging waste sent to landfill and, consequently, the size of landfill tax collected by HM Government.
- Greenhouse gases (GHGs) emission savings. Increased recycling of packaging materials produces secondary materials for use in manufacture (e.g. new packaging). This reduces the GHGs emissions associated with the raw material extraction, packaging manufacturing and waste management. Recycling packaging materials is generally less carbon-intensive than other packaging waste treatment options. These GHGs emissions savings would contribute to HM Government's carbon emission reduction targets.
- Mandatory labelling on all packaging to indicate if the packaging is recyclable or not. This will facilitate consumers participating in recycling packaging.
- Provision and servicing of recycling containers at stores/public spaces to enable the separate collection of single use disposable paper cups for recycling – financed by those companies (producers) who fill cups with product to sell to consumers (referred to as mandatory take-back).
- Cost of managing in scope packaging materials that have been disposed of in litter bins or littered on the ground.

This consultation stage IA has addressed numerous evidence gaps identified in the 2019 consultation IA. This has been achieved by further internal analysis and externally commissioned research. Given the complexity of the reforms, this IA still has some evidence gaps that are outlined throughout the cost benefit analysis. Our intention

is to address these gaps through the consultation as well as further research to inform the final impact assessment.

One area where further research will need to be undertaken prior to the final impact assessment is in relation to *business payments* associated with the collection and disposal of household-like waste. At the time of producing this impact assessment, we had estimated that business payments would be in the region of £249m-£413m per year over the 10-year appraisal period. This figure was derived from a '*cost per tonne*' approach, as outlined in Annex D.

However, following extensive engagement with WRAP, we have become aware of the possible limitations of our existing methodological approach and subsequently have taken steps to improve our analysis by reforming our approach. This has meant that greater efforts have been taken to disaggregate any fixed and variable costs associated with household-like waste collection (see Annex D for a more definitive explanation).

Using what we believe to be a more robust methodological approach, we now estimate that annualised business payments will likely be somewhere between our original estimate and £1.5bn. Despite this estimated increase in business payments, this does **not** impact on the NPV of any policy option as these costs are a *transfer* from LA's/waste holders to obligated packaging producers. Nonetheless, we will engage extensively with stakeholders on this during the consultation process and we will undertake further analysis ahead of the completion of the final impact assessment as to improve the robustness of these results.[2]

Furthermore, the true impact of a reformed packaging producer responsibility scheme also depends on a) the nature of kerbside and business recycling collection services which will impact on packaging recycling rates and b) the implementation of deposit return schemes (DRS) for drinks containers and their scope. The options for these policy measures are considered in the relevant LA's that correspond to those policy consultations. Materials in scope for the Scottish DRS and the DRS for England, Wales and Northern Ireland have been assumed to be the same. In this impact assessment we have assumed that both policies will be implemented, and for a) we have considered the preferred option in the respective LA's and for b) we have assumed an all-in DRS in England, Wales and Northern Ireland. Any changes to those policies following consultation will be reflected in the baseline for the EPR analysis at final IA stage.

The table below summarises the costs and benefits of packaging producer responsibility reform under the options analysed. More details of these costs can be found in the cost-benefit analysis (CBA) section.

Summary of monetised costs (+) and savings (-) under each policy option over the appraisal period (£m) discounted (2019 prices, 2020 base year)

Change over 2021-2032 (discounted, against baseline)	**Option 1**	**Option 2**	**Option 3**
Transition costs			

[2] Whilst this analysis is being undertaken, we will default to using our '*cost per tonne'* approach in the subsequent text.

EPR and labelling packaging technologist and familiarisation costs to producers	£82.5	£82.5	£82.5
IT Investment costs	£13.6	£13.6	£13.6
Disposable paper cup familiarisation and bin costs to businesses			£9.4
Costs			
Additional cost of setting up and administering the scheme (i.e. administrative and management costs)	£98.0	£98.0	£98.0
Landfill Tax loss to HMT (transfer)	£70.9	£90.5	£98.1
Compliance costs to producers (HH recycling and residual, NHM recycling, litter and HWRC waste collection and treatment)	HH: £8,318.5 NHM: £2,665.2 HWRC: £331.2 Litter: £758.7	HH: £8,349.8 NHM: £2,768.6 HWRC: £331.2 Litter: £758.7	HH: £8,349.8 NHM: £2,768.6 HWRC: £331.2 Litter: £758.7
Loss of funding benefiting current PRN beneficiaries	£3,889.8	£3,889.8	£3,889.8
EPR and labelling training costs to producers	£26.4	£26.4	£26.4
EPR communications campaign costs	£4.4	£4.4	£4.4
Cost to producers of disposable paper cup bins and collection			£74.6
Disposable cup training costs to businesses			£6.2
Benefits			
Greenhouse gas emissions savings	-£214.8	-£364.1	-£371.7
Additional material revenue for recycling sector	-£119.0	-£202.5	-£226.5
Savings to LAs (HH, HWRC and litter packaging collection and treatment) and businesses (NHM recycling collection and disposal) due to waste management costs transferred to packaging producers	Savings to LAs HH: -£8,318.5 HWRC: -£331.2 Litter: -£758.7 Savings to businesses NHM: -£2,665.2	Savings to LAs HH: -£8,349.8 HWRC: -£331.2 Litter: -£758.7 Savings to businesses NHM: -£2,768.6	Savings to LAs HH: -£8,349.8 HWRC: -£331.2 Litter: -£758.7 Savings to businesses NHM: -£2,768.6
Reduced (or increased) net recycling and residual costs under each option as a result of efficiency savings (or costs) accruing to producers.	HH: -£45.8 NHM: -£73.4	HH: £67.7 (net cost) NHM: -£34.3	HH: £67.7 (net cost) NHM: -£34.3

Savings to packaging producers from removing current PRN compliance costs	-£3,889.8	-£3,889.8	-£3,889.8
Disposable paper cup litter and residual savings (incl landfill tax savings)			-£116.0
Net present societal value	£157.2	£218.0	£275.4
Total cost to business (present value)	£16,331.8	£16,754.2	£16,836.7

Non-monetised impacts are the following (explained in the cost benefit analysis section):

Non-monetised costs	**Non-monetised benefits**
Increased monitoring and enforcement	A more vibrant domestic reprocessing market
Obligated producer changes	Reduced littering
Business transition	Reduced use of virgin materials
Consumer prices	Reduced contamination of recyclate
	Incentives for long-term innovation and strategic planning
	Increased transparency
	Reduced packaging
	Circular economy

The table below shows the overall recycling rate for all packaging, excluding packaging captured through DRS return points, across all sectors. EPR along with mandatory labelling will increase recycling collection as household and businesses will place recycling material in recycling bins rather than residual waste. This will in turn increase recycling rates (explained in more detailed in the main analysis); we have removed DRS materials so all benefits attributed to DRS policy are in the DRS IA.

Overall recycling rates by packaging material across all sectors in 2032 for options considered (with packaging captured at DRS return points removed[3][4])

	Baseline	**Option 1**	**Option 2/3[5]**
Plastic	43%	50%	61%
Wood	38%	39%	39%
Aluminium	38%	40%	40%
Steel	85%	93%	93%
Paper/Card	82%	86%	86%
Glass	73%	81%	81%

[3] This means that we have assumed that an 'all in' Deposit Return Scheme (DRS) will be in place and therefore DRS materials will be diverted from municipal waste to comply with the DRS scheme

[4] DRS materials not captured through DRS returns points are included within these recycling rates. This differs from the EPR target recycling rates shown in the consultation document which do not include any materials in scope of DRS.

[5] The recycling rates are the same for Options 2 and 3 due to the lack of data available on the impacts of disposable cups mandatory takeback scheme. This will look to be addressed in the final IA.

Total	68%	72%	75%

SECTION 1: PROBLEM UNDER CONSIDERATION

Domestic regulations governing producer responsibility for packaging waste are (i) the Packaging (Essential Requirements) Regulations 2015; and (ii) the Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (as amended). This IA assesses options relating to reforming the latter set of Regulations, which are hereafter referred to as 'the Packaging Waste Regulations'. The scheme has been in place since 1997 and operates UK-wide under GB and parallel Northern Ireland regulations. The regulators are the Environment Agency (EA) in England, Natural Resources Wales (NRW), Northern Ireland Environment Agency (NIEA) and Scottish Environment Protection Agency (SEPA). Under Annex 2 of the Northern Ireland Protocol, Northern Ireland will need to meet the requirements of the EC Directive on Packaging and Packaging Waste (94/62/EC).

A detailed description of the current regulations can be found in Annex A.

To date, the Packaging Waste Regulations have been successful in ensuring that producers have met the targets set by government and the UK has met EU targets at a low cost to business. However, the current system has many shortcomings and is unable to meet the policy objectives set out in the consultation document without reform. The following is a list of the main shortcomings of the current system that the proposed reforms seek to resolve:

- It is not designed to recover from producers the full cost of collecting and managing packaging waste, rather it is designed to incentivise an increase in the recycling of packaging waste, therefore the values attached to the purchase of evidence (PRNs) essentially represent the additional cost of recycling different packaging materials. The income raised through the sale of PRNs has supported some growth in reprocessing capacity and related activities but only a small proportion of the revenue raised has supported collections.[6] Furthermore, as the current system is market driven the price of PRNs and hence the total revenue raised through the sale of PRNs can fluctuate considerably from year to year as explained above. In this IA we assume that producers pay the full net costs of managing packaging waste generated by households and the wider municipal sector.
- There are concerns around the transparency of the PRN system and the visibility producers have of how their PRN fees have been used. Under an EPR system producers will contribute more funds into the system, so all actors require visibility of how this money is raised, distributed and the outcomes it achieves. More robust data and greater transparency of reporting are also needed of a future system and to help achieve higher recycling targets.
- Concern around an uneven playing field with regards to the issue of evidence for packaging waste that is recycled in the UK (PRNs) and that which is exported due to risks around the issue of Packaging Waste Export Recovery Notes (PERNs) on recyclable material that is not packaging, packaging that is of poor quality that cannot be recycled, or on contamination such as food residues; and that recycling that can be

[6]The National Packaging Waste Database reports at a high level the allocation of PRN/PERN revenue. In 2017 around 30% of the total PRN revenue funded collections, however this represented somewhere between 3-7% of the total cost of managing household packaging: https://npwd.environment- agency.gov.uk/FileDownload.ashx?FileId=50cf92ea-ae92-4fd8-a521-a8e3793a038c

done at a lower cost overseas has been encouraged leading to an over-reliance on export markets and insufficient growth in UK reprocessing capacity.

- There has been limited direct support for consumer communications to encourage recycling of packaging waste with many people continuing to be confused over what packaging they can and can't recycle
- It is designed to support an increase in the recycling of packaging waste, and not the design and use of more sustainable and recyclable packaging.
- Packaging placed on the market data is reported by material (e.g. tonnes of plastic, card, glass, etc) this means that data for specific types of packaging is not reported; the new system will require more granular reporting by material, packaging format (bottle, tub, jar, etc) and in the case of plastics by polymer. These costs have not been quantified at this stage, but we are seeking to gather more information for the final IA through stakeholder engagement. This has limited the opportunity to target specific packaging items. For example, single use paper cups are reported as card packaging meaning that producers can meet their obligation by purchasing card PRNs, rather than by taking specific action to increase the recycling of paper cups.

Overall, the current producer responsibility system for packaging is not comprehensive enough, lacks transparency, and is not able to deliver the principles of EPR and the outcomes government wants to see achieved from a reformed packaging producer responsibility regime.

Recycling of single use paper cups

Single use cups, including paper cups, in which drinks are sold are defined as packaging and producers placing single use cups on the market are obligated to comply with the current packaging regulations. However, as noted above, the current scheme does not incentivise the recycling of paper cups as producers can meet their obligations by purchasing paper/card PRNs. As part of the proposed reforms to the current packaging scheme, government wants to see producers take greater responsibility for these difficult to recycle packaging products and provide consumers with the opportunity to do the right thing by recycling their disposable cups. In 2018 the UK cup recycling rate was estimated to be 1 in 400 (0.25%)[7]. Several national coffee shop brands and 'quick service restaurant' retailers[8] have started to work collaboratively to increase the number of single-use paper cups being recovered and recycled including through voluntary takeback schemes. For example, set up in 2018, the National Cup Recycling Scheme is incentivising waste management companies to recover single-use cups for recycling by providing the additional revenue required to make cup-collections financially viable. This is a voluntary initiative and the scheme is currently achieving a recycling rate of 6%.

SECTION 2: RATIONALE FOR INTERVENTION

Polluter pays principle and negative externalities

At present, taxpayers and businesses pay the majority of the costs of collecting and managing packaging waste through services provided by LAs and waste management companies but have limited control over the packaging that accompanies the products they purchase. Whilst we cannot attribute precisely what proportion of costs are

[7] https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/65705.htm

[8] The National Cup Recycling Scheme is funded by Costa, McDonald's, Pret A Manger, Café Nero, Greggs, Burger King and Pure and operated by Valpak Ltd.

borne by businesses at present, the current system does not meet the 'polluter pays' principle as packaging producers do not bear the full financial responsibility for the of end-of-life management of packaging, nor are they accountable for the environmental externalities created by their packaging. As a result, there is minimal incentive for producers to consider the impact of disposing of the packaging they choose to use for their products at end of life. An EPR system would correct this as it would internalise some of the costs of dealing with packaging waste as well as provide incentives for packaging producers to reduce the environmental impacts of their packaging (e.g. by switching to easier to recycle material).

Under the EPR system, producers will become financially responsible for the full net costs of the collection and treatment of their packaging at end of life net of any income from the sale of these materials to reprocessing and recycling sectors.

The net costs associated with managing recyclable packaging are lower than those associated with managing packaging in residual waste. For example, recyclable materials can be sold to reprocessors and the income received used to offset the costs of collection whilst the costs of managing packaging disposed of in residual waste to landfill includes the cost of the landfill tax. Producers will have a financial incentive to use less packaging, particularly hard to recycle packaging, to minimise their financial burden. Where packaging is necessary there will be a financial incentive to make it easily recyclable. This is because in line with the waste hierarchy recycling is less harmful than recovery[9] or disposal. This will reduce the negative externalities associated with packaging waste which are associated with the production, use and disposal of packaging including natural resource depletion, wider ecosystem impacts associated with the production of raw materials and damage to eco-systems including leakage to the environment, greenhouse gas (GHG) emissions (from both production and sending packaging to landfill and incineration), disamenity impacts from littering or impacts on land use from landfill sites.

The proposed changes will seek to address these externalities by requiring businesses to take increased responsibility for the environmental impact associated with their packaging when it becomes waste ensuring that modulated fees will incentivise producers to switch to more environmentally friendly materials.

Poor quality of material for recycling

Contamination of materials collected for recycling during the collection process reduces the value of the materials and results in a loss of material for recycling. Through EPR, and other policies such as those proposed in England to improve the provision of recycling services to households and business and ensure collection of a common set of material for recycling, measures will be put in place to increase the quality of materials collected for recycling. In terms of EPR, this includes incentivising producers through the fees they pay to design and use packaging to enable improved waste management such as reducing hard to recycle or disruptive materials, producer funded consumer communications (including national campaigns and direct to household and business communications), the requirement for packaging to be labelled as recyclable or not recyclable to make it easier for people to know what they can and can't recycle, and incentive related payments to those collecting and managing packaging waste to increase the quality, and hence value, of recycled materials. This will be done through modulated fees as harder to

[9] This includes anaerobic digestion, incineration with energy recovery etc.

recycle materials (e.g. plastic film) will have higher fees so producers will be incentivised to switch to easier to recycle materials.

Insufficient consumer information and confusion over what packaging items are recyclable

The current system has not encouraged producers or compliance schemes to educate and inform consumers, although a few have chosen to do so. This is in part a feature of its competitive nature meaning the costs of doing so would likely be borne by a few organisations, but the benefits could be felt by all. However, to reach high levels of collection and recycling, consumer education and information must be prioritised and scaled up. The proposed changes will require obligated producers to fund national and local consumer awareness and communications campaigns.

However, there are also weaknesses associated with packaging labels, particularly current labels. As per unpublished research carried out by On-Pack Recycling Label Ltd (OPRL), these include low levels of consumer awareness on the meaning of labels, inconsistent (and sometimes inaccurate) use of labels across products and market competition between various schemes. These factors are reducing the effectiveness of packaging recyclability labelling currently used across the UK.

Lack of collection and sorting infrastructure and/or poorly developed markets

Some types of packaging are technically recyclable but are not recycled due to limited provision of collection points or collection services or a lack of sorting capacity to separate this packaging from other packaging types. This may either be because it is not cost effective to put those systems in place currently or because the full societal cost of the packaging is not reflected in current decisions and hence the financial net gain is not usually 'high' enough to incentivise recycling.

Examples include food and drinks cartons which despite collection provision increasing in many parts of the UK are not always collected in a way that enables them to be separated for recycling or are not separated effectively from other types of card packaging to enable them to be recycled. Whilst some types of film plastics are technically recyclable, the collection and sorting infrastructure is poorly developed and there is a lack of end markets for the recovered materials. Other types of flexible plastic packaging are not suited to mechanical recycling such as composite packaging made of different polymers.

EPR will incentivise obligated producers to choose to use packaging materials that have effective recycling infrastructure already in place, by attracting lower fees, or seek to ensure infrastructure is funded to increase the recycling rates of certain packaging if it is more cost effective to do so. In the case of paper cups, for example, a mandatory requirement to takeback cups would ensure that producers facilitate and fund the desired increase in the collection of single-use paper cups.

System-wide inefficiencies

There is a lack of shared objectives across the supply chain for long term transition towards more packaging waste being recycled; a failure to include and coordinate different actors in the supply chain; a lack of support to drive market demand for recycled materials; and insufficient mechanisms to deal with uncertainty and learning through innovation. There is a need to improve the collection, treatment and reprocessing infrastructure of the whole system. This is unlikely to happen without government intervention because the costs associated with innovation and improving the flow of knowledge and technology between actors would need to be faced by individual businesses - whilst the whole sector would enjoy the resulting benefit. Whilst we should assume that there will be

some innovation amongst producers at present, as ultimately different actors in the supply chain still need to operate competitively, the current system does not drive the *optimum* level of innovation due to the potential for 'free-riding'.

Information failure & need for government intervention in fibre-based composite packaging

Placed on the market packaging data for paper cups and other types of fibre-based composite packaging is not reported currently as a separate packaging material stream nor do we have accurate data on recycling and capture rates for cups. Intervention would be required to obtain better data so that government and industry is better able to understand the challenge and scope for improved management of this packaging stream.

The high costs associated with reprocessing single use paper cups means that the net financial gain from recycling them is low and reprocessors do not have an incentive to actively seek and reprocess paper cups[10]. Policy interventions that encourage cups to be collected/reprocessed (i.e. mandatory reporting, mandatory takeback/ recycling targets) could provide reprocessors with the financial incentive to collect/reprocess cups and other types of composite packaging.

The Deposit Return Scheme (DRS) was considered as a potential approach to increase the recycling rate of disposable cups. However, views outlined in both the previous EPR and DRS consultations suggested that disposable cups would present contamination challenges and would likely require separate reverse vending machines to collect the cups. It was therefore deemed more practical to use EPR as a tool to drive cup recycling.

SECTION 3: POLICY OBJECTIVE

The UK Government and the devolved administrations have agreed to consult on a UK-wide scheme given the integrated supply chains associated with the production and use of packaging materials within the UK market; with Defra taking the lead in the resourcing and programming of the work supported by officials from the Welsh Government, the Scottish Government and the Department of Agriculture, Environment and Rural Affairs, Northern Ireland.

There are several objectives of the proposed policy reforms. These are reflected in commitments made by the UK Government and the devolved administrations.

The **UK Government's** commitments include:

- BEIS Industrial Strategy and Clean Growth Strategy for England (2018)
  - Commitment to explore how we can better incentivise producers to manage resources more efficiently through producer responsibility systems.
- 25 Year Environment Plan for England (2018)
  - Commitment to reform the Producer Responsibility system (including the Packaging Waste Regulations) to incentivise producers to take greater responsibility for the environmental impacts of their products

[10] https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/657.pdf

- Resource and Waste Strategy for England (2018)
  - Maximising resource productivity - through more efficient manufacturing processes
  - Maximising the value from resources throughout their lifetimes - by designing products more smartly to increase longevity and enable recyclability
  - Managing materials at end of life – by targeting environmental impacts
- A manifesto commitment to introduce an export ban on plastic waste to non-OECD countries which will require investment in additional sorting and recycling facilities in the UK.

During 2020 the **Welsh Government** undertook a consultation and engagement programme as a precursor to its next Waste Strategy – *Beyond Recycling – A strategy to make the circular economy in Wales a reality*. The strategy sets the ambition for Wales to become a zero-waste nation by 2050, meaning any discarded materials are recycled and re-circulated within the Welsh economy, with no loss of materials from the system – effectively a 100% recycling rate from all sectors. To support this Beyond Recycling sets high level objectives to tackle littering and to increase the range of plastic materials collected for recycling and develop more recycling infrastructure and end markets in Wales. In *Beyond Recycling* Welsh Government commits to work with the UK Government and the other devolved administrations in developing legislation for an Extended Producer Responsibility (EPR) scheme for packaging and then over time to develop an EPR approach for additional products such as tyres, textiles, bulky wastes (for example furniture, mattresses and carpets) and products used in construction.

The 2019 Waste Management Plan for **Northern Ireland** sets out Northern Ireland's intentions to work towards a sustainable and circular economy. This means using the "waste hierarchy" (waste prevention, preparing for re-use, recycling, recovery and finally disposal as a last option) as a guide to sustainable waste management. It is Northern Ireland's intention to revise the current Northern Ireland Waste Management Strategy - "*Delivering Resource Efficiency"* to include the fundamentals of the European circular economy package. The expectation is that the revised strategy would include Northern Ireland's intentions on: meeting the revised European municipal waste targets for recycling and landfill, introducing extended producer responsibility arrangements and a potential Deposit Return Scheme for drinks containers, meeting higher packaging waste recycling targets and adopting measures in relation to reducing all forms of littering.

In **Scotland** circular economy policy is set out in *Making Things Last: a circular economy strategy for Scotland*. This policy is underpinned by key principles, which include 'applying the waste hierarchy' and preventing waste and promoting reuse, and 'Polluter pays' meaning those who produce pollution should bear the costs of managing it to prevent damage to the environment or human health. Implementation is supported by a series of targets relating to increasing recycling, reducing food waste, reducing overall waste and reducing the use of landfill. The Scottish Government has recently consulted on additional legislative measures to support a circular economy and is working with the UK Government and the other devolved administrations on measures, including legislation, which will give new impetus to circular economy businesses and a modern, effective and efficient resource management system. This includes working jointly with the UK Government, the Welsh Government and the Department of Agriculture, Environment and Rural Affairs in Northern Ireland on reforming the packaging regulations and introducing extended producer responsibility. Separately Scottish Government has regulations in place to introduce a Deposit Return Scheme for single-use drinks containers in 2022.

The summary of responses to the 2019 Consultation on reforming the UK packaging producer responsibility system (February 2019) can be found here. Regular stakeholder engagement has enabled us to keep policy objectives well informed. Following the 2019 consultation, stakeholder engagement has continued and informed the further development of our policy proposals. This has included through an industry sounding board established with the support of INCPEN (Industry Council for Packaging and the Environment), the government's Advisory Committee on Packaging (ACP), and Defra's Packaging and Collections Working Group and the Resources & Waste stakeholder advisory group. Specific engagement has also taken place with local authority groups in England and with key stakeholders within the devolved administrations. These have given stakeholders the opportunity to discuss the proposed reforms and put their opinions forward.

Increase packaging recycled

Government will consult on new packaging waste recycling targets. The proposals assessed in this document will inform the setting of targets and help obligated producers achieve these targets. A principle of EPR is that money raised from producers should be retained in the system to fund the management of municipal packaging waste. The funding should be used to support improvements to the collection and sorting infrastructure in addition to wider costs such as disposal of packaging waste arising from households and litter management. This will contribute towards more packaging waste being collected and in a more consistent way and improve the sorting and reprocessing processes resulting in higher recycling rates.

Increase the recyclability of packaging

Figures from 2017 show that 70.0% of UK packaging waste was either recycled or recovered, compared to 71.4% in 2016[11]. As set out in the policy objectives and the 2019 consultation, government wants to create the right incentives for producers to design their products to be resource efficient and as a consequence to reduce negative environmental impacts. The 2019 consultation set out proposals to apply modulated fees to packaging placed on the market. The second consultation will provide further detail on how modulated fees could work in practice. Modulated fees will encourage producers to make changes to the way in which they design and use packaging. For example, fee rates will be lower for materials which are easily recyclable and higher for materials which cannot be recycled.

Reduce unnecessary packaging (not quantified in this IA)

The modulated fees paid by producers will reflect the cost of managing different types of packaging, the ease or otherwise of recycling this packaging and the recycling targets to be achieved. To determine the total costs paid by individual producers these fee rates will be applied to the amount and type of packaging they place on the market. This in turn is expected to provide an incentive to producers to review the packaging they use, including opportunities to reduce the packaging they use, thereby reducing their overall costs of compliance.

Improve the environment

Increased recycling and use of recyclate as a secondary raw material will lead to less packaging waste that is either landfilled or incinerated. These outcomes will improve the environment for the public and for wildlife, as well as

[11] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918270/UK_Statistics_on_Waste_statistical_notice_March_2020_accessible_FINAL_updated_size_12.pdf

generating carbon savings. As producers will also contribute to the costs of managing littered packaging and public communications to reduce littering this measure will contribute to these outcomes.

Increase domestic recycling and reprocessing capacity

A key aim of the current producer responsibility regulations is to increase the recycling of packaging waste and in doing so to stimulate the growth in the UK recycling industry through the PRN system. This has not been achieved to the level that government and stakeholders would like to see. The reforms will address this through requiring producers to cover the full net costs of collecting, sorting/treating packaging waste. This will increase the supply of materials for recycling, and the quality of material for recycling by reducing contamination and reducing the use of hard to recycle packaging and packaging that is not recyclable. In turn, this will allow investors to be more confident in investing in the UK's recycling industry. The consultation also sets out options to ensure that UK reprocessors and exporters of packaging waste are operating on a level playing field.

Enhanced data reporting

The packaging EPR scheme will rely heavily on data and evidence provided by participants across the packaging value chain. Appropriate evidence on the mass flows of packaging through the waste management system needs to be provided to support the calculation and setting of targets, fees and payments. All material facilities (transfer stations, bulking stations and sorting facilities) that receive waste containing packaging will need to report on the tonnages and composition of packaging waste received, processed, lost and/or sent to other facilities. New sampling and compositional analysis methodologies that reflect EPR packaging requirements will be developed to ensure that data evidence is being collected and reported at a sufficient level of granularity. A project is currently underway to identify and develop a sampling and compositional analysis methodology for material facilities that will support the collection and reporting of packaging data. A decision will need to be taken on the best way to introduce these requirements and methodology including within regulation in advance of EPR being implemented. A post implementation review of the material facility sampling and reporting regulations set within Schedule 9 of the Environmental Permitting Regulations (England and Wales) is currently underway and could provide an opportunity to incorporate EPR requirements within those regulations, strengthening and widening existing arrangements. A similar process could apply to the Code of Practice on Sampling and Reporting at Materials Recovery Facilities (Scotland) and an assessment on whether material facility regulations could be developed for Northern Ireland may occur.

Reporting requirements, beyond those already required in The Producer Responsibility Obligation (Packaging Waste) Regulations 2007, may also be required of reprocessors and exporters to distinguish different levels of recyclate entering and leaving their facilities. Many reprocessors already capture and use this information as part of their core business processes but this may need to be standardised. Further evidence will be commissioned to determine what changes are necessary and any additional costs in reporting and compliance monitoring.

SECTION 4: DESCRIPTION OF OPTIONS CONSIDERED

Baseline

The baseline makes an ex-ante assumption about the approach to consistency of recycling collections in England as well as the Deposit Return Scheme on beverage containers policy for England, Northern Ireland and Wales. It assumes these policies will be implemented in 2023 and this baseline takes the highest net present value option in

the corresponding impact assessments. For this reason, our baseline for this impact assessment excludes DRS obligated drinks containers from municipal recycling collections.

We expect some pre-2023 packaging switching from harder to recycle packaging materials to more widely recycled packaging materials, in part attributable to government's announcement of its intention to reform packaging producer responsibility policy and to voluntary initiatives such as the UK Plastics Pact. These switches have been accounted for in the modelling. For more info please check Annex C.

Mandatory labelling of packaging will be a key aspect for the delivery and effectiveness of EPR policy as consumers need clear labelling to know how to dispose of their packaging waste. Whilst modulated fees offer a financial incentive for obligated producers to shift towards more recyclable packaging, greater use of recycled content in the production of packaging and other products will only be possible if there is an adequate *supply* of high quality recyclate in the first place. For this to be the case, EPR must facilitate effective sorting and disposal of packaging waste, by consumers and businesses alike, as to increase the rate of recycling *and* protect the quality of whatever is. Mandatory labelling will help with this by ensuring a clear and concise message is provided to the disposer of the packaging.

At present, producers can choose to adopt one of a variety of recycling labels[12] or not to label their packaging. Labels used include:

- On-Pack Recycling Label (OPRL);
- Green dot (seen on many imported products);
- The mobius loop; and
- Symbols specific to plastic, glass, steel and aluminium.

OPRL labels already have traction with consumers and are the most widely used on packaging in the UK[13] – all the national supermarkets are members of OPRL Ltd who report that 7 in 10 consumers recognise and act on their labels[14][15]. In the baseline, which has no mandatory labelling, it is assumed that OPRL will continue to offer labelling solutions to packaging producers who voluntarily choose to adopt labelling. We have assumed a steady increase in the uptake of OPRL labels in the baseline scenario – see Annex G for further details.

EPR option 1 (minimal product): full net cost recovery, modulated fees and mandatory labelling

Option 1 is to reform the packaging producer responsibility system. The principal change in this option will see the requirement placed on producers to pay the full net costs of managing the packaging they place on the market

[12] Recycle Now website identifies 12 different labelling schemes/symbols used on products and packaging. https://www.recyclenow.com/recycling-knowledge/packaging-symbols-explained

[13] OPRL is a business-led UK labelling scheme that has been operating for over 10 years. Over 550 brands across all sectors use the label on their packaging products. The OPRL is based on what technically can be recycled as well as what is collected for recycling through local recycling services. The threshold for the widely recycled label is 75% of UK local authorities offering a collection service.

[14] OPRL https://www.oprl.org.uk/about-oprl

[15] This is supported by surveys carried out by WRAP which report that OPRL labels are generally better understood than other recycling symbols currently on packaging.

(household and household-like) when it becomes waste and the implementation of modulated fees. Modulated fees are the mechanism by which costs are recovered from producers and fee rates are set to reflect the costs of managing different packaging materials/formats. This option will meet policy objectives as it will drive the increased use of recyclable packaging and increased recycling of packaging waste as well as reducing packaging waste in residual waste.

The IA quantifies these changes for all materials in scope by using a model developed by Eunomia on behalf of Defra[16]. This is a significant improvement compared to the 2019 IA where only two forms of plastic packaging (PVC and polystyrene) were analysed.

Within the scope of full net costs, packaging producers will be expected to pay for litter management costs attributed to household and household-like packaging and therefore this would meet the policy objective to place the burden on packaging producers to pay for the end-of-life costs of the materials they place on market.

There is no statutory definition of litter, but it is commonly assumed to include materials that are improperly discarded[17] rather than found in bins. This and the cost of waste placed in litter bins is included in the Net Present Value (NPV) but the policy is subject to further consultation and we will also consult on the framework for litter payments. We will provide more details on this in the final stage IA.

For this IA we have carried out a quantitative appraisal of the costs of setting up and administering the scheme (i.e. administrative and management costs) under two approaches to governance. These costs are indicative at this stage, and we will seek to improve them for the final IA.

Requirements for mandatory labelling will be implemented in a manner that supports the wider approach to packaging EPR, whilst minimising additional compliance costs for businesses. Our intention is to mandate UK-wide labelling of packaging to provide clear information on the recyclability of any item of packaging and to help consumers dispose of packaging waste appropriately. It is proposed that producers would label their packaging as 'Recyclable' or 'Not Recyclable' (exact wording and messages to be determined), informed by an assessment of the recyclability of their packaging formats. The labelling may also support messages that direct consumers to dispose of packaging via specific routes such as front of store recycling.

The labelling measures will be complemented by producer funding for communications and education initiatives to advise consumers on how to recycle and the consequences of making the wrong disposal choices. These costs will be included as part of full net cost payments.

EPR option 2: full net cost recovery, modulated fees, mandatory labelling and plastic film collection for recycling

This option is equivalent to Option 1 but includes for the costs of collecting and sorting of plastic film packaging for recycling. Producers are keen to see plastic film collected for recycling and for it to be part of the core set of packaging materials to be collected from households and businesses for recycling. For this to happen, producers

[16] Eunomia, Study on two approached to extended producer responsibility for packaging

[17] https://researchbriefings.files.parliament.uk/documents/SN06984/SN06984.pdf

will need to pay for the cost of collecting and sorting this material – this is consistent with the approach taken for other packaging materials. We will test this assumption at consultation. Although some plastic film is technically recyclable, services for the collection and sorting of film plastics are poorly developed and to date there has been limited incentive for investment in UK reprocessing capacity. Tonnages collected for recycling from households and the municipal sector are low (it is estimated that in the UK only 17% of LAs collect plastic film packaging) and much of this material is of poor quality and hence of low value. Where film plastic is collected for recycling much of it is exported but restrictions on exports are increasing and the UK Government has announced its intention to ban the export of plastic waste to non-OECD countries. The UK Government has also stated an ambition for all plastic packaging to be reusable, compostable or recyclable by 2025. The 2019 consultations on both consistent recycling (in England) and packaging producer responsibility reform did not make provision for plastic film packaging recycling and assumed that it would not be part of consistent recycling collections. Collection provision for film plastics is also limited in the devolved administration (DA) areas. Respondents to the 2019 consultations challenged this assumption and argued that earlier consideration of plastic film packaging was required. This view has been reinforced through subsequent stakeholder engagement, particularly by large brands and manufacturers, retailers and the plastics industry. This option is more ambitious than option 1 and would be more desirable from a policy perspective as it would include a material that is scarcely recycled and mainly ends up in residual waste, which then goes to landfill or EfW facilities. We have covered the assumptions in more detail in the cost benefits analysis below but we are assuming that increased collection of this material will result in an increase in the recycling rate, which will happen gradually as infrastructure will need to be built to reprocess this material. We are also assuming that with clear labelling consumers will be able to dispose of this material in the appropriate bin.

EPR option 3: full net cost recovery, modulated fees, mandatory labelling, plastic film collection for recycling, plus mandatory reporting and takeback of disposable paper cups.

This option is the same as Option 2, with the addition of the proposal that all sellers of filled disposable paper cups[18] [19] should be mandated to i) report what they place on the market and ii) facilitate their separate collection for recycling. These producers could have the flexibility to establish their own collection systems and determine how best to maximise the collection and recycling of disposable paper cups or financially support a paper cup collection system.

The benefits of introducing a mandatory reporting obligation on producers and a requirement on producers to take-back used disposable cups for recycling include:

- Building on existing industry good practice and tested systems;
- Likely to reduce litter and disposable cup waste by encouraging producers to invest in infrastructure and communication campaigns to influence consumer behaviour.

The evidence surrounding the disposal of paper cups is weak so we have procured research on this waste stream to improve our analysis of this element of the policy ahead of the final stage IA. The final stage IA will therefore likely include a firmer policy proposal for this material informed by this additional evidence and feedback to the proposals presented in the consultation document. This is our preferred option as it goes one step further than the other options and includes a material that mostly is not recycled currently and therefore would meet the policy

[18] Disposable cups are paper-based disposable cups (for hot drinks and cold drinks

[19] The point of compliance and de minimis threshold for this element of the EPR reform has not been finalised. For the purposes of this analysis we have assumed that no de minimis is in place

objective to increase packaging that is recycled. As we have discussed in the cost benefits analysis section, we assume that sellers of filled paper cups will provide disposable cup bins, reprocessors will invest in infrastructure to reprocess this material and finally consumers will dispose of cups in the appropriate bins.

Non-regulatory approach

A non-regulatory option was not appraised. A key outcome of the policy is that packaging waste is managed in a way that all companies that use or place packaging on the market take on their relevant responsibilities for that packaging including when it becomes waste. A voluntary approach would not ensure that this could be achieved. International experience suggests that market forces will lead producers to take back products at end of life where it is profitable, or in the interests of brand management, to do so. For example, Germany, Norway[20] and the Netherlands all have a DRS as well as some form of kerbside or household recycling collection and achieve some of the highest reported rates of plastic drinks bottle collection/recycling in Europe at 98%, 95% and 95% respectively[21].

This is much less likely to be the case for lower value products, and products for which there is a cost to end of life management. Packaging is such as product; it is widely used and represents a small proportion of the overall cost of the product it is protecting; millions of households and businesses generate packaging waste by virtue of the products they buy; and there is a cost attached to managing packaging waste, a cost that producers are only partly contributing to currently. As a result, it is considered that a non-regulation approach will not achieve the policy outcomes set by government, also because a regulatory system already exists, we are looking to reform it, and not start from scratch. Industry recognises this and supports governments' proposals to reform the existing regulations.

As described in the background section, a regulatory approach to packaging producer responsibility has been in place since 1997 and has placed obligations on producers in respect of the packaging they place on the market. The UK Government made a commitment in the Resources & Waste Strategy 2018 to invoke the 'polluter pays' principle and to introduce extended producer responsibility for packaging meaning that producers would be required to pay the full costs of disposal of packaging they place on the market. The Devolved Administrations have made similar commitments. The 2019 consultation on reforming the current regulations set out the case for change and sought views on the key areas for reform for which there was broad support.

The system provided by the current regulations is not designed to enable full cost recovery from producers and will not deliver government's ambitions for higher packaging recycling rates and the use of more recyclable and sustainable packaging. Regulations are required to define obligated producers, to set out the requirements and obligations on these producers including the packaging waste management and other costs payable by producers, and to ensure equal treatment of obligated producers. Regulations are also necessary to ensure provision is made for the fees paid by producers to be distributed to those incurring the costs of managing packaging waste, for example to LAs who are responsible for managing household packaging waste. Although there are many outcomes

[20] Here a deposit return scheme was combined with a declining environmental tax in accordance with recycling, which created a further incentive for achieving a very high return rate

[21] Voluntary & Economics Incentives Working Group Report: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/694916/voluntary-economic-incentives-working-group-report-drinks-containers-final.pdf

for the policy, the main policy objective is to make packaging producers responsible for the end of life costs of packaging and in doing so improve the end of like management of packaging waste. This would not be possible in a non-regulatory system.

SECTION 5: COSTS AND BENEFITS OF EACH OPTION

BASELINE

BRIEF DESCRIPTION

As described in section 4, the baseline assumes that the measures detailed in the consistent municipal recycling collections in England and DRS (for England, Wales and Northern Ireland) impact assessments are in place and the associated costs, benefits and recycling rates of these are reflected in the baseline. To appraise a manageable suite of options, the DRS IA identified an economic option with the highest new value (in terms of NPV) which was then taken as baseline for the economic analysis of this IA. However, it is unclear at this stage whether an all-in or On-the-go DRS will be implemented. Subsequently, the analysis used in this paper is only indicative and dependent on what approach is taken in the future. Packaging items in scope of the England, Wales and Northern Ireland DRS (assumed to be an all in DRS for the analysis) and the Scottish DRS will be excluded from packaging EPR. The tonnage of DRS materials captured through DRS return points has been removed from this analysis. The cost attached to DRS materials collected via household or business collection services will be a matter for the DRS Deposit Management Organisation. EPR obligated producers will not be expected to pay for the costs of collecting DRS materials not returned to designated DRS collection points. These costs are included within the analysis however as DRS materials not captured through a DRS return point make up around 3% of the total packaging POM tonnage, these costs are a small proportion of the overall costs. This will be refined further for the final impact assessment.

This option has no costs or benefits as it represents the baseline. In this section we only present the amount of packaging that is placed on the market, current packaging waste recycling rates and the amount of packaging currently found in residual waste in a 'do-nothing' option (but assuming DRS and consistency are in place).

BACKGROUND

Placed on the market packaging and pre-2023 switches

UK placed on the market (POM) packaging data is taken from the material specific Pack Flow 2025[22] reports commissioned by Defra, and carried out by Valpak Consulting, Verde Research & Consulting, Recoup and WRAP, which have been finalised since the publication of the 2019 consultation IA. A key benefit of the Pack Flow reports

[22] Pack Flow report -plastic packaging, https://wrap.org.uk/resources/report/metal-flow-2025-metal-packaging-flow-data-report ; https://wrap.org.uk/resources/report/paper-card-flow-2025-paper-packaging-flow-data-report ; https://wrap.org.uk/resources/report/glass-flow-2025-glass-packaging-flow-data-report; https://wrap.org.uk/resources/report/wood-flow-2025-wood-packaging-flow-data-report

is that they account for packaging handled by currently unobligated businesses which is not captured by the National Packaging Waste Database (NPWD)[23].

A further benefit of these reports is their granularity. The reports provide a detailed breakdown of POM for each material type by packaging format and polymer (for plastic). This is an important input for estimating the impact of modulated fees on individual packaging types as for some materials, such as the colour of plastic packaging can impact recyclability. Assumptions made by Eunomia in their analysis of the impact of modulated fees[24] were used to provide further granularity. Although the Pack Flow POM estimates are produced in conjunction with cross-industry stakeholders and cross-checked against other data sources, they are still uncertain to an extent due to limitations in the data available. The amount of uncertainty increases with the level of granularity.

The use of some plastic polymers is expected to reduce significantly before 2023 and this change has been captured in the IA. It is assumed that PVC, PS and non-recyclable black plastic used in Pots, Tubs and Trays (PTTs) will reduce between 2020 and 2023 in favour of more widely recycled packaging. It is expected that some of this material switching will be attributable to producers starting to respond to anticipated EPR measures and some will be attributable to other incentives, including the WRAP-led UK Plastics Pact[25] and other independent business initiatives. Without robust data on the extent to which these switches will take place assumptions were informed by WRAP expert judgement and trends emerging from the UK Plastics Pact. Annex C provides a sensitivity analysis of pre-2023 switches.

Table 1 below shows the packaging placed on market in the 'do-nothing option'. The data is categorised into Household (HH), Non-Household Municipal (NHM) and other Commercial and Industrial (C&I). NHM is the portion of C&I waste that is household-like and is in scope of EPR. Other C&I is the element of C&I waste not in scope of EPR modulated fees. A key uncertainty in the POM data is calculating the NHM portion of C&I packaging. A discussion on how this has been estimated and the implications of this uncertainty are discussed in Annex D.

Table 1 Baseline packaging POM data (excl. packaging captured by DRS 'all-in') in a 'do-nothing' scenario – best estimate

Packaging material	2023 POM (Kt)			2027 POM (Kt)			2032 POM (Kt)		
	HH	NHM	Other C&I	HH	NHM	Other C&I	HH	NHM	Other C&I
Plastic	1,300	423	484	1,319	428	490	1,334	433	497
Wood	70	228	1,017	67	220	983	65	213	945
Aluminium	68	11	38	73	11	40	77	12	43
Steel	274	129	122	266	127	120	261	124	117
Paper/Card	1,721	2,403	1,487	1,755	2,451	1,517	1,800	2,501	1,555
Glass	692	133	0	676	130	0	657	126	0
Total POM	4,125	3,326	3,148	4,155	3,367	3,150	4,194	3,410	3,157

Sources: various please see Annex D for a description on how we calculated POM data. Figures might not add up due to rounding's

Projected recycling

[23] https://npwd.environment-agency.gov.uk/

[24] Eunomia (2019), "Study on Two Approached to Extended Producer Responsibility for Packaging"; unpublished report for Defra.

[25] The UK Plastics Pact is a collaborative initiative that aims to help create a circular economy for plastics. Its membership includes businesses from across the plastics value chain as well as government and NGOs.

Recycled tonnages for each packaging material are also taken from the Pack Flow reports with additional assumptions from Eunomia's analysis, including data from waste composition analyses, were also used to provide further granularity. The Pack Flow recycling estimates are less granular than their POM estimates and so there is more reliance on these additional assumptions. Good quality data from waste composition analyses are available to disaggregate household data however the equivalent data for NHM is less detailed and these estimates are therefore less certain. For additional information on the methodology used to come up with the projected recycling tonnages and rate in the tables below please check Annex E. Table 2 presents the baseline recycling projections in tonnes (excluding the proportion of DRS materials captured through the DRS scheme).

Table 2 Baseline recycling projections in tonnes (excl. packaging captured by DRS 'all-in') in a 'do-nothing' scenario – best estimate

Packaging material	2023 Recycling, Kt			2027 Recycling, Kt			2032 Recycling, Kt		
	HH	NHM	Other C&I	HH	NHM	Other C&I	HH	NHM	Other C&I
Plastic	313	88	460	358	127	466	379	130	472
Wood	26	126	348	25	122	336	24	118	323
Aluminium	26	3	15	28	4	15	30	4	16
Steel	237	78	120	237	81	118	231	79	115
Paper/Card	1,061	1,477	1,418	1,112	2,141	1,446	1,154	2,194	1,483
Glass	470	80	0	474	108	0	465	105	0
Total	2,134	1,852	2,360	2,234	2,583	2,381	2,283	2,630	2,409

Source: Defra modelling, Pack Flow reports, additional assumptions from Eunomia and WRAP. Figures might not add up due to rounding's

Table 3 shows the recycling rates under a baseline option which excludes packaging captured by DRS. The removal of DRS materials reduces the total packaging recycling rate, as well as the recycling rate for the relevant material types, as DRS materials tend to be highly recycled compared to other packaging types. The introduction of consistent municipal recycling in England is expected to increase the baseline packaging recycling rate over the appraisal period. The impacts of this policy differ across material types according to the proportion of packaging in scope. For example, the baseline paper/card recycling rates is predicted to increase significantly by 2032 as all household-like paper/card packaging in England is in scope of consistent municipal recycling. In contrast, after excluding packaging captured by DRS, a significant proportion of the aluminium tonnage in EPR packaging are items such as aerosols and foil.

Table 3 Baseline packaging recycling rates (excl. packaging captured by DRS 'all-in') in a 'do-nothing' scenario – best estimate

	2023				2027				2032			
	HH	NHM	Other C&I	Total by packaging type	HH	NHM	Other C&I	Total by packaging type	HH	NHM	Other C&I	Total by packaging type
Plastic	24%	21%	95%	39%	27%	30%	95%	43%	28%	30%	95%	43%
Wood	37%	55%	34%	38%	37%	55%	34%	38%	37%	55%	34%	38%
Aluminium	38%	31%	21%	37%	38%	34%	21%	38%	39%	34%	21%	38%
Steel	87%	60%	96%	83%	88%	64%	96%	85%	89%	64%	96%	85%
Paper/Card	62%	61%	95%	71%	63%	87%	95%	82%	64%	87%	95%	82%
Glass	68%	60%		67%	70%	83%		72%	71%	83%		73%
Total recycling rate by waste classification	52%	56%	73%	60%	54%	77%	73%	67%	54%	77%	73%	68%

Source: Defra modelling, Pack Flow reports, additional assumptions from Eunomia and WRAP

Packaging in residual waste by sector

It is assumed that all non-recycled packaging waste is collected as residual waste and sent to landfill or Energy from Waste (EfW). This is calculated by subtracting the recycling tonnage from the POM tonnage for each material, therefore source and reliability of them can be found in Annex E. The residual figures shown in table 4 include metal packaging recovered for recycling from Incinerator Bottom Ash (IBA). The amount of packaging collected as residual

waste in the baseline is expected to fall over the appraisal period due to the increase in recycled packaging due to consistent municipal recycling in England.

Table 4 Baseline packaging in residual waste in tonnes - best estimate

Packaging in residual	2023 Kt			2027 Kt			2032 Kt		
	HH	NHM	Other C&I	HH	NHM	Other C&I	HH	NHM	Other C&I
Plastic	987	335	24	957	300	24	955	304	24
Wood	44	102	669	43	98	647	41	94	622
Aluminium	54	9	30	56	10	32	60	10	34
Steel	73	103	5	62	91	4	60	88	4
Paper/Card	660	926	69	643	311	70	646	318	72
Glass	222	53		203	22		192	21	
Total packaging in residual waste	2,039	1,528	797	1,964	832	778	1,954	837	757

Source: Defra modelling, Pack Flow reports, additional assumptions from Eunomia and WRAP

EPR OPTION 1: FULL NET COST RECOVERY, MODULATED FEES AND MANDATORY LABELLING

Structure of this section:

- Costs
  Monetised
    - Obligated producers' costs
        - *Compliance costs (Net costs of collecting packaging for recycling; Net costs of collecting packaging in residual waste; Compliance costs under baseline)*
        - *Packaging technologist costs*
        - *Redesign costs associated with mandatory labelling*
        - *Training costs*
        - *Familiarisation costs*
        - *Litter costs*
        - *Running costs for EPR scheme administrator*
        - *Running costs for IT system*
        - *Admin costs for labelling scheme*
        - *Communication campaign costs*
            - ➔ *Total costs borne by obligated packaging producers*
    - *Public sector costs*
        - *Landfill tax (transfer)*
        - *Investment IT costs*

  Non-monetised costs
- Benefits

Monetised

- Benefits to businesses
- Benefits to reprocessors
- Benefits to society

Non-monetised benefits

Impacts of modulated fees

EPR Option 1 is to reform the packaging producer responsibility system and introduce a modulated fee system that allows for the recovery of the full net costs of managing packaging waste in the municipal sector. As explained in the baseline section, DRS materials[26] are not in scope of EPR and will not be subject to modulated fees. Defra commissioned Eunomia to analyse and make recommendations on the logistics of both a modulated fees and deposit based EPR scheme[27]. Based on the findings in the report and following consultation with stakeholders, modulated fees were considered the more pragmatic and effective approach, so a deposit based EPR scheme for packaging is not being considered further.

A further objective of Eunomia's work was to suggest indicative fee levels and appraise the likely impacts of a modulated fees approach on producers. This included considering the impact of modulated fees on producers' behaviour in terms of packaging placed on the market. As part of this work Eunomia developed a model to provide indicative fees for several packaging types as well as assess the potential impact of these fees on producer behaviour and on packaging recycling rates. Defra have further adapted this model to quantify indicative impacts of modulated fees for this analysis.

The Eunomia model includes different options whereby the mechanics of modulated fees can be adjusted. However, all the options are based on modulating by recyclability, with the recycling rate used to measure recyclability. Alternative approaches to measuring recyclability are discussed in Eunomia's report, however using the recycling rate was considered the most suitable method for this analysis based on the data available.

It should be noted that the options explored by Eunomia and included in this analysis are for illustrative purposes and do not imply a preferred mechanism for calculating modulated fees by government. Indeed, implementing Eunomia's preferred approach may not be technically or economically feasible, at least at present. Recyclability is one of several possible factors which could be used, alone or in combination to modulate fees. We are not consulting on a preferred mechanism for calculating modulated fees as ultimately it will be a decision for the Scheme Administrator. The outcomes and framework for modulated fees is part of the consultation and further work is underway in conjunction with industry to determine the best way to apportion the full net cost to producers through modulated fees and to minimise unintended consequences. This consultation should help to provide stakeholders with sufficient time to prepare for the introduction of EPR. For more information on the potential impacts of modulated fees and the externally commissioned research that has informed our analysis on modulated fees please see Annex B.

Packaging switches

As well as those initiated by the introduction of modulated fees in 2023, it is expected that some packaging material switches will occur before this date. Based on discussions with WRAP we have included a small number of switches

[26] Placing DRS packaging on the market is however assumed to incur producer costs in line with the approaches set out in the DRS impact assessment.

[27] Eunomia (2019), "Study on Two Approached to Extended Producer Responsibility for Packaging"; report for Defra.

which are expected to occur before 2023 and are outside the scope of the Eunomia model. It is expected that some of these switches will occur due to producers anticipating modulated fees and preparing for the introduction of EPR[28]. Not all these switches are attributable to EPR however as producers face other influences to switch to more recyclable packaging, for example the UK Plastic Pact commitments or Plastic Packaging Tax. These switches are therefore divided between the baseline and EPR options. This is an arbitrary split and a sensitivity analysis was produced to understand the impact of using different assumptions.

The switches included in this analysis were recommended by WRAP who have expert knowledge on the recyclability of packaging types and likely substitutes. As in the first consultation IA, this analysis concentrates on switches between plastic polymers as this is where there is the clearest evidence of potential substitutes. Polyvinyl chloride (PVC) and polystyrene (PS) are identified as currently difficult to recycle and therefore likely to see diminished use by producers. A significant amount of PS and PVC placed on the market are in the form of pots, tubs and trays (PTT) and based on recommendations by WRAP, we have assumed that a significant proportion of these packaging types will be substituted for more recyclable polymers by 2023. Some will remain in use at the introduction of EPR, however due to their current low recyclability these are expected to be phased out quickly under EPR as indicated by the Eunomia model. PS and PVC PTTs are assumed to be mainly substituted for polyethylene terephthalate (PET) equivalent with small amounts switching to polypropylene (PP) and polyethylene (PE).

Table 5 shows the tonnage of PS and PVC in the EPR option compared to the baseline. For years before 2023 the difference in PS and PVC placed on the market can be explained by switches related to PTTs which occur before modulated fees are in place. From 2023 the table also shows the impacts of modulated fees on all PVC and PS in the municipal sector. Under the EPR option municipal PVC and PS is predicted to be phased out completely by 2027, as in keeping with feedback from WRAP.

Table 5 HH and NHMPS and PVC plastic packaging in EPR Option and Baseline (tonnes)

	Baseline				**EPR Option**			
	2021	**2023**	**2027**	**2032**	**2021**	**2023**	**2027**	**2032**
PS	49,461	43,733	32,054	17,053	43,471	31,681	0	0
PVC	15,485	13,750	10,212	5,668	13,668	10,094	0	0

Source: Pack flow reports, Defra assumptions, Eunomia assumptions

It is assumed that other PS and PVC packaging will not switch at the same rate before 2023 and therefore is included as a potential switch from the introduction of EPR. Within the analysis these packaging types are assumed to switch to PET, PP and PE as well as high-density polyethylene (HDPE), which are all based on previous discussions with WRAP. Table 6 shows the tonnage of these polymers in the municipal sector under the EPR and baseline options.

[28] It is worth noting that whilst we have modelled these switches, these are not definitive figures and are subject to change depending on the structure of modulated fees that are agreed on in Phase 2 of engagement with WRAP.

Table 6 HH and NHM HDPE, PE, PET and PP plastic packaging in EPR Option and Baseline (tonnes)

	Baseline				EPR Option			
	2021	**2023**	**2027**	**2032**	**2021**	**2023**	**2027**	**2032**
HDPE	84,525	85,033	86,032	87,261	84,525	85,087	86,625	88,117
PE	19,534	19,743	20,160	20,683	19,625	19,926	26,281	26,657
PET	227,673	234,995	249,589	268,650	233,592	246,904	274,081	278,814
PP	235,276	238,501	244,961	253,097	237,076	242,116	255,949	258,823

Source: Pack flow reports, Defra assumptions, Eunomia assumptions

Black plastic was also identified by WRAP as a packaging category likely to be phased out significantly before the introduction of EPR. As part of their analysis Eunomia sought to disaggregate plastic POM data to allow for the analysis for modulated fees on the use of black plastic and therefore estimated the amount of household-like plastic packaging placed on the market. Eunomia made the simplifying assumption that all household-like black plastic packaging is in the form of PTTs. WRAP has advised that almost all black PTTs will switch to an alternative by 2023. We have therefore assumed that all black plastic PTTs currently placed on the market will switch to a non-black equivalent of the same polymer before 2023 in the EPR options. Some black plastic remains in the baseline past 2023 but is phased out by 2027. This assumption will be sense checked with industry ahead of the final IA.

Table 7 Black Plastic PTTs (tonnes)

	2021	**2023**	**2027**	**2032**
Black PTT (EPR Option)	28,758	0	0	0
Black PTT (Baseline)	43,136	28,930	0	0

Composite packaging

Composite packaging is not defined in regulations but is defined in the Environment Agency's (EA) technical interpretations guidance as: 'multi-layered sheets of dissimilar materials which are bonded together and cannot be separated by hand', such as laminated paperboard[29]. The EA's guidance also states that the weight for composite packaging 'should be recorded under the predominant material by weight'. This means that composite packaging is not reported separately under the current packaging regulations and as a result there is limited data available, something we are looking to change with the new regulations. Therefore, we have not considered composite packaging in our analysis of the impact of modulated fees. We expect that if we extend our analysis to include the impact of modulated fees on composite packaging then the positive NPV will increase in magnitude. This is because producers would be expected to reduce the use of composite packaging in favour of more recyclable alternatives to reduce the financial burden of modulated fees or invest in infrastructure to enable the recycling of composite packaging, particularly fibre-based packaging. We have commissioned some further work on fibre-based composite packaging to help address this evidence gap.

[29] This type of packaging is distinct from multi-material packaging, which is defined as: 'packages constructed of assembled components of different material', such as a blister pack made from cardboard and plastic which can be separated by hand.

Scheme administration and governance options

Two governance options have been included in this IA, namely a single scheme administrator approach (SA) and a single scheme administrator and compliance schemes approach. [Note: In the IA we have not addressed the wider pros and cons of both approaches – the consultation document compares each option against the principles established for packaging EPR].

A single scheme administrator approach: Under this approach delivery of all aspects of the packaging EPR scheme would be the responsibility of a single not-for-profit, value chain led scheme administrator appointed by and accountable to the UK Government and the devolved administrations. Producers obligated to pay packaging waste management costs would register with the SA and report data on the packaging they place on the market. As for the current regulations, the Environment Agency and devolved equivalents will be the regulator and producers will be subject to penalties if they do not comply. For this to work as an effective deterrent, the cost of compliance would have to be lower than the fine. Further work will be done to address this for the final IA. They would pay fees to the SA to cover the cost of managing the packaging they place on the market and achieve recycling targets. The SA would set the modulated fee rates and would determine how competition across the entire packaging value chain will help deliver targets in the most cost-efficient and effective ways. The SA would allocate the money paid by producers to meet targets and to support a coherent collection infrastructure and a more cost-effective and efficient system for managing packaging waste. It would make payments to LAs and others providing waste management services in accordance with priorities and agreed principles. With this approach there is no statutory role for compliance schemes as there is under the current regulations. However, producers could choose to employ experienced companies to help them manage their obligations such as data reporting.

Scheme Administrator and compliance schemes: Under this approach the system would be administered and managed through a UK-wide scheme administrator, established on a not-for-profit basis, appointed by and accountable to the UK Government and the devolved administrations, and a number of producer compliance schemes. Obligated producers would choose which compliance scheme to join. Schemes would submit their members packaging data to the regulator and scheme administrator, collect fees from producers, and pass money raised through fees (modulated fees) to the chosen administrator. The schemes would be responsible for meeting targets on behalf of their members and for providing evidence to demonstrate that they had met these recycling targets. The cost of this evidence would be paid for by their members and could take different forms depending on the approach agreed to payments for NHM/household-like packaging and other aspects of scheme design which will be confirmed following consultation. The scheme administrator would set the modulated fee rates /mechanism, inform compliance schemes of fees to be recovered from their members for the management of household packaging waste and administer payments to LAs and others as agreed, and may also have a role in relation to payments for NHM/household-like packaging depending on the approach taken

We have provided a range of initial estimates for the costs of administering the EPR scheme informed by a review of international packaging EPR systems, the costs associated with administering the current regulations and cost estimates provided by WRAP and Valpak for the two approaches under consideration. The lower overall cost representing a single-SA approach and the higher cost representing a single SA and compliance scheme approach. For the purposes of this analysis we assume that in total a similar number of companies to those obligated under

the current packaging producer responsibility scheme (~ 7,000[30]) will be obligated in some way under the future scheme. Due to ongoing engagement with policy teams, the specific design of this future scheme has yet to be decided. However, this will be addressed in the final IA.

We have assumed that the Environment Agency and equivalent environmental agencies for each of the devolved administrations will be responsible for carrying out compliance monitoring and enforcement activities related to non-compliances with the regulations on the part of obligated producers.

The estimates are provided with our best understanding of how the tasks could be carried out, but we recognise that the scope of these tasks and the associated costs may change following consultation and further industry engagement.

Under both approaches the modulated fee rates and/or the modulation mechanism will be set by the scheme administrator so will not be a basis for competition. In the approach with compliance schemes producers can chose which scheme they join thereby presenting an element of choice and competition – schemes will compete for members on the basis of the services they can offer to producers. Depending also on the approach we take to payments for NHM/ household-like packaging this could introduce a further element of competition. There is likely to be a single data system for reporting of data (as there is for the current regulations) – although it is possible (as now) that individual compliance schemes may also chose to run their own data management systems to facilitate uploading of producer information into the national database.

Mandatory labelling

There are two approaches presented in the consultation document for the delivery of mandatory recyclability labelling. Mandating recyclability labelling could involve government requiring producers through regulations to include an appropriate label on their packaging and setting out some parameters that they would be required to meet such as on the design (shape, size or colour), message to be included on the label and a requirement for labels to be approved. This is government's preferred approach. The other approach is for government to appoint an organisation to run the labelling scheme and to require producers to join that scheme and use the labels developed by the appointed scheme on their packaging.

The key benefit associated with the non-centralised labelling approach is the opportunity to introduce mandatory labelling slightly earlier (likely one year earlier) than if a central labelling scheme approach was introduced – this is due to the length of time we expect it to take to procure an organisation to run the labelling scheme compared to the length of time it would take to set out parameters within which producers could design their own labels. It also provides producers with some flexibility in how they comply including importers of packaging products for sale in the UK.

30 There may be producers who only place DRS materials on the UK market and so would not be obligated under packaging EPR – indicating that this may be an overestimate. However, there will also be international companies / importers placing 'filled' packaging on the UK market that will be in scope of modulated fees – indicating that this may be an underestimate. For this analysis we have assumed that these two cohorts of producers balance each other out and that ~7,000 is a suitable estimate of the number of producers that could be obligated under EPR for packaging. Total number of obligated may also increase depending on feedback on proposals to lower the de minimis and change point of compliance but at this stage we do not have an indication of additional obligated producers.

For the purpose of the IA we have modelled the costs and benefits of appointing a single organisation and requiring all producers to use specific recyclability labels. We expect this option to be higher cost to producers than the option whereby producers are required to apply their own recyclability labels as the costs of establishing and administering a national scheme would need to be covered by producers. Producers would likely need to pay some form of 'membership fee' and may have higher familiarisation and training costs associated with using the labels. However, these additional costs may to some extent be outweighed by the comparatively higher benefits associated with communicating a common labelling scheme to consumers.

The timeline is yet to be confirmed for the roll-out of mandatory recyclability labelling as this links to the introduction of modulated fees and consistent collections including the collection of plastic films and flexibles for recycling. For this analysis, we have modelled the impact of mandatory recyclability labelling to come into effect from April 2025. By giving businesses until April 2025 to comply with the requirements (but ensuring that the necessary resources and guidance is in place from 2023) will allow businesses time to incorporate the new labelling as part of their business as usual re-design processes and hence prevent significant re-design costs associated with this regulation[31]. However, we are consulting on a later date (end of financial year 2026/27) by which the collection for recycling of plastic film and flexible packaging should be introduced.

The labelling of packaging would need to be informed by an assessment of recyclable and non-recyclable packaging formats consistent with the approach to assign modulated fees to packaging types. This would require input from across the supply chain; from reprocessors who are able to inform what packaging items can be recycled or are difficult to recycle, through to producers who take the packaging design decisions and kept under review to allow for developments in packaging materials and packaging design, and innovation in sorting and processing technologies.

In order to maximise the effectiveness of this policy, it is proposed that there would not be a De Minimis threshold – meaning that all primary packaging[32] placed on the market will have to carry a label. The proposal is that it will be brand owners who are obligated to label their packaging. The brand owners were selected as they are responsible for choosing the design and material composition of the packaging for their product. However, this assumption will be reviewed at consultation. For this analysis, we refer to the number of packer/fillers and not brand owners due to the limitations of the available evidence. Analysis carried out estimated that if the de-minimis were removed there could be around 6,570 UK packer/fillers[33].

Businesses abroad that produce products for sale in the UK will also need to act on the mandatory labelling requirements, however we have not included these costs due to these businesses operating outside of the UK. Importers of these packaged products will be responsible for ensuring that the packaging on any products they import for sale in the UK is appropriately labelled. Excluding imported packaging and packaged products from mandatory labelling requirements would impact on its effectiveness given the size of the UK market, packaging

[31] Based on guidance from stakeholders, it is expected that most producers redesign their packaging every two years (either to comply with regulatory labelling requirements or for other reasons (revised requirements related to health/allergens, new aesthetic etc.)).

[32] An example of primary packaging is a steel can that contains baked beans.

[33] Eunomia (2019), Scenarios for Adjusting the Extended Producer Responsibility De-Minimis Threshold, unpublished report for Defra. Eunomia was not able to include an option of "Brand Owner" because of the limitations of the data.

companies abroad are unlikely to be deterred from placing packaging/packaged items on the UK market due to the EPR requirements (labelling / modulated fees), given the fact that the marginal increase in production costs due to modulated fees would unlikely exceed the revenue they would receive. Further consideration of the potential trade implications of the proposed labelling requirements will be addressed as part of the final IA.

Table 8 – Businesses assumed to be members of the OPRL scheme (baseline), and businesses assumed to be required to comply with the mandatory labelling requirement (based on central option)

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Projected baseline (OPRL) voluntary members[34]	1199	1319	1439	1559	1619	1679	1739	1799	1859	1919
Projected businesses in scope of mandatory labelling – No de minimis in place			4153	4153	4153	4153	4153	4153	4153	4153

Projected Recycling

Due to changes in packaging producers' behaviour an increase in packaging recycling rates is expected from the introduction of modulated fees. As well as modelling these benefits, assumptions were also made about the impact of labelling on the recycling rate of municipal packaging waste. Commercial and Industrial (C&I) packaging is out of scope, so modulation and labelling will not have any impacts on the C&I packaging recycling rate.

Mandatory labelling: Mandatory labels will have a positive impact on the recycling rate of packaging. A study carried out by WRAP and Boots[35] in 2019 found that when a sticker was added to a bottle of shower gel to indicate that it was recyclable, the proportion of consumers who said that they recycled this packaging increased by 3% points (from 87% to 90%).

The research split the sample of 4,000 trial participants in half, with one group receiving a non-labelled bottle and the other half receiving a labelled bottle. Within each group of 2,000 participants, half were asked about their 'disposal of bathroom items' at the recruitment stage of the process (these were the primed participants). After finishing their shower gel, testers were invited to complete an online questionnaire asking Boots' standard questions about their views of the product, as well as questions about how they disposed of the bottle. The key results of the survey are outlined below:

	With sticker (primed)	With sticker (unprimed)	No sticker (primed)	No sticker (unprimed)
Recycling rate	90%	92%	87%	84%

To model the benefits associated with mandatory recyclability labelling, we have taken the percentage point difference from 'No sticker (primed)' (87% recycling rate) and 'With sticker (primed) (90% recycling rate), 3% points, and applied it to the recycling rate of all recyclable packaging materials (i.e. not including PVC, PS or black plastic). We chose to use the evidence from the primed participants as we wanted to include a conservative estimate of the associated benefits – the 'primed participants' declared a lower change in recycling rate between with/without the label. We will be reviewing this assumption ahead of the final IA. It is worth noting that the Boots study was based

[34] Based on Defra projections

[35] Recycle Now oversaw analysis and reporting of the trial. The trial sample was not representative of the general population, so observed differences in behaviour amongst trial participants should be treated with caution and may not replicate the behavioural response from the wider population.

on a small sample and the outcome might not be reliable e.g. different materials may be more/less sensitive to a recyclability label. However, this is the best evidence we have at this stage and we will seek to refine it for the final IA.

The joint impact of modulated fees and labelling is shown in table 9. All material types are expected to see some increase in recycling due to increased collection and over time a shift to easier to recycle materials. Modulated fees and labelling are estimated to increase the recycling rate of municipal packaging by around 6 percentage points (from 65% to 71%) above the baseline level by 2032. As non-municipal, and transit packaging is out of scope of modulated fees and labelling it is assumed that there will be no impact on the recycling rate of this packaging. Taking this into account, the impact on the overall packaging recycling rate is four percentage points increase on baseline by 2032 (68% to 72%). These impacts are in addition to the positive impact of consistent municipal recycling on the packaging recycling rate which are captured in the baseline.

Table 9 Joint impact of modulated fees and labelling – packaging recycling rates (excluding packaging captured by DRS)

Recycling Rate 2032	**Baseline**				**Option 1**			
	HH	**NHM**	**Total Municipal (HH + NHM)**	**Total (incl. other C&I)**	**HH**	**NHM**	**Total Municipal (HH + NHM)**	**Total (incl. other C&I)**
Plastic	28%	30%	29%	43%	36%	38%	37%	50%
Wood	37%	55%	51%	38%	40%	58%	54%	39%
Aluminium	39%	34%	38%	38%	41%	37%	41%	40%
Steel	89%	64%	81%	85%	96%	96%	96%	93%
Paper/Card	64%	87%	78%	82%	69%	92%	82%	86%
Glass	71%	83%	73%	73%	78%	95%	81%	81%
Total recycling	**54%**	**77%**	**65%**	**68%**	**61%**	**82%**	**71%**	**72%**

It is estimated that there will be 7,777kt of recycled packaging in 2032 under the EPR option which contrasts with the baseline estimate of 7,322Kt. This equates to 455kt of additional recycling by 2032. This is made up of 266kt of additional household recycled material and 188kt of additional NHM recycled packaging.

Table 10 Recycling packaging (in tonnes) in 2032 under the baseline and option one

Recycling Tonnage Kt (2032)	**Baseline**			**Option 1**		
	HH	**NHM**	**Total (incl. other C&I)**	**HH**	**NHM**	**Total (incl. other C&I)**
Plastic	379	130	982	485	165	1,121
Wood	24	117	464	26	124	473
Aluminium	30	4	50	32	5	52
Steel	230	79	425	250	99	464
Paper/Card	1,154	2,195	4,831	1,241	2,308	5,032
Glass	465	104	569	516	119	635
Total recycling	2,283	2,530	7,322	2,549	2,818	7,777

COSTS

In the section below, we present the main costs resulting from the introduction of an EPR scheme. The main costs to obligated packaging producers will be compliances costs (incl. modulated fees). Other costs that these producers will bear include technologist costs, packaging litter costs, administrative costs, national campaign costs and adopting mandatory labelling.

Other costs of the policy include IT system costs pre-2023 (borne by government), and landfill tax loss (this is a transfer rather than a cost).

Cost of compliance to obligated packaging producers

Under an EPR system, producers' costs of compliance would be the full net costs of managing packaging recycling in the municipal sector (HH and NHM) and residual waste in the HH sector. These costs represent the cost transfer from LAs (HH net costs of packaging recycling and residual waste collection) and NHM businesses (only for packaging recycling) to producers. The breakdown of the compliance costs into those associated with recycled packaging and residual packaging for each sector can be found in tables 12 and 13. The compliance costs will be paid through modulated fees on different packaging materials. The cost of managing household packaging waste disposed at household waste recycling centres (HWRC) and bring banks[36] will also be borne by obligated producers. To determine the additional compliance costs to obligated packaging producers we have also calculated compliance costs that would occur in a do-nothing option and netted these from the additional costs.

Net costs of collecting and treatment of packaging for recycling

The HH recycling costs of packaging are for dry recyclables and are net of primary recyclable material revenues. We have used WRAP modelling results as presented in the consistent municipal recycling IA for the optimised option for the overall costs of dry recycling and removed costs associated with non-packaging material. This is done by applying an estimate of the proportion of packaging in household recycling streams to the overall dry recyclables costs. For example, in 2022, WRAP's model estimates that LAs net collection and treatment costs of optimised collection in England would be £619m for all dry recyclables. WRAP estimates that packaging materials could represent around 78.7% of total volume when partially compacted by collection trucks, or 65.3% by weight[37]. Thus, packaging recycling costs are modelled to be around £534m in 2022 for England's LAs. A factor of 1.18[38] has then been applied to estimate total UK costs for household packaging recycling collections giving a baseline UK cost of £630m in 2022. This figure will be improved in the final IA as we will receive data from the Devolved ADministrations (currently we are uprating England figures to the UK).

For the NHM sector, we applied WRAP's estimated dry mixed recycling collection cost per tonne to the recycling tonnage for NHM sector.

Overall, we estimate the net costs of packaging recycling collections from the municipal sector (HH and NHM) to be around £939m in 2023 and rising to £1,120m by 2032. Under this option these costs will be borne by obligated packaging producers.

---

[36] These are containers provided by some local authorities where residents can drop off waste materials for recycling.
[37] Some aspects of the costs are calculated by weight and some by partially compacted volume.
[38] WRAP, 2019, Bristol, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd

Table 11: Net* costs of packaging recycling collection – best estimate[39]

	2023 (£m)	2027 (£m)	2032 (£m)
HH	£689	£800	£831
NHM	£249	£366	£380
Total	£939	£1,165	£1,210

*net of material value

Net costs of collecting and disposing of packaging in residual waste

The unit HH collection and disposal costs for residual packaging waste are based on the WRAP modelling results under the optimised collection option as outlined in the consistent recycling IA. These costs were determined by looking at WRAP's projected total residual waste costs (£1.6bn in 2022 in England) and then applying the estimated proportion of packaging in residual waste (17.8%)[40]. Applying this proportion gives an estimated cost of £278m in 2022. The costs are inclusive of the landfill tax and average gates fees paid to residual waste treatment facilities. These costs were uplifted by 1.22[41] to determine the total UK cost (£339m). This uplift is calculated for packaging waste in residual waste specifically and it is different to the uplift in the previous page (1.18) which applies to the packaging waste in recycling waste.

The NHM sector costs of collection of packaging waste are assumed to be constant over time. The cost per tonne for residual collection and treatment was taken from WRAP's modelling of NHM collection costs for the consistent municipal recycling impact assessment. This was applied to the total NHM residual tonnage as discussed in the POM assumptions section. The HH and NHM residual collection and disposal costs include landfill tax payments.

Overall, the municipal costs of managing packaging waste in residual waste are estimated to be £591m in 2023 decreasing to £409m by 2032. For the HH and NHM sector there are savings achieved due to increased diversion of packaging materials to recycling collections assuming optimised collections at kerbside.

Under an EPR scheme **only the costs of household residual collections will be borne by obligated packaging producers**, however we have presented NHM residual costs for completeness. These costs will be borne by current waste holders.

Table 12: Total cost of residual collections – best estimate

	2023 (£m)	2027 (£m)	2032 (£m)
HH	£292	£287	£283
NHM*	£300	£136	£126
Total	£591	£423	£409

*not borne by obligated packaging producers

Total HH and NHM recycling costs are expected to rise over the appraisal period due to the increase in the amount of recycling collected. This is partially offset by the fall in the cost of residual waste collection in the HH sector. Total

[39] Some figures might not add up due to roundings

40 WRAP, 2019, Bristol, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd

[41] WRAP, 2019, Bristol, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd

costs will also rise due to the estimated increase in the total amount of packaging placed on the market over the appraisal period For now we have assumed that the price level in the secondary market will remain constant, however further work will be carried out on this in preparation for the final IA.

Litter costs

Following the consultation on the reform of the UK Packaging Producer Responsibility System in February 2019, government intends to include within the scope of "full net costs" for the following categories of litter costs: prevention activity; provision and management of receptacles for 'bin litter'; and the clearance of 'ground litter', and additionally for the collection and reporting of litter waste management data. We expect these costs to be borne by relevant obligated packaging producers, and the scope of these payments and the recipients of payments for managing litter is part of this consultation.

In 2019 Eunomia undertook a research project[42] that provided a quantitative estimate of the costs of packaging litter clean-up across England, Scotland[43] and Wales[44]. This project was commissioned to improve the evidence basis and understanding of the costs of managing littered packaging to inform policy decisions regarding the inclusion of litter management costs as part of costs to be recovered from producers.

Research project approach: This study was conducted by using local authority street cleaning outturns as a starting point. Disaggregation of these costs and attribution to litter was based on previous research with LAs in Scotland. Assumptions were verified where possible with interviews with local authorities from across the UK. Costs associated with specific litter fractions were modelled based on available litter composition data. Whilst this project has improved our understanding of litter costs the figures below are indicative. This is due to the significant methodological limitations of the analysis that hinder the generation of robust figures. Some limitations include:

- The lack of quantitative estimates due to LAs not monitoring the activities required to produce the core assumptions over time, and reporting functions not disaggregating by the required activities. Most assumptions obtained have been based on rough semi-qualitative estimates;
- Overrepresentation of London LAs in the sample;
- Reliance on a small number of litter composition studies, of which only one study investigated litter volumes and only three recorded litter weights;
- Lack of robust information on rural authorities of a variety of socio-economic levels; authorities of low- and high-end levels of deprivation; as well as authorities representing different parts of the UK;
- Numerous assumptions made, and variables created throughout the modelling process based on very limited available information; and
- No Northern Ireland councils in the sample.

42 Eunomia, Financial Cost of Packaging Litter report prepared for WRAP (2019) unpublished

43 Scotland's Litter Problem report done by Eunomia and formed the basis of this analysis https://www.zerowastescotland.org.uk/litter-flytipping/scotlands-problem

44 The contractors were unable to speak with any Northern Ireland councils due to time constraints.

Phase II of this project is ongoing and will address a significant number of the limitations above. The final stage EPR IA will include the new findings.

Findings relevant to EPR: According to the report, total street cleaning costs borne by primary LA Street Cleansing Departments and Other Duty Bodies[45] across the UK was £932m, of which approximately £560 million was litter clean-up cost. It is estimated that packaging accounted for 35% of the total modelled cost of litter. This reflects that although packaging makes up a majority of litter by volume (~70%), when count (~20%) and weight (~40%) are used to attribute cost for different components of litter provision, this brings the relative contribution down; as staff time for ground litter is the largest fraction of cost (attributed on the basis of count) this leads to count based units influencing the percentage attribution more than the other units. After removing clean-up costs attributed to packaging in scope of an all in DRS scheme[46], litter clean-up costs attributed to EPR packaging amount to £97.72m per year[47].

Compliance costs under baseline

To calculate additional compliance costs to packaging producers we have to net the compliance costs under the current PRN scheme (so under the baseline) from the compliance costs under option 1 (calculated in table 11 ad 12). In Annex F, we have presented the full analysis undertaken to calculate compliance costs that would be borne by packaging producers without an EPR scheme. Table 13 presents the overall compliance costs of the current PRN system. This is netted from the total cost of compliance of obligated producers under the new EPR system in table 15.

Table 13: Overall costs of the current PRN system to producers in baseline

Costs	**2023 (£m)**	**2027 (£m)**	**2032 (£m)**
Compliance costs	£453	£482	£516
Compliance scheme operational costs	£18	£18	£18
Total cost	**£471**	**£500**	**£534**

Table 14 Net cost of compliance borne by obligated producers under option 1

	2023 (m)	**2027 (m)**	**2032 (m)**
HH recycling collection costs	£689	£800	£831
NHM recycling collection costs	£249	£366	£380
HH HWRC and bring bank collection	£43	£43	£43

[45] 'Primary LA street cleansing departments' are street cleaning departments responsible for the majority of bin emptying, street sweeping etc. They are different from other departments who may have litter clearing within their remit, for example Parks or Highways. Beside LAs, other bodies (referred to as 'Other Duty Bodies') have a duty to remove litter. These are called litter authorities in the legislation and include schools for example.

[46] These are covered in the DRS impact assessment

[47] The consultation document quotes a higher litter cost estimate based on analysis not available at the time of drafting the Impact Assessment. As costs are transferring from one part of the economy to another they do not impact on the net costs and benefits to the economy or society as a whole.

HH -packaging collection costs in residual waste	£292	£287	£283
Litter costs	£98	£98	£98
Compliance cost baseline	-£471	-£500	-£534
Total	**£900**	**£1,093**	**£1,099**

Packaging technologist costs

It is expected that businesses placing packaging and packaged items on the market will have to pay for additional 'packaging technologist' services[48] to support their compliance with new labelling requirements and to help businesses respond to the new modulated fee system.

For the purposes of this analysis, we have assumed that this cost will be a one-off payment, borne by all producers currently complying with the packaging producer responsibility regulations (6,870 businesses[49]). This assumption will be revised if there is a change to the De Minimis threshold with the introduction of packaging EPR. Specialist technologist services will be required to:

- Offer advice on the recyclability of different packaging materials and formats.
- Support the redesign and selection of packaging to improve recyclability.

We have estimated the increased costs per business for packaging technologist services for different types of business, as shown below:

- Non-food retailer, with 90,000 Stock Keeping Units (SKUs) (£2,362,500)
- Supermarket, with 12,000 'own brand' SKUs (£315,000)
- Large brand, with 500 SKUs (£13,125)
- Small brand, with less than 15 SKUs (£788)

These are best estimates based on discussions with stakeholders. However, due to the varied nature of businesses we recognised that these costs will differ significantly – i.e. two supermarkets will face different costs dependent on the number of SKUs they place on the market and their business operations. The following broad assumptions were used to estimate these figures. Each technologist is assumed to have the capacity to review 1200 (SKUs)/year[50]. The packaging specification technologist salary costs are estimated to amount to £28k-£35k/year[51]. To work out the cost per business, the mid-point of this salary range was taken and the cost per SKU calculated (£26.25). This was then scaled up to the number of SKUs within each business type. The number of SKU's placed on the market by business type was derived during stakeholder engagement. These costings factor in overhead costs, based on discussions with RPC.

For small brands, a slightly different approach was taken. We assumed that the cost per SKU will be higher due to small brands being more likely to rely on external agencies to help them to comply due to their buying power not expected to be strong and they are unlikely to have internal expert resource. We expect that this will double their costs relative to larger businesses from £26.25/SKU to £52.50/SKU.

The total expenditure on packaging technologists is expected to amount to £90m during the transition period (2023-2025) - all SKU's will be reviewed during this period.

---

[48] Packaging technologists are responsible for the design and manufacture of packaging.

[49] Average complying businesses over 2005 – 2017. We expect this 6,870 businesses to include the pack/fillers obligated to comply with mandatory recyclability labelling (4,153). Other operators using the packaging technologist services may include manufacturers, sellers or importers.

[50] Assumption based on stakeholder engagement

[51] £34,000 - £43,000 including overhead costs at 22% - salaries based on stakeholder engagement

With no de minimis in place, the number of businesses expected to use packaging technologist services is expected to be ~6,870. The costs associated with a non-de minimis option are presented in table 15.

Table 15 – Central estimate, packaging technologist costs (2023-2032) with no de minimis[52], £m

2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
45.1	45.1								

Redesign costs associated with mandatory labelling

Redesign costs associated with mandatory labelling by 2025 are assumed to be zero due to businesses amending or adding labelling as part of their business as usual reviews of packaging.

Training costs

This option will require all businesses to spend time training relevant staff on the new packaging regulations (including the modulated fee system and mandatory labelling). This could be either online or face-to-face training.

For small/large brands, we have assumed 3 FTE days per year to train new staff/keep up to date with any rule/process changes[53]. For supermarkets and non-food retailers, we have assumed 5 FTE days[54]. These assumptions have been discussed with OPRL Ltd. The wage we have assumed for this cost is the median hourly wage of 'advertising and market research' as reported by the ONS in 2019, we have then increased this to a 2023 wage level (assuming a 2%/annum wage increase) and then added overheads at a rate of 22% (£19.30/hour)[55] - resulting in a total cost of 1 FTE equal to £185. A 2% wage growth is applied each year from 2023.

The costs summarised in table 16 are net of the training costs expected to occur in the baseline – the costs of training staff to comply with OPRL rules. We expect there to be provision of training ahead of recyclability labels becoming mandatory in 2025, for those wishing to comply from 2023. These costs are summarised in Annex G.

Table 16 - Total estimated training costs (2023-2032), £m

2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
3.8	3.8	3.7	3.7	3.7	3.7	3.6	3.6	3.6	3.6

Familiarisation costs

We expect all producers to spend 10-hours familiarising themselves[56]. The familiarisation costs are assumed to incur in 2023 and 2024 only based on the assumption that businesses will comply with modulated fees from April

[52] Overheads at 22% were applied to the salary costs to determine the total packaging technologist cost to businesses.
[53] We expect this to be a reasonable estimate based on the size of the regulatory change and the number of different workers that may need to undertake training.
[54] As above.
[55] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datalist?:uri=employmentandlabourmarket/peopleinwork/earningsandworkinghours/datalist&filter=datasets&page=2 *(Earnings and hours worked, UK region by industry by two-digit SIC: ASHE Table 5)*
[56] We expect 10 hours to be a reasonable estimate based on the size of the regulatory change and the number of different workers that may be expected to be familiar with the new regulations within each business. 10-hours is an average, with smaller businesses spending less time familiarising themselves, and larger businesses spending more time. However, the assumption is not specifically evidenced based.

2023 (even if labelling is not required until 2025). The same wage as outlined above (£19.30/hour) has been used to calculate this cost. The total costs are expected to amount to £864k per year for 2023 and 2024.

Running cost for EPR scheme administrator

To calculate the costs of setting up a new organisation to manage and administer EPR for packaging, we have estimated staff, office and administrative costs. A low, central and high cost estimate have been calculated to reflect the running costs of a single UK-wide scheme administrator (low cost) and the running costs of a smaller UK scheme administrator supported by several compliance schemes (high cost). We expect the costs of a single scheme administrator approach to be lower than the combined running costs of a scheme administrator and compliance schemes, due to some duplication or overlap of functions by the compliance schemes and the scheme administrator and the need for a level of engagement between the organisations. For the purpose of calculating the NPV, we have assumed that the central estimate is the cost of running a single scheme administrator organisation; this decision was taken to mitigate the risk of underestimating costs.

The costs provided in this section are based on work by both Valpak and WRAP. Valpak is a compliance scheme who carried out some analysis into the costs of running an EPR scheme for packaging – their costs estimates are based on their own experience of supporting the delivery of producer responsibility for packaging. The WRAP analysis was developed with guidance from Defra. We will look to improve on these cost estimates ahead of the publication of the final IA.

Staff costs:

Single administrator: Under the single scheme administrator approach, 248 FTEs are assumed to be employed to run the scheme. The roles assumed to be required include account managers, technical specialists, analysts, financial professionals, admin, management, HR, audit, marketing, communications and IT staff. For the purposes of this assessment each staff member is assumed to cost the scheme administrator £45,800[57]. We have applied a 2% annual wage growth rate to this salary each year to 2032.

Single administrator and compliance schemes: Under this approach, 272 FTEs are assumed to be employed. 215 FTEs are assumed to be employed through compliance schemes and 57 FTEs by the single administrator. The same salary cost and annual wage growth assumed under the 'single administrator' (£45,800) have been applied to determine the staff costs of running this approach.

Table 17 - Staff costs of different governance approaches (£m)

Staff costs	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Single administrator approach	13.6	13.9	14.1	14.4	14.7	15.0	15.3	15.6	15.9	16.2
Single administrator and compliance schemes approach	18.2	18.5	18.9	19.3	19.7	20.0	20.4	20.9	21.3	21.7

Our two estimates of total FTE required compares with approximately 300 employees involved with packaging compliance currently. On the one hand there is likely to be a certain amount of duplicated activity among the 50 schemes operating in the UK, but on the other the resource required under EPR is significantly higher than the current packaging regulations.

[57] 2020 price level – derived by Defra based on evidence of numbers of staff likely to be required provided by Valpak and WRAP

Office costs:

Under both a single governance scheme approach and the approach with compliance schemes, the office costs expected to be incurred include: the cost of premises, ground rent, utility bills, security, cleaning and maintenance. As outlined above, the costs associated with the approach that includes a single administrator and compliance schemes are slightly higher due to compliance schemes also incurring office costs. The office costs for each approach are set out in table 18. These are expected to stay constant each year during the appraisal period.

***Table 18 – Annual office costs for each approach* (£m)**

Office costs	Single administrator approach	Single administrator and compliance schemes approach
Cost of premises	0.21	0.22
Ground Rent / Rates / Utilities	0.50	0.55
Security / Cleaning / Maintenance	0.57	0.63
Other office Costs	0.20	0.22
Total	**1.48**	**1.63**

Admin costs

As outlined above, the costs associated with the single administrator and compliance scheme approach are slightly higher due to compliance schemes also incurring admin costs. The admin costs for each approach are set out in table 19. These are expected to stay constant each year during the appraisal period.

***Table 19 – Annual admin costs for each scheme* (£m)**

Admin costs	Single scheme administrator approach	Single scheme administrator and compliance schemes approach
Audit & Tax	0.42	0.46
Legal	0.15	0.16
Insurance	0.47	0.52
Other Professional Fees	0.33	0.37
Other	0.62	0.68
Total	**2.00**	**2.19**

The total administrative costs for both approaches are presented in table 20 below. The single administrator approach has lower running costs than the approach which includes compliance schemes – therefore, for the purposes of calculating the NPV, we have assumed that the single scheme administrator running costs are the low estimate and that the running costs for the the best estimate.

Table 20 – Total costs for each governance model

Total costs (£m)	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Low estimate - single scheme administrator approach	17.1	17.3	17.6	17.9	18.2	18.5	18.8	19.1	19.4	19.7
Best estimate – single administrator and compliance schemes approach	22.0	22.3	22.7	23.1	23.5	23.9	24.3	24.7	25.1	25.5

Running cost for IT system

New IT and digital systems are required to facilitate the running of EPR scheme. This infrastructure is likely to be required to facilitate registration and possibly accreditation processes, to support the administration of the payment framework, and the submission of evidence on packaging placed on the market and its flow through the waste management system, together with associated costs. Once the IT systems have been developed, the costs of running the IT system will be borne by the scheme administrator (with the costs ultimately passed on to producers). No formal market investigation has taken place into the costs of running such an IT system yet, therefore the ongoing costs are uncertain at this stage. However, Defra has reviewed the costs of running several IT systems (for example, National Packaging Waste Database and Waste Tracking) to provide an initial estimate. The estimated Waste Tracking running costs will be used a proxy for the running cost for the IT systems required to support the EPR scheme for packaging. The Waste Tracking running costs include:

- Staff (management, admin, help desk, communications, marketing and stakeholder engagement) (~£500k/year)
- Hosting environments (~£75k/year)
- Development and service enhancement (~£250k/year)
- Support (~£175k/year)

We are working with the Digital Data and Technology Services[58] to improve on these estimates ahead of the final IA. We are also undertaking further work to determine which parties will be responsible for the design and development of the underpinning IT/digital infrastructure.

Table 21 – IT system cost per year, million[59]

£m	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
IT system costs	£1.0	£1.0	£1.0	£1.0	£1.0	£1.0	£1.0	£1.0	£1.0	£1.0

Admin costs for labelling scheme

Additional administrative functions related to the option of a mandatory labelling scheme will add further costs to producers, relative to the baseline where adoption of labelling is assumed to be voluntary. For example, a more sophisticated governance structure is likely to be required, increased provision of legal advice and regular liaison

[58] Defra's digital partner to help with IT guidance and advice for major new projects and changes to existing digital services.
[59] These costs do not factor in optimism bias at this stage. However, this will be addressed in the final IA.

and reporting to the UK Government and the devolved administrations. In addition, it is expected that the operator of the labelling scheme will be required to deliver significant industry engagement activities.

In this option, we have calculated the administration costs by increasing the baseline administration costs of a voluntary scheme by the proportionate increase in members' in-scope in the reform option, relative to in the baseline.

The costs summarised in table 22 are net of the administrative running costs for the baseline voluntary labelling scheme – the assumed administrative running costs for the baseline labelling scheme are presented in Annex G. In the baseline, it is assumed that there will be an increase in new voluntary members each year – therefore, the baseline admin costs are expected to rise each year. This means that relative to the baseline, the additional costs of running a mandatory scheme for a fixed number of members (~4,153) decreases slightly each year[60]. These administration costs will be covered by producers through membership fees.

Table 22 - Total administration costs associated with running a mandatory labelling scheme (2023-2032), £m

£m	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Removed de minimis	6.65	6.43	6.20	5.98	5.87	5.76	5.65	5.53	5.42	5.31

Communication campaign costs

WRAP has assessed national campaign costs required to maximise the effectiveness of consistency and EPR policies. Part of this cost is accounted for in the consistency IA and the challenge was to apportion the costs associated with packaging that will be borne by obligated packaging producers under EPR. It ultimately will be for the Scheme Administrator (under either governance approach) in conjunction with its producer members to determine how much they wish to spend on national communications campaigns in England, Northern Ireland, Scotland and Wales. However, for the purpose of this IA cost estimates have been included based on WRAP's analysis. If national communications are focussed just on dry recyclables, then the EPR allocation for packaging would be around 65% of the total estimates. We will refine these costs for the final IA. We did not have costing for 2031 and 2032 so we assumed they remain the same as 2030.

Table 23- Communication campaign costs

Year	Total	Communication campaign costs attributed to EPR
2022	£439,725	£287,140
2023	£1,078,435	£704,218
2024	£799,145	£521,842
2025	£764,145	£498,987
2026	£837,717	£547,030

[60] See table 9 above for clarification on the trends of expected businesses using recyclability labels in the baseline, and in the reformed scenario.

2027	£799,145	£521,842
2028	£764,145	£498,987
2029	£760,572	£496,654
2030	£760,572	£496,654
2031	£760,572	£496,654
2032	£760,572	£496,654
Total	**£8,085,023**	**£5,279,520**

In table 24 we summarise all the costs that will be borne by obligated packaging producers under option 1. These are net of compliance costs that would have been incurred under a do-nothing option.

Table 24 – Total costs borne by obligated packaging producers under option 1, £million

	2023	**2027**	**2032**
Compliance costs	900	1093	1099
packaging technologist costs	45.1	-	-
training costs	3.5	3.4	3.3
familiarisation costs	0.8	-	-
Scheme admin costs	22.0	23.5	25.5
IT costs	1.0	1.0	1.0
Admin costs for labelling scheme	6.7	5.9	5.3
Communications campaign costs	0.7	0.5	0.5
Total	**980.0**	**1,127.1**	**1,134.7**

Public sector costs

Landfill tax

The landfill tax in the analysis is fixed at £91.35 per tonne (2019 rate) - this is in line with WRAP's option analysis[61] and the consistency impact assessment. We assumed that this cost will remain constant for the period 2023-2032. The fixed landfill tax rate is assumed for the purposes of economic modelling and to be consistent with WRAP recycling options and the consistency impact assessment. This might underestimate the total costs incurred by LAs should the rate of landfill tax increase. Residual waste is split between landfill and energy from waste (EfW). Using data from 'WasteDataFlow' we have assumed that the split of waste to landfill and EfW in 2017/18 remains constant throughout the period 2023-2032. The percentage split used it 71.6% to EfW and 28.4% to landfill, in line with assumptions made in the consistency IA. The total expenditure on landfill tax is a product of the residual waste tonnages, the landfill tax rate and the tonnage of residual waste disposed to landfill. Table 26 shows the landfill tax expenditure in the central estimate in the baseline option. Government receives less in landfill tax receipts in option 1 than the baseline option due to the reduction in residual waste as more packaging waste is recycled. This is not a cost but a transfer from government to producers obligated under EPR.

Table 25 - Landfill tax expenditure by each sector - best estimate

61 WRAP have kept this constant to show the first order impact to LAs of increased recycling. The landfill tax costs are embedded within the net HH recycling management costs within WRAP's analysis. Thus, we too followed the approach of fixing landfill tax at the 2019 prices rather than projecting forward for consistency purposes.

			2023		2027		2032	
	% residual to landfill (a)	Landfill tax rate (b)	Residual (c)	Landfill tax expenditure (m) (a)*(b)*(c)	Residual (d)	Landfill tax expenditure (m) (a)*(b)*(d)	Residual (e)	Landfill tax expenditure (m) (a)*(b)*(e)
HH	28.4%	£91.35	1.99mt	£51.6	1.74mt	£45.2	1.67mt	£43.3
NHM	28.4%	£91.35	1.49mt	£38.7	0.68mt	£17.6	0.63mt	£16.3
C&I	28.4%	£91.35	0.80mt	£20.7	0.78mt	£20.2	0.76mt	£19.6
Total				**£111.0m**		**£83.1m**		**£79.2**

Table 26 - Reduction in landfill tax net of baseline, million

Landfill tax expenditure – (£m)	2023	2027	2032
HH	£1.3	£5.7	£7.4
NHM	£0.9	£3.6	£5.4
C&I	£0	£0	£0
Total	£2.2	£9.7	£12.8

Investment IT costs

Funding is required to establish IT systems and nearly all the costs are assumed to be incurred prior to the appraisal period. We have included these costs in the NPV calculations following advice from RPC.

We expect EPR IT development costs to amount to £3.7m/year from 2021/22 to 2024/25[62]. This will amount to £14.8m in total and will fund the development phase, including the design, procurement, testing and roll out of new systems (£11.3m), and transition from the NPWD to the new system (£3.5m).

Once the IT system has been developed, the costs of running the IT system will be borne by producers through the administrative fees they pay to the scheme administrator and / or the regulators.

Listed here are additional costs and benefits that we were not able to monetise.

Non-monetised costs:

- Increased monitoring and enforcement: the reforms will see more money in the system and additional obligations placed on producers. In addition, we are consulting on options to create a more transparent system. This means regulators will have to carry out additional compliance monitoring and enforcement duties. Regulators are currently mapping out the points where compliance is required to be monitored.
- Obligated producer changes: There could be a new cost to businesses given the change to the definition of who is obligated. As explained in the SaMBA analysis the intention is to move to a single point of compliance and

[62] These are only indicative estimates. We have since commenced the discovery phase to determine the options available and improve the rough order of magnitude costs for the options.

options to lower the de-minimis threshold are also being considered. At this stage we do not hold information on the number of additional obligated producers and the amount they may have to pay. In such cases, these businesses will need detailed guidance on how to comply with the regulations. Reporting requirements on obligated businesses will also change and will require more granular reporting of types of packaging placed on the market and where in the UK.

- Business transition: There will be costs to stakeholders relating to familiarisation. As an example, producers will have to train staff to understand the new regulations. They will need to set up new systems and possibly teams to handle new requirements.
- Consumer prices: It is presumed that of any additional costs placed on producers through the reforms, a certain amount could be passed on to the consumer through increased product prices. The complexities of how businesses will do this are not quantifiable at this stage.

BENEFITS

Benefits to businesses

It is expected that there will be efficiency savings to HH collection costs due to increased recycling capture rates. Although recycling collection and treatment costs will increase, this will be more than offset by reduced residual collection and disposal costs leading to lower costs overall. As these costs will be borne by producers, higher levels of recycling and more efficient collections will mean lower compliance costs.

Based on WRAP's modelling of HH collection and treatment costs for the consistent municipal recycling IA, the cost of collecting and treating HH packaging recycling is expected to increase as waste is diverted from residual to recycling under the EPR option. By 2032 the cost of recycling HH packaging is expected to be £0.4m more than under the baseline option. These costs are however more than offset by savings due to the fall in the amount of packaging in residual waste. By 2032 collection and disposal costs for packaging in residual waste will be £6.3m less than under the baseline option. Overall, this leads to a net saving of £5.9m per year by 2032 to obligated producers as LAs will transfer collection costs to them once EPR is in place.

Table 27 - Difference in HH collection and treatment costs on baseline

£m	2023	2027	2032
Recycling	£0.0	£0.5	£0.4
Residual	-£3.3	-£6.8	-£6.3
Total	-£3.3	-£6.3	-£5.9

WRAP's modelling of the collection and treatment costs of NHM waste for the consistent municipal recycling IA shows that the net cost per tonne of collecting and treating packaging in residual waste is higher than collecting and treating dry mixed recycling. On this basis there are net savings for those businesses who are producing packaging waste and paying collection charges from diverting packaging from residual waste to recycling at the aggregate level. However, not all business-types benefit from these reductions in NHM residual as packaging producers will cover the cost of recycling in the NHM sector which is estimated to increase to £28.3m per year above the baseline level by 2032. However, as producers are not expected to cover NHM residual costs they will not benefit from the resulting savings. These savings, rising to £41.8m per year by 2032, instead accrue to

businesses in the NHM sector. Overall, there are net savings of £13.5m to businesses (NHM waste holders for residual waste and obligated producers for recycling waste) per year by 2032.

Table 28 - Difference in NHM collection and treatment costs on baseline, million

£m	2023	2027	2032
Recycling	£4.7	£20.8	£28.3
Residual	-£7.0	-£30.7	-£41.8
Total	-£2.3	-£9.9	-£13.5

Benefits to reprocessors

Secondary market profit margin

One of the main benefits to businesses is the material revenue originating from the sale of any additional packaging material sent for recycling. Whilst it is unclear whether reprocessors have the capacity at present to handle this increase, we have assumed that the prospective financial gains should offer a sufficient incentive for reprocessors to invest accordingly. This revenue is split between benefits to LAs and the wider economic benefits. Benefits to LAs occur as they sell these materials to third parties and receive income. This income is already accounted for in the assessment of the net cost of recycling collections. For this reason, we account for benefits to reprocessors only here.

These wider economic benefits occur down the supply chain, i.e. at the stage of reprocessing and recycling dry materials that are then sold on the secondary materials markets. These benefits are considered indirect, and therefore not included in the Equivalent Annual Net Direct Cost to businesses (EANDCB). To calculate total materials sold to the secondary materials markets we have used the projected recycling tonnages from the Pack Flow reports. We have then multiplied the tonnage placed on market for each material each year by the projected recycling rates. From that, we have removed the tonnage of material that is exported as the overseas reprocessors/recyclers would benefits from selling these materials in the secondary materials market. We have then multiplied the tonnage of reprocessed/recycled material by the reprocessed material prices. These are the prices paid in the secondary market when reprocessed materials are sold. Average reprocessed materials prices are assumed to be flat over the period to 2032. This is a limitation of the analysis which we will seek to refine in the final stage IA. The table below presents the reprocessed materials prices.

Table 29 - Reprocessed materials prices: baseline option (£/t)

	2023	2027	2032
Paper	400	400	400
Glass	50	50	50
Aluminium	1,578	1,578	1,578
Steel	560	560	560
Plastic	884	884	884

To account for the additional profit margin rather than the revenue, we have applied a proxy for profit margin to the turnover values based on data from the Annual Business Survey (ABS) which details GVA and turnover[63] for

[63]https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/datasets/uknonfinancialbusinesseconomyannualbusinesssurveysectionsas

individual sectors, including the UK recycling sector. We have assumed a gross margin of 25% for UK based recyclers. This is based on historical GVA/turnover for the materials recovery and glass/paper sectors. This is applied to the additional turnover resulting from the policies to estimate net impact on margins. This is a refinement of the analysis done in the previous IA that considered revenues rather than profits.

To sum up, this is the formula that has been used for each material for each year:

> **Placed on market tonnage * recycling rate *(1- % of recycled material that is exported) * reprocessed material price *0.25 = gross profit margin of reprocessors**

Table 30 shows the net gross profit to the recycling and reprocessors sectors under the baseline.

Table 30 - Baseline material gross profit from recycled material – central option

	2023	2027	2032
Reprocessors and recyclers gross profit margin	£241m	£267m	£271m

We have then calculated these benefits with recycling rates and tonnages for option 1 and to assess the additional revenues originating from the introduction of EPR we have netted the baseline revenues to those. We then netted the benefits that were already realised in the baseline option to present the additional benefits originating from EPR. Table 31 shows the net gross profit to the recycling and reprocessors sectors under option 1 net of the baseline. By 2032 there are £22.4m per year in additional gross profit to reprocessors.

Table 31 - Option 1 gross profit margin of recyclers/reprocessors (net of baseline) – best estimate option

	2023	2027	2032
Best estimate	£3.9m	£15.7m	£22.4m

Benefits to society

One environmental benefit of EPR is the reduction in greenhouse gas (GHG) emissions as a result of increased recycling rates for packaging waste. By 2032 there is estimated to be an additional 494Kt of packaging waste diverted to recycling from residual waste.

Table 32- Additional packaging diverted to recycling from residual waste (*Kt*) [64]

	2023	2027	2032
Plastic	28	91	140
Wood	3	9	8
Aluminium	1	2	3
Steel	4	52	78
Paper/Card	41	166	200
Glass	8	54	66
Total	**85**	**374**	**494**

[64] Figures might not add up due to rounding

Diverting packaging waste from residual waste to recycling will create GHG emissions savings. These are estimated in table 33. The calculations are based on BEIS greenhouse gas conversion factors from 2018[65]. These conversion factors allow organisations and individuals to calculate GHG emissions from a range of activities, including waste disposal and recycling[66]. Overall, there is predicted to be 276kt of traded emissions and 96Kt of non-traded emissions savings per year by 2032.

Table 33 - Traded and non-traded carbon reductions

Carbon reductions	Traded (t)			Non-Traded (t)		
	2023	**2027**	**2032**	**2023**	**2027**	**2032**
Plastic	29,553	95,708	146,631	15,708	50,868	77,934
Wood	414	1,202	1,155	-396	-1,149	-1,104
Aluminium	3,186	9,847	10,517	2,028	6,268	6,694
Steel	5,123	66,048	99,153	39	508	763
Paper/Card	2,485	10,005	12,071	2,424	9,759	11,775
Glass	771	5,007	6,136	54	349	427
Total	41,532	187,817	275,664	19,856	66,604	96,490

For each of the Options' GHG emissions savings, we applied the carbon prices as presented in Table 34 over the appraised period.

Table 34 - Applied carbon prices, in £/t of CO2

	Traded	**Non-Traded**
2021	37.04364	105.65
2022	46.39853	107.3819
2023	55.75342	109.1139
2024	65.10831	110.8459
2025	74.4632	112.5778
2026	83.81809	114.3098
2027	93.17298	116.0418
2028	102.5279	117.7737
2029	111.8828	119.5057
2030	121.2376	121.2376
2021	132.4954	132.4954
2033	143.7532	143.7532

By applying the carbon prices, it is estimated that £53.5m in societal benefits through greenhouse gas emissions reductions will be achieved per year as a result of EPR by 2032. These savings are presented in table 35.

Table 35 - Total carbon savings

	2023 (£m)	**2027 (£m)**	**2032 (£m)**

[65] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018

[66] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726911/2018_methodology_paper_FINAL_v01-00.pdf

Plastic	3.36	14.82	32.28
Wood	0.00	0.00	0.00
Aluminium	0.40	1.64	2.47
Steel	0.29	6.21	14.36
Paper/Card	0.40	2.06	3.43
Glass	0.05	0.51	0.94
Total	**4.48**	**25.28**	**53.50**

Non-monetised benefits:

- **A more vibrant domestic reprocessing market**: Proposals set out in the consultation aim to drive better design of packaging to enable greater recycling and to achieve consistency in the packaging materials collected for recycling. These measures are designed to increase the quantity and quality of material available to UK reprocessors, thereby increasing their confidence that they can access materials of the required quantity and quality on a consistent basis. This will be beneficial in creating a stronger, more stable and more vibrant domestic reprocessing market.

- **Reduced littering**: Improvements to the collection of packaging waste, producer-funded communication campaigns and recyclability labelling can result in less packaging waste being littered. The benefits of this are that there will be reduced costs associated with cleaning up litter and it will benefit the natural environment and improve people's experience of the environment. In this IA we have only been able to assess the cost of litter related to EPR material.

- **Reduced use of virgin materials**: The consultation sets out proposals that will look to achieve higher recycling targets. If more packaging waste is recycled this will benefit the secondary materials market. If secondary materials are cheaper than virgin materials, this should reduce virgin materials used in manufacturing. The benefits of this are to reduce the depletion of precious resources: the process of extraction can also harm habitats and landscapes. Conversely, making new products from recycled materials can cause less harm, using less water, less energy and generating lower carbon emissions. When we create new markets for recycled materials, we also make recycling more economically viable.
- **Reduced Contamination of recyclate:** As consumers respond to mandatory recyclability labels and they become more effective recyclers (i.e. they correctly put recyclable items in the recycling bins and put non-recyclables into residual waste), contamination levels at materials recovery facility (MRFs) are expected to reduce. This is likely to reduce the gate fees paid by LAs. LAs currently effectively 'pay twice' for contamination. They pay a gate fee for recycling materials to be sorted at MRFs, typically in the range £50-80 / tonne. This process removes non-recyclable and contaminating materials which then need to be disposed of at a typical cost of £100-150 / tonne.
- Furthermore, **Consumers**: We are proposing that producers should pay for the costs of providing information to consumers on recycling packaging and to encourage less littering of packaging waste and will consult on a framework for litter payments. Additionally, it is proposed that mandatory labelling should be adopted to clearly state whether primary packaging is recyclable or not. These labels would benefit consumers who would be much better informed on what packaging is recyclable and therefore make well informed choices on the products they buy.

In addition, these are some of the system-wide benefits to the producer responsibility system.

- **Incentives for long-term innovation and strategic planning**: the reforms will create a more stable and transparent system that will de-risk investment in innovation and encourage strategic planning.
- **Increased transparency:** Several measures have been proposed in the consultation that will help towards creating a clearer and fairer system. This will benefit all actors in the system by creating a level playing field and giving stakeholders confidence in the system.
- **Reduced packaging**: the EPR system will place additional costs on producers as they will have to cover the full net costs of managing the packaging they place on the market once it becomes waste. This per-tonne fee will be a strong driver to encourage producers to use less packaging. This will in turn reduce the use of virgin materials and as well as the environmental impact of the manufacturing process.
- **Circular economy**: all of the measures proposed in the consultation will help in creating a more circular economy where less material is wasted and more packaging is recycled.

EPR OPTION 2 OPTION 1 PLUS: PLASTIC FILMS & FLEXIBLES COLLECTED FOR RECYCLING

Structure of this section:

- Background
- Plastic film
- Costs
  - Obligated producers' costs
    - *Costs related to plastic film collection and recycling*
      - ➔ *Total net compliance costs borne by obligated producers*
  - *Public sector costs*
    - *Landfill tax (transfer)*
    - *Investment IT costs*
- Benefits
  - Benefits to businesses
  - Benefits to reprocessors
  - Benefits to society

BACKGROUND

Plastic film

Under this option we assume that provision will be made through the EPR scheme to enable plastic film & flexible packaging to be collected for recycling. The policy is under development and a phased introduction is being considered for the collection and recycling of this material. For this reason, the findings in this section should be treated as indicative and preliminary. The final stage IA will include a firmer policy proposal for this material.

In terms of evidence base, we have used some initial research undertaken by WRAP for Defra on the current collection infrastructure to understand cost and performance impacts of UK-wide collection of plastic film collections[67]. Separate to this, Suez has undertaken work on behalf of a consortium of businesses to understand

[67] To confirm we can use this in IA as it's part of a technical report 'for internal use'

the volume and weight of flexible plastic packaging placed on the UK market (POM) as well as to estimate the costs of collecting and preparing this material for recycling. The section below uses both sources. We will seek to refine the evidence base for the final stage IA.

Previous WRAP research has suggested there are 7 core polymer streams used in the manufacture of plastic carrier bags and film and flexible packaging for products. Most film packaging is made from low and high-density polyethylene and polypropylene.

The number of LAs collecting plastic film packaging for recycling is very low - see table 36. When plastic carrier bags are added the percentage of UK local authorities collecting film plastics for recycling, increases to 17%.

Table 36 – Proportion of LAs offering plastic film packaging collections[68]

	Number of LAs in UK	**LAs collecting plastic film packaging for recycling**	
		Number	**Percentage**
England	326	35	11%
Wales	22	3	14%
Scotland	32	2	13%
NI	11	0	0%
UK	391	40	10%

Placed on Market (POM)

There are uncertainties around the tonnages of plastic film packaging placed on the market every year, and consequently how much of this gets collected for recycling. Several studies and reviews have been undertaken each of which have produced different estimates. According to WRAP's Plastics Market Situation Report 2019[69] the total plastic packaging POM in 2017 (including both consumer (household-like packaging) and non-consumer (commercial & industrial incl. agriculture packaging)) is estimated to be around 2.4 million tonnes/year, of which approximately 760,000 tonnes is films. The estimated weight of total consumer [70]plastic film POM for 2017 is **395,000 tonnes**.

The WRAP research on plastic film highlights conflicting estimates for the weight of plastic film collected for recycling in the UK:

[68] Unpublished plastic film technical WRAP report, 2020

[69] WRAP. 2019. Plastics Market Situation

https://wrap.org.uk/resources/market-situation-reports/plastics-2019

[70] Report.https://www.wrap.org.uk/sites/files/wrap/WRAP_Plastics_market_situation_report.pdf
https://wrap.org.uk/resources/report/plasticflow-2025-plastic-packaging-flow-data-report

- The WRAP 2019 Plastics Market Situation Report reports that 18,000 tonnes of plastic film packaging was collected for recycling in 2017/18 (2017 data for Scotland)[71], meaning the recycling collection rate was 4.6%;
- The WRAP 2018 Composition of Plastic Waste Collected via Kerbside Report[72] estimates that in 2015/16, approximately 56,500 tonnes of plastic packaging film were collected through kerbside recycling schemes[73].

According to WRAP, the 18,000 figure is the more robust of the two. We will do further work ahead of the final IA to ensure this figure is accurate.

Work undertaken by Suez provides different estimates of plastic film packaging POM. Suez gathered data through a full review of available data including from published sources and from waste compositional data and packaging type analysis. The analysis by Suez considered all 'flexible' and 'film' packaging, and so included packaging items such as pouches and metallised plastics. They estimated flexible packaging placed on market to be 895,000 tonnes. This figure excludes contamination. Of this they estimated that 374,232 tonnes were arising in household waste and 520,667 tonnes in NHM waste. It is Suez's view that all 895,000 tonnes of flexible plastic packaging waste are being disposed of in landfill or EfW and that very limited amounts are from households or businesses for recycling. According to the latest RECOUP[74] data, plastic films collected for recycling from UK households was 21,000 tonnes in 2019. As WRAP has quoted RECOUP data in their studies, we have used this data as the current best estimate for plastic film packaging collected for recycling from UK households.

In terms of NHM plastic film our understanding from engagement with WRAP and Suez is that none is collected for recycling currently. We are planning some specific engagement with the plastics sector, so we will confirm that in the final IA.

[71] This was based on Recoup (2018): UK Household Plastics Collection Survey 2018.
[72] WRAP. 2018. Composition of Plastic Waste Collected via Kerbside Report.

https://wrap.org.uk/resources/report/composition-plastic-waste-collected-kerbside

[73] The 56,500 estimate is based on the assumed % of kerbside plastic recycling that is film packaging.
[74] https://www.recoup.org/news/7895/uk-household-plastics-collection-survey-2019

Table 37: Plastic film packaging POM per year according to different sources

	Weight (tonnes)
WRAP (2017 data)	
Total plastic packaging POM	2.4 million
Total plastic film packaging POM	760,000
Total consumer (household) plastic film packaging POM	395,000
Total consumer (non-household) plastic film packaging POM	233,000
Total non-consumer plastic film packaging POM	132,000
Plastic film collected at kerbside for recycling[75]	18,000
Suez	
Total consumer flexible packaging POM	895,000
Total consumer (household) flexible packaging POM	374,232
Total consumer (non-household) flexible packaging POM	520,667
RECOUP (2019)[76]	
Plastic collected for recycling from UK households	550,000
Plastic film collected from households for recycling	21,000

The WRAP and the SUEZ studies offer similar consumer POM figures that are expected to end up in the household waste stream (374kt – 395kt). The key difference between the two studies is their assumptions on the consumer POM that ends up in non-household settings (NHM). SUEZ expect 521kt of flexible packaging to be in the NHM waste stream, whereas WRAP expect 365kt of plastic film to be in the NHM and C&I waste stream. Using WRAP assumptions, we estimate the split of this non-household POM to be 233kt in the NHM waste stream and 132kt in the C&I waste stream.

More robust data on plastic films would significantly strengthen this analysis. We will seek to further our understanding for the final stage IA.

COSTS

Cost to obligated producers

Costs related to plastic film collection and recycling

Collection cost: This is the service cost defined as the cost of truck and crew attending a customer's site or residential premises to empty a container. Where films are collected for recycling, there appears to be inconsistency in the method of collection and how plastic film packaging is incorporated into recycling collections and where film plastics are collected for recycling by LAs a wide in the types of packaging collected.

WRAP research identified several challenges for materials recovery facilities (MRFs) in the sorting of film, which in part explains the low coverage of services and the mixed range of polymers accepted by LA collections. One of the

[75]Based on Recoup (2018): UK Household Plastics Collection Survey 2018.
[76] https://www.recoup.org/news/7895/uk-household-plastics-collection-survey-2019

challenges of this material is the low weight and irregularity of size that makes it difficult to be detected by standard sorting equipment and as a result most MRFs remove this material at the very start of the process, typically manually, in the pre-sort cabin to minimise further downstream issues.

WRAP reviewed existing LA film collections and found very limited data on collection costs and operational performance that could be used in this analysis. WRAP identified no specific cost and performance reporting mechanism for the collection of film, or other materials at present. Whilst there are reporting frameworks in WasteDataFlow and Revenue Outturns reported to central government the costs of collecting different types of materials are not reported separately and are therefore very difficult to isolate. There appears to be very limited case studies or evidence from existing schemes to provide indicative costs for services collecting film. The complexity in range of collection services and frequencies of collection mean a range of costs are needed to be developed in a standardised format to fairly compare the costs of systems.

Business (NHM) collection and sorting costs

A full review of available data and a bottom up analysis from waste compositional data and packaging type analysis was undertaken by Suez. According to their study, the service **cost for business collection** is estimated as follows:

- between £0.07 and £0.27 per kg in rural areas
- between £0.09 and £0.20 per kg in suburban areas
- between £0.07p and £0.16 per kg in urban areas.

For collections from business this assumes that films and flexible packaging is collected in a co-mingled manner. We will do further research for the final IA to ensure these figures are accurate.

Sorting costs - This is the cost of sorting the collected materials into a series of crude mono-streams ready for recycling and/or reprocessing. This cost will occur if a material is collected in a co-mingled stream as Suez have assumed in their study for collections from businesses.

The cost of sorting is expected to range between £0.14 and £0.45 per kg. The variation in cost is down to different plant sizes, levels of contamination and uncertainties.

Combining **collection** costs and **sorting** costs results in the following range:

- Lowest cost option - £0.21 per kg or £210/t
- Central cost option - £0.28 per kg or £280/t
- Highest cost option £0.72 per kg or £720/t

The distribution is not normal so that's why the average cost is skewed to the lower end[77]. This partly relates to the distribution of businesses within different rurality's, partly to the type of service likely to be adopted and then depending on the collection service, the type of sorting required.

According to the Suez study, the total flexible consumer packaging POM assumed to be appearing in non-household settings is 520ktpa. A lower estimate has also been included based on WRAP and Defra assumptions – this estimate assumes that 233ktpa of consumer plastic film ends up in non-household settings. According to Suez research, it should be achievable to reach a capture rate of 56% after 5/6 years of introduction of a plastic film collection.

[77] Based on Suez analysis and assumptions

Therefore, in the central case option, we have assumed that the policy will be in place by 2025 and that by 2032, the collection rate for plastic film will have increased to 56%. We have assumed a linear increase of collection rate between 2025 and 2032.

Table 38 presents the collection and sorting costs between 2025 and 2032 and the associated capture rate. These calculations do not consider any economies of scale that might happen as the collection rate increases.

Table 38: High cost option - Annual collection and sorting costs for businesses, based on SUEZ POM[78], £ mil

2024	2025	2026	2027	2028	2029	2030	2031	2032
0%	7%	14%	21%	28%	35%	42%	49%	56%
-	10.21	20.41	30.62	40.82	51.03	61.23	71.44	81.64

Table 39: Best case option - Annual collection and sorting costs for business, based on WRAP POM[79], £ mil

2024	2025	2026	2027	2028	2029	2030	2031	2032
0%	7%	14%	21%	28%	35%	42%	49%	56%
-	4.57	9.13	13.70	18.27	22.83	27.40	31.97	36.53

Household collection and sorting costs

Suez's study provided an estimate of average service costs by household. This is an average cost across all local authority types, reflecting different geographies and the time it takes to lift and empty recycling containers. Service cost is also influenced by the route density achieved by the collector which is independent of factors controlled by the householder. This cost is based on the cost of the truck and crew and efficiency of collection and the type of collection. The latter depends on how many collections can be undertaken by the vehicle and crew in one round.

The estimated total cost of **collecting** and local handling of film and flexible packaging for an average household is estimated at 0.47p per year. This is based on current service costs for all material and does not include incremental costs associated with adding films & flexibles into an existing service. It assumes that vehicle capacity will be freed up with the diversion of materials to DRS and hence film can be accommodated within existing vehicles.

Based on the 2019 RECOUP's study[80] that 21kt of plastic film is collected for recycling, we have estimated the recycling rate to be 5.3% (based on WRAP POM) and 5.6% (based on SUEZ POM)[81]. To calculate total collection costs in the UK in 2025, we have assumed that ~5% of households currently receive a plastic film packaging for recycling service. This is lower than the total proportion of UK households that are offered plastic film packaging collection (11%) – this makes sense on the basis that not all households will put plastic film packaging in their recycling bin. Tables 40 and 41 below present collection rate for recycling and the annual collection costs. The latter is found by multiplying the collection rate by the number of households in the UK by the cost of collection per

[78] Figures rounded to nearest £1,000
[79] Figures rounded to nearest £1,000
[80] https://www.recoup.org/news/7895/uk-household-plastics-collection-survey-2019
[81] 21k divided by 395k = 5.3% (WRAP POM). 21k divided by 374k = 5.6%. We have taken an average of these collection rates to get 5.5%

household. For instance, for the annual collection costs in 2023 (£0.72m) is equal to 27.6m (no. UK households) multiplied by the collection rate for recycling (5.6%) times the collection cost*s per household (£0.47).*

Table 40: High cost option - Annual collection costs for households, based on SUEZ POM[82] £ mil

	2024	2025	2026	2027	2028	2029	2030	2031	2032
Collection rate for recycling	5.6%	11.9%	18.2%	24.5%	30.8%	37.1%	43.4%	49.7%	56.0%
Annual collection costs	0.72	1.53	2.34	3.15	3.96	4.77	5.58	6.39	7.20

Table 41: Best case option - Annual collection costs for households, based on WRAP POM[83]£ mil

	2024	2025	2026	2027	2028	2029	2030	2031	2032
Collection rate for recycling	5.3%	11.6%	18.0%	24.3%	30.7%	37.0%	43.3%	49.7%	56.0%
Annual collection costs	0.68	1.50	2.31	3.13	3.94	4.76	5.57	6.39	7.20

We have no robust data on the average **sorting costs** for plastic films collected from households. We have therefore assumed an average sorting cost of £0.20[84] per kg based on Suez's estimates for NHM. We will try to improve this for final IA. Tables 42 and 43 show total costs of collection and sorting for household waste.

Table 42: Alternative cost option - Annual collection & sorting costs for household waste[85] based on SUEZ data £mil

	2024	2025	2026	2027	2028	2029	2030	2031	2032
Collection and recycling rate	5.6%	11.9%	18.2%	24.5%	30.8%	37.1%	43.4%	49.7%	56.0%
Sorting costs	4.12	8.76	13.40	18.03	22.67	27.31	31.94	36.58	41.22
Sorting and collection costs	4.84	10.29	15.74	21.18	26.63	32.08	37.52	42.97	48.42

Table 43: Best case option - Annual collection & sorting costs household waste[86] based on WRAP data £ mil

	2024	2025	2026	2027	2028	2029	2030	2031	2032
Collection and recycling rate	5.3%	11.7%	18.0%	24.3%	30.7%	37.0%	43.3%	49.7%	56.0%
Sorting costs	4.13	9.05	13.97	18.89	23.82	28.74	33.66	38.58	43.50
Sorting and collection costs	4.81	10.55	16.29	22.02	27.76	33.50	39.23	44.97	50.70

One-off costs

The WRAP research highlighted that should there be a need to include film in a core set of recycling materials, then for the material entering MRFs, there would be a need for investment in MRFs. Currently, there is no register of existing equipment within the around 90 MRFs in England that could help inform whether they could manage

[82] Figures rounded to nearest £1,000, based on 27.6m households in the UK. We have assumed that 10% of households currently have plastic film collected for recycling (at a cost of £0.47 per household per year)

[83] Based on 27.6m households in the UK. We have assumed that 10% of households currently have plastic film collected for recycling (at a cost of £0.47 per household per year)

84 This was calculated by taking the average of the NHM film sorting costs (£0.14 - £0.45) and multiplying the value by 2/3. This is due to the cost distribution skewed to the lower end.

[85] Figures rounded to nearest £1,000, based on 27.6m households in the UK. We have assumed that 10% of households currently have plastic film collected for recycling (at a cost of £0.47 per household per year)

[86] Based on 27.6m households in the UK. We have assumed that 10% of households currently have plastic film collected for recycling (at a cost of £0.47 per household per year)

plastic film or what areas would need investment. However, with only a few MRFs accepting film currently it would be reasonable to suggest that most sites would need to invest in appropriate equipment, assuming sufficient space is available to handle and store plastic film.

At this stage we are not able to provide one-off costs that MRFs will incur as this will depend on their needs and what the existing plant already has installed. It will also depend on decisions on how householders and businesses will be asked to present film plastics for collection and how the film plastics will be collected. WRAP provided some example of costs that might be needed depending on the picking line used to sort plastic film. Costs provided are indicative only and will vary from site to site depending on the complexity of the plant and the integration work required. The different systems could vary from manual pickers, to a picking station with vacuum extraction system, vacuum extraction direct from belt, air knife or a Near infra-red (NIR) sorting.

Compliance costs of obligated producers

As in option 1 producers will be expected to pay for the full net cost of collecting and sorting recyclable packaging waste from the municipal sector (HH and NHM) as well as the management of packaging in residual waste in the HH sector. Under option 2 these costs include the addition of plastic film collection and sorting costs for recycling which we have calculated as described above.

In table 44 we have presented these costs. We are not presenting the calculations as we have followed the same methodology and assumptions as option 1, and the reason why the compliance costs are different is because of the addition of plastic film recycling costs. Technologist costs, redesign costs associated with mandatory labelling, training costs, familiarisation costs, EPR scheme governance and administrative costs, litter costs, mandatory labelling costs and communications campaign costs are expected to be the same as option 1. For the methodology taken to calculate them please refer to the option 1 section on costs.

Table 44 shows the total costs borne by obligated packaging producers under option 2.

Table 44 - Net cost of compliance borne by obligated producers under option 2, £million

	2023	**2027**	**2032**
HH collection and sorting plastic film costs	-	22.0	50.7
NHM collection and sorting plastic film costs	-	13.7	36.5
HH recycling collection costs	683.4	794.1	821.5
NHM recycling collection costs	248.7	363.7	376.4
HH - residual waste collection costs	289.1	279.8	251.0
Compliance costs baseline	-4.9	-6.8	-6.3
packaging technologist costs	45.7	-	-
training costs	3.5	3.4	3.3
Familiarisation costs	0.8	-	-
Governance and administration costs	22.0	23.5	25.5
IT costs	1.0	1.0	1.0
Admin costs with running mandatory labelling system	6.7	5.9	5.3
Comms campaign costs	0.7	0.5	0.5
Total	**1,296.7**	**1498.8**	**1565.4**

Public sector costs

Landfill tax

As option one there will be a decrease in landfill tax revenue as government receive less in landfill tax receipts than the baseline option due to the reduction in residual waste as more packaging waste is recycled. This is not a cost but a transfer from government to waste holders. The methodology used is the same as option one, but costs are different as residual tonnages change compared to option one.

Table 45 - Reduction in landfill tax net of baseline, million

Landfill tax expenditure – (£m)	2023	2027	2032
Total	£2.1	£11.9	£19.5

Investment IT costs

Same as option 1.

BENEFITS

The collection of plastic film for recycling will increase the overall recycling rate for plastic packaging, as not only will modulated fees offer a financial incentive for producers to shift towards more easily recyclable materials, but more materials will be collected for recycling funded by producers under option 2. We have assumed that by 2032 the capture rate for film plastic will increase to 56%[87] from 5% in 2024 for household plastic film and from 0% in 2024 for plastic film from non-household municipal sources. We are making this assumption as we would have a collection system in place for plastic film (which currently we don't have in most LAs) and we would expect this material to go to reprocessing/recycling plants which in turn would increase recycling rate of plastic film. This will increase the supply of plastic film for recycling; certainty of supply will in turn incentivise the development of more reprocessing capacity; and an increase in the availability of recycled plastic will help to reduce plastic packaging tax payments of producers.

We have not been able to quantify the benefits resulting from the end markets for clean plastic film.

Benefits to businesses

Based on WRAP's modelling of HH collection and treatment costs for the consistent municipal recycling IA, the cost of collecting and treating HH packaging recycling is expected to increase as waste is diverted from residual to recycling under the EPR option. Under option 2 there are also additional costs attributed to plastic film collection.

Under this option there is also the additional cost of collecting film packaging from 2025. By 2032 the cost of recycling HH packaging is expected to be £51.1m more than under the baseline option. There are savings from reduced collection of residual waste however these costs are lower than the increase in the cost of recycling. By 2032 residual collection and disposal costs will be £34.9 lower than under the baseline option. Overall, this leads to additional net costs of £16.2m per year by 2032.

[87] Based on industry estimates

Table 46 - Difference in HH collection and treatment costs on baseline (£m)

	2023	2027	2032
Recycling	£0.0	£22.5	£51.1
Residual	-£3.3	-£11.0	-£34.9
Total	-£3.3	£11.5	£16.2

The cost per tonne of collecting and treating residual and recycling packaging in the NHM sector is taken from WRAP's modelling of waste management costs for the consistent recycling IA. Based on these assumptions recycling costs are expected to increase to £62m above the baseline by 2032. However, there will be savings of £63.8m from reduced residual waste collection and treatment costs.

As discussed in option 1, the increased cost of NHM recycling will be borne by packaging producers. However, as packaging producers aren't expected to cover NHM residual collection costs they will not benefit from the associated savings; these instead accrue to businesses in the NHM sector. Across all businesses there are net savings of £1.6m per year by 2032.

Table 47 - Difference in NHM collection and treatment costs on baseline, £million

	2023	2027	2032
Recycling	£4.5	£33.1	£62.0
Residual	-£6.7	-£38.5	-£63.8
Total	-£2.2	-£5.4	-£1.6

Benefits to reprocessors

Secondary market profit margin

We have used the same methodology as for option 1 to calculate benefits originating from the material revenue of the packaging material sent for recycling. These costs are different from option 1 as with the introduction of plastic film collection we expect an increase in material sent to reprocessors and recycling plants.

Table 48 shows the net gross profit to the recycling and reprocessors sectors under option 2 net of the baseline.

Table 48 - Option 2 gross profit margin of recyclers/reprocessors (net of baseline) – best estimate option

	2023	2027	2032
Best estimate	£3.6m	£760.5m	£48.7m

Benefits to society

One environmental benefit of EPR is the reduction in greenhouse gas (GHG) emissions due to increased recycling. By 2032 there is estimated to be an additional 750Kt of packaging waste diverted to recycling from residual waste.

Table 49 - Additional packaging diverted to recycling from residual waste

	2023 (Kt)	2027 (Kt)	2032 (Kt)
Plastic	22	177	395
Wood	3	9	8
Aluminium	1	2	3

Steel	4	52	78
Paper/Card	41	166	200
Glass	8	54	66
Total	79	459	750

Diverting recyclable materials from residual waste to recycling will create GHG emissions savings. These are estimated in Table 50. The calculations are based on BEIS greenhouse gas conversion factors from 2018. Overall, there is predicted to be 547kt of traded emissions and 239Kt of non-traded emissions savings per year by 2032.

Table 50 - Traded and non-traded carbon reductions

Carbon reductions	**Traded (t)**			**Non-Traded (t)**		
	2023	**2027**	**2032**	**2023**	**2027**	**2032**
Plastic	23,284	186,296	415,625	12,375	99,016	220,904
Wood	414	1,202	1,155	-396	-1,149	-1,104
Aluminium	3,186	9,847	10,517	2,028	6,268	6,694
Steel	5,123	66,048	99,153	39	508	763
Paper/Card	2,485	10,005	12,071	2,424	9,759	11,775
Glass	771	5,007	6,171	54	349	427
Total	35,263	278,405	544,659	16,524	114,751	239,461

For each of the Options' GHG emissions savings, we applied the carbon prices as presented in Table 51 over the appraised period. Under option 2 it is estimated that there will be an additional £113m of societal benefits from greenhouse gas emission reductions annually by 2032, relative to option 1.

Table 51 - Total carbon savings

	2023 (£m)	**2027 (£m)**	**2032 (£m)**
Plastic	£2.7	£28.8	£91.5
Wood	£0.0	£0.0	£0.0
Aluminium	£0.4	£1.6	£2.5
Steel	£0.3	£6.2	£14.4
Paper/Card	£0.4	£2.1	£3.4
Glass	£0.0	£0.5	£0.9
Total	£3.8	£39.3	£112.7

EPR OPTION 3: OPTION 2 + SINGLE USE PAPER CUPS TAKE BACK

This option assumes the introduction of EPR, modulated fees, mandatory labelling and plastic film collection, as set out in option 2, as well as the introduction of mandatory reporting and take back of disposable paper cups. There is no crossover in the analysis between option 2 and the inclusion of a single use paper cups take back requirement, so it is possible to sum the impacts for option 2 with the impacts of introducing a single use paper cups take back requirement. More details on the costs and benefits of single use paper cup collection can be found below. We then present a summary table of these impacts summed with the impacts of option 2.

Overall option 3 is our preferred option as it delivers the highest NPV and is the most ambitious option that would address stakeholder pressure to include plastic film for recycling as part of the policy. It would also include paper cup collection further reducing the environmental costs associated with single use paper cups. Government is seeking views through the consultation on placing a mandatory takeback obligation on sellers of filled disposable paper cups, and any impacts this may have on sellers and consumers. This obligation would require the separate collection and recycling of single-use paper cups.

BACKGROUND

If we chose not to introduce specific measures for single use disposable cups, the packaging would still be obligated under the EPR scheme as paper/card packaging (as now). We would instead be relying on the continuation of voluntary industry initiatives to increase the collection and recycling of paper cups. These have had a positive impact so far, but understandably a relatively small impact compared to our level of ambition. Indeed, in 2018 the UK cup recycling rate was estimated to be 1 in 400 (0.25%). In addition, it is difficult to quantify the impact of voluntary measures with no mandatory reporting in place.

Government is seeking views through the consultation on placing a mandatory reporting and take-back requirement on sellers of filled disposable paper cups – replicating and building on current good practice within the industry. This would mean sellers of filled disposable cups providing collection points instore or at front of shop and arranging for the collection and recycling of these cups (the requirement will likely depend on the size of the business or store). This will increase the supply of separately collected disposable cups, which in turn could make the recycling of disposable cups (and other fibre-based composite material) more financially viable. Disposable paper cups (and other fibre-based composite material) require more intensive reprocessing – when the supply of fibre-based composite material is low, reprocessors are less likely to run the more costly reprocessing operations or invest in the necessary infrastructure in the first place. This will also give government the data necessary to monitor recycling performance and set future recycling targets. In turn this would inform the deployment of further measures by the sector (such as collection points at transport hubs or outside office blocks) that may be necessary to increase recycling rates to meet future targets.

The proposal for a mandatory take-back of disposable cups may also incentivise sellers to reduce the number of disposable cups they place on the market in the first instance. We have not factored this assumption (i.e. a falling placed on the market trend) into our analysis due to the uncertainty around behavioural change. Beyond these packaging reforms, behavioural change will be influenced by the Covid-19 pandemic, technological advances and consumer preferences. Given the uncertainty around the weight of these factors, we have held our estimated POM figure for disposable cups constant over the appraisal period.

Assumptions

Paper cups POM: The most commonly reported figure for disposable paper cups placed on the market is an estimated 2.5bn units – however Eunomia estimated the number of paper cups placed on the market to be as high

as 5bn in 2017[88]. In the absence of more reliable data – we have assumed that this higher estimate of 5bn includes all disposable paper cups (cups suitable for both hot drinks (e.g. coffee cups) and cold drinks (e.g. milkshake cups). Our modelling is based on this higher estimate as to reduce the likelihood that we are underestimating the POM figure, and because we have assumed Eunomia are a more reliable source of data. However, this assumption will be tested further ahead of the final IA. We have then inflated the POM figure from a 2017 level to a 2023 level in line with a growth rate proposed by the Environmental Audit Committee[89], resulting in 2023 POM of 5.9bn units (equivalent to 107k tonnes[90]) and assumed this figure each year to 2032.

Cup recycling rate (baseline): The Environmental Audit Committee reported the recycling rate of disposable cups to be 0.25%[91] in 2017. This recycling rate has been widely reported in recent years by academics and journalists. The National Cup Recycling scheme set a target recycling rate of 8% by 2020 for current members. We have therefore assumed in the baseline, that in 2023 the recycling rate for cups will be 0.25% and by 2032, the overall recycling rate for cups will reach 8%, growing gradually each year.

Cup recycling rate (with mandatory takeback on producers): With mandatory takeback in place, it is expected that in 2023 the recycling rate for paper cups will increase to 39.25%. This figure was derived using evidence from the 'Leeds by example' study[92]. The study found that following the roll out of new cup recycling bins and a communication campaign, the number of people who said they recycled their paper cups increased from 14% to 53%. We took the percentage point difference and applied it to our baseline recycling rate for paper cups (0.25%)[93]. Thereafter, a 1% increase in recycling rate was applied each year during the appraisal period to represent consumers adjusting over time to being asked to, and being able to, deposit used cups at recycling points. This assumption is based on 'stated' evidence, and thus should be treated with caution.

MONETISED COSTS

Disposable cup collection costs

We have two estimates of collection costs – a higher cost (£195/tonne) and a lower cost (£189/tonne)[94]. These costs were estimated internally by Defra analysts based on insights provided by WRAP. The £195/tonne cost is the sum of the recyclate 'collect and sort' charge waste collectors require when they collect plastic waste from 'hotels and catering' outlets (£125/tonne)[95] and the reward that Valpak as scheme administrator for the National Cup

[88] https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/65705.htm
[89] ibid
[90] Assuming that each cup weighs 18g.
[91] https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/657/65705.htm
[92] https://issuu.com/hubbubuk/docs/double_lbe_report_2019_digital
[93] The percentage point difference should be treated with caution due to evidence being 'stated' rather than 'revealed'. However, both samples of interviewees would have been subject to the same inclination to report that they had recycled their cup when they had not.
[94] Kerbside collection for households and private waste collections for businesses are the two main disposal avenues for fibre-based composite packaging currently – the **business** collect and sort cost for plastic has been used rather than the **household** LA collect and sort cost for plastic as it is slightly higher which we estimate to be more appropriate given the need to sort composite packaging from the 'paper stream'.
[95] WRAP

Recycling Scheme pays waste collectors to collect a tonne of paper cups (£70). The low cost (£189/tonne) is the sum of the recyclate 'collect and sort' charge waste collectors require when they collect businesses paper waste (£119/tonne)[96] from hotel and catering outlets and the reward that the National Cup Recycling Scheme pays waste collectors to collect a tonne of paper cups (£70). The plastic waste 'collect and sort' cost is slightly higher than the 'collect and sort' cost for paper due to the volume of plastic that can be collected being lower than the volume of paper being collected per tonne. The higher cost (£195/tonne) has been used in this analysis. The £70 reward from the National Cup Recycling Scheme is described as the additional revenue that waste collectors need to receive to make collecting the paper cups financially viable. The collections cost presented in table 52 are net of the baseline costs.

Table 52 – Disposable cup collection costs, net of the baseline costs (£m)

Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	**Total**
Collection costs	8.14	8.25	8.37	8.48	8.59	8.71	8.83	8.95	9.07	9.19	**86.59**

New disposable cup bins

From discussions with stakeholders the cost of a disposable cup bin that allows the public to separate the different components of cups, is approximately £300. The total cost of purchasing bins would be paid by sellers that place filled paper cups on the market – 'disposable cup outlets'. For the purposes of this analysis we have assumed that all paper cup outlets will be in-scope (~32,200). This will include ~13,200 'non-specialist outlets' (restaurants that sell take-away drinks), ~8,500 independent 'coffee shops' and ~10,400 'branded coffee shop outlets' in 2023.

It has been assumed that one bin per outlet will be installed in the UK – this does not necessarily mean that each disposable cup outlet will pay for one bin - the costs will be spread depending on the proportion of cups placed on the market. All bins will be installed by the end of 2023 and estimated to cost £9.67m.

Landfill tax

We have used the 2021 landfill tax rate of £96.70/tonne and held this constant over the appraisal period. As the recycling rate increases the amount of waste sent to landfill will fall – this will be a cost to HMT but a saving to LAs and businesses who pay for waste collection services.

Table 53 – Loss of landfill tax to government

Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	**Total**
Loss of landfill tax	0.93	0.94	0.96	0.97	0.98	1.00	1.01	1.02	1.04	1.05	**9.90**

Training and familiarisation costs

We have assumed that that the average coffee shop worker is paid £9.25[97]/hour, and each shop will spend a total of 2 hours training their staff on disposable cup collections each year. Overheads at 22% were added to this cost to businesses.

Table 54 training and familiarisation costs, £million

Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	**Total**
Training	0.73	0.74	0.76	0.77	0.79	0.80	0.82	0.84	0.85	0.87	**7.97**
Familiarisation	0.73	-	-	-	-	-	-	-	-	-	**0.73**

[96] WRAP

[97] 2020 UK minimum wage uplifted to 2023 prices (assuming 2% growth rate each year). The wage level is expected to increase by 2% each year thereafter.

MONETISED BENEFITS

Litter clean-up cost savings

Some initial findings from the Eunomia litter study on litter costs[98] found that LAs spend approximately £30m on clearing littered disposable cups each year. We have assumed that these costs occur in the baseline in 2023 as we have assumed that there is no change in the recycling rate of disposable cups until 2023. From 2023 onwards, we expect the litter costs in the baseline to fall steadily in line with the steady increase in baseline recycling rate. In this option, when the take-back requirement is implemented, the recycling rate is expected to increase, and the litter costs are similarly expected to fall proportionately. The net savings associated with reduced clearing of littered disposable cups are presented in table 55.

Table 55 – Savings associated with reduced clearing of littered disposable cups (£m)

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	**Total**
Litter savings	11.80	11.72	11.64	11.57	11.49	11.42	11.35	11.27	11.20	11.13	**114.59**

Greenhouse gas (GHG) emission savings

The tonnes of GHG emissions associated with disposing of cups when they become waste is expected to fall under the proposed reform, compared to the baseline option.

Changes in GHG emissions are defined as traded or non-traded, depending on whether they occur in sectors covered under the EU Emissions Trading Scheme[99] (ETS), primarily electricity generation/energy-intensive industry ('traded emissions') or outside the EU ETS, primarily transport, waste disposal and heating ('non-traded emissions'). In the case of waste, emissions from waste sent to landfill and incineration are non-traded, and emissions from recycling or composting are traded. The GHG emission savings are the result of the policies increasing the amount of material being recycled and reducing the amount of waste that ends up in landfill/incineration plants.

Through the introduction of DRS, we are assuming that although the production of disposable cups will remain constant over the period, more will be collected as recyclate rather than residual given changes in consumer behaviour. Increased recycling will reduce the (traded) GHG emissions associated with raw material extraction, product manufacturing and waste management (recycling materials is generally less carbon intensive than EfW).

Reduced use of landfill will lower the (non-traded) GHG emissions. In the case of landfill, biodegradable waste (paper for example) can decompose anaerobically, generating methane, a potent GHG. The incineration of fossil-based waste (plastic for example) releases CO_2 into the atmosphere – also a potent GHG. Despite both of these waste treatment methods usually recovering some energy, they remain for many materials, a net GHG contributor. Therefore, by diverting waste away from these disposal streams and by increasing the amount of recycled material, the policies will reduce GHG emissions.

These reduced tonnes of GHG emissions can be monetised using carbon prices so that we have monetised 'GHG savings'. To calculate the GHG Mts of emissions associated with a tonne of cups becoming waste, we used 95% of GHG Mts associated with a tonne of paper becoming waste and 5% of the GHG Mts associated with a tonne of

[98] Add source

[99] Although incineration emissions are non-traded, the energy recovery component from incinerating municipal waste generates energy which offsets the need to produce that energy through existing UK power plants. That offset is counted as traded emissions savings.

plastic becoming waste – a disposable cup is typically 95% paper and 5% plastic. These factors were then multiplied by £/tonne GHG traded and non-traded units provided by BEIS.

Table 56 – UK traded carbon factors for paper and plastic. The reduction in GHG emissions associated with a tonne of material being recycled rather than disposed of in residual waste.

UK traded	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Paper	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06
Plastic	-1.05	-1.05	-1.05	-1.05	-1.05	-1.05	-1.05	-1.05	-1.05	-1.05
Disposable cups	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11

Table 57 – UK non-traded carbon factors for paper and plastic. The reduction in GHG emissions associated with a tonne of material being recycled rather than disposed of in residual waste.

UK non-traded	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Paper	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07
Plastic	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55	-0.55
Disposable cups	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10

Table 58 – GHG emission savings (£m)

Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	**Total**
GHG emission savings	0.69	0.75	0.81	0.88	0.94	1.01	1.08	1.15	1.27	1.40	**9.97**

Material revenue

From engagement with reprocessors we have estimated that recycled disposable cups can be sold for ~£70/tonne upwards. We have taken the low estimate from our research to estimate the potential benefits of intervention.

Table 59 – Material revenue benefits from increased recycling of disposable cups (£m)

Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	**Total**
Material Revenue	2.92	2.96	3.00	3.04	3.09	3.13	3.17	3.21	3.26	3.30	**31.08**

Residual waste savings

The savings per tonne of waste no longer being disposed of as residual waste and instead being recycled is assumed to be approximately £50.48/tonne for businesses. This is derived from WRAP data for the unit cost per tonne of collecting and disposing of residual waste of £147.18 with the landfill tax deducted so that only the collection/gate fee cost remains.

Table 60 – residual waste savings, £m

Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	**Total**
Residual waste savings	2.33	2.36	2.40	2.43	2.46	2.49	2.53	2.56	2.60	2.63	**24.79**

Table 61 - Summary of Option 3 costs and benefits, £m

	2023	**2027**	**2032**
Transition costs			
EPR and labelling packaging technologist and familiarisation costs to producers	£46.5		
IT Investment costs	£3.7		
Disposable cup take back familiarisation and bin costs to businesses	£10.4		
Costs			
Additional administrative and governance costs	£11.9	£12.5	£13.7
Landfill Tax loss to HMT	£3.0	£12.9	£20.5
Compliance costs to producers (HH recycling and residual, NHM residual, litter and HWRC waste collection and treatment)	HH: £972.4 NHM: £248.7 HWRC: £42.8 Litter: £97.7	HH: £1,093.9 NHM: £377.4 HWRC: £42.7 Litter: £97.7	HH: £1,123.2 NHM: £412.9 HWRC: £42.6 Litter: £97.7
Loss of funding benefiting current PRN beneficiaries	£471.0	£499.8	£534.3
EPR and labelling training costs to producers	£3.5	£3.4	£3.3
EPR communications campaign costs	£0.7	£0.5	£0.5
Cost to producers of disposable cup collection	£8.1	£8.6	£9.2
Disposable cup take-back training costs to businesses	£0.7	£0.8	£0.9
TOTAL COSTS (incl. transition)	£1,817.7	£2,205.8	£2,371.9
Benefits			
Greenhouse gas emissions savings	£4.5	£40.2	£114.1
Additional material revenue for recycling sector	£6.5	£28.6	£52.0
Savings to LAs (HH, HWRC and litter packaging collection and treatment) and businesses (NHM residual collection and disposal) from reduced packaging recycling and waste management costs	HH: £972.4 NHM: £248.7 HWRC: £42.8 Litter: £97.7	HH: £1,093.9 NHM: £377.4 HWRC: £42.7 Litter: £97.7	HH: £1,123.2 NHM: £412.9 HWRC: £42.6 Litter: £97.7

Net savings (or costs) from residual and recycling treatment (incl landfill tax saving) borne by producers and businesses	HH: £3.3 NHM: £2.2	HH: -£11.5 (net cost) NHM: £5.4	HH: -£16.2 (net cost) NHM: £1.6
Savings to packaging producers from removing current PRN compliance costs	£471.0	£499.8	£534.3
Disposable cup litter and residual savings (incl landfill tax savings)	£15.1	£14.9	£14.8
TOTAL BENEFITS	£1,771.1	£2,244.7	£2,490.3

SECTION 6: RATIONALE AND EVIDENCE THAT JUSTIFY THE LEVEL OF ANALYSIS USED IN THE IA (PROPORTIONALITY APPROACH)

We have significantly expanded the evidence base and analysis compared to the 2019 consultation stage impact assessment. There are still some evidence gaps highlighted in the IA and we will seek to refine for the final stage IA. Due to lack of evidence or available data the following areas were not included in this IA:

- Obligated producers – online marketplace impacts
- Packaging data by material and format. Some gaps will be filled in the final IA but substantive improvements in data will not start happening until the new system are in place.
- Non-compliance penalties
- Potential impacts on consumer product prices (some work on this has been done)
- Likely positive impact to domestic reprocessing market

SECTION 7: WIDER IMPACTS

- Regional/distributional impact: payments to LAs will take account of rurality and level of deprivation and performance expectations.
- Impacts on trade flows: we are not expecting any impacts on trade flows. We are aware that there might be some issues on the labelling front if goods are exported/imported and we intend to follow procedures required to avoid this.
- Impact on competition: at this stage we do not envisage any impact on competition as a result of the policy.

SMALL AND MICRO SIZE BUSINESS ASSESSMENT (SAMBA)

Under the Producer Responsibility Obligations (Packaging Waste) Regulations 2007, a producer is an 'obligated' packaging producer if it, or a group of companies it is part of, handled at least 50 tonnes of packaging materials in the previous calendar year and has a turnover of more than £2 million a year (based on the previous financial year's accounts)[100]. This threshold is called the 'de minimis' and was set to exempt small businesses from the burden of complying with the current packaging producer responsibility regulations. At the time of preparing this analysis the

[100] https://www.gov.uk/guidance/packaging-producer-responsibilities

number of obligated companies is assumed to be 6,780 (average of the number registered over the period 2005-17).

Defra has engaged with SMEs in our stakeholder engagement process and has considered carefully any options that may put an unnecessary burden on SMEs. The responses to the 2019 consultation did not provide a steer on the options presented for the de minimis, with an even split of respondents expressing a preference for the following outcomes: reduce the de minimis, retain the current de minimis, and don't know/either replies. There was concern amongst some for finding a balance between excessive burden being placed on small businesses versus the strong belief in the 'polluter pays' principle.

Our proposal[101] is that under the EPR scheme Brand Owners and Importers should be obligated to pay modulated fees to cover waste management costs (for the packaging they fill or have filled in the case of the Brand Owner, and for the filled packaging they import in the case of the Importer). There will also be a reporting obligation on Sellers (e.g. supermarkets) and others to report where they place packaging on the market. There will be an obligation on Distributors (see below) and an obligation on Online Marketplaces to report the packaging being sold through their marketplaces and pay modulated waste management cost fees.

In the cost benefit analysis presented in this IA we have assumed that under all options the de minimis threshold will be lowered to up to 25 tonnes and £1m turnover, for packaging producers who will be obligated to pay modulated fees. It is also proposed that Distributors (person who sells unfilled packaging to businesses, for example a wholesalers selling unfilled disposable cups to coffee shops) and any other businesses who sell directly to producers who fall *below* this new de-minimis threshold would take on the obligation on their behalf. While for the mandatory labelling we have assumed no de minimis threshold.

Below we consider separately the effect of lowering the de minimis threshold for the obligated producers, followed by a discussion of applying no de minimis threshold for mandatory labelling and how we are going to mitigate any possible disproportionate impact on small and micro enterprises.

- *De minimis threshold for obligated producers complying with modulated fees*

Since the 2019 consultation, we have significantly improved the evidence base by commissioning an external evidence project that investigated the number of companies below the current de-minimis threshold, and the tonnage of packaging handled by those companies[102]. The report provided six hypothetical de-minimis options, structured around point of compliance and removal or decrease of the de minimis threshold. The report informed our decision on our preferred approach to small and micro businesses. Eunomia was not able to include an option of "Brand Owner" because of the limitations of the data. Importers were also not included in the analysis by Eunomia.

Table 62 contains findings for these hypothetical options, showing additional obligated companies and estimated additional tonnes of packaging handled by these companies. The table shows both the option where the de minimis is completely removed and the option where the de minimis threshold is lowered (from £2m turnover to £1m and from 50t of packaging handled to 25t of packaging handled); these two options are assessed against different points of compliance (sellers and packer/fillers).

[101] This is a simplified description of the obligations we are proposing. Please refer to the consultation document for more detail.
[102] Reforming the packaging producer responsibility system Impact assessment

The estimates of additional tonnage vary between the Sellers and Packer/Fillers options. A possible explanation for this is that different amounts of tonnage are handled by those businesses who are currently above the de-minimis, meaning that different amounts of tonnage would be added when lowering or removing the de-minimis. This could be due to several factors, including the fact that in the current system some packaging will be discarded, exported, or sold to those below the de-minimis and therefore would not subsequently be reported by the next in the chain.

In the absence of better evidence, we have made the simplifying assumption that the estimated additional tonnes of packaging handled is constant among businesses, regardless of their size. For each option we have therefore divided the total tonnages by the total number of businesses that handle that tonnage. These tonnages are presented in the last column of table 62. Under this assumption the average tonnage handled by newly obligated businesses are not constant across the different options. We are unable to verify the robustness of this and we will seek to strengthen this for the final IA.

Table 62 – Number of additional businesses included, and additional tonnes of packaging handled under the different options

Option	Micro (<10 employees)	Small (10-24 employees)	Medium (50-249 employees)	Large (250+ employees)	Additional businesses (a)	Estimated additional tonnes of packaging handled (b)	Estimated tonnes of packaging handled by each business (b/a)
Single Point Compliance: Sellers							
De-minimis Removed	9,398	2,071	787	263	12,519	336,740	27
£1m turnover and 25t	746	164	62	21	994	111,805	112
Single Point Compliance: Packer/Fillers							
De-minimis Removed	3,117	687	261	87	4,153	612,764	148
£1m turnover and 25t	326	72	27	9	434	147,482	340

We have then calculated an estimated compliance cost per tonne of packaging handled (including admin costs) for our preferred option (option 3). These are presented in table 63.

Table 63 – Estimated compliance costs (incl. admin costs) per tonne of packaging handled

	2023	2027	2032
Compliance cost per tonne	£ 232	£ 230	£ 228

To estimate the new burden, we have multiplied these compliance costs per tonne by the average tonnes handled by micro and small businesses in each option. These findings are presented in table 64. As the average tonnage handled by newly obligated businesses is not constant across options, the additional burden to small and micro businesses changes depending on the point of compliance and then de minimis level.

Table 64 – Estimated annual compliance costs (incl. admin costs) for each micro and small business

Option	Estimated additional tonnes of packaging handled[103]104	Estimated compliance costs per micro or small business		
		2023	2027	2032
Single Point Compliance: Sellers				
De-minimis Removed	27	6,247	6,195	6,130
£1m turnover and 25t	112	26,123	25,905	25,632
Single Point Compliance: Packer/Fillers				
De-minimis Removed	148	34,267	33,981	33,624
£1m turnover and 25t	340	78,922	78,263	77,439

At this stage we are unable to determine whether these costs will put a disproportionate burden on micro and small businesses. We will seek further evidence during consultation and for the final IA when the policy will be more developed, and a final decision made and reflected in the IA.

- *Impact on small businesses of complying with mandatory labelling*

We expect the packaging technologist costs to small/micro businesses to be £52.60/SKU. This cost represents the cost to the small/micro business of complying with the labelling requirement. We have doubled the expected cost per SKU for small/micro businesses due to them being more likely to rely on contractors and not having the economies of scale that larger businesses might have to drive the costs down. According to Defra procured research on the impact of removing or lowering the De Minimis threshold (set out in table 62), the total number of pack/fillers handling consumer packaging that are expected to be small/micro businesses is 3,804. Therefore, of the 6,870 producers expected to comply with mandatory labelling/modulated fees, 55% are expected to be small/micro businesses. However, whilst the total packaging technologist costs are high (£91m in total), small/micro businesses would only be covering a small proportion of this cost as they are assumed to be placing significantly fewer SKU's on the market. In the absence of reliable data, (and with an understanding that there is a significant variation in the number of SKUs placed on the market by small/micro businesses) we have assumed that small/micro businesses on average place 15 different SKUs on the market. This is a best estimate based on discussions with stakeholders. The cost per business would average at £789. In total, the cost to small/micro businesses is expected to be £3m over the appraisal period.

The other key cost is the familiarisation costs and ongoing training costs associated with complying with mandatory labelling. During the transition period, we expect each small business to spend 10-working hours familiarising

103

These figures are rounded to one significant figure, whereas our model rounds to two decimal points. Subsequently, the estimated compliance cost divided by the cost/tonne does that perfectly equal the number of additional tonnages.

104

themselves with the new requirements. We expect 10 hours to be a reasonable estimate based on the size of the regulatory change and the number of different employees within each business that may be expected to be familiar with the new requirements. 10-hours is an average, with smaller businesses spending less time familiarising themselves, and larger businesses spending more time. However, the assumption is not specifically evidenced based. We also assume that each small business will be allocated 3 days FTE to training each year to keep up to date with the latest labelling requirement– this could be split between a number of staff or carried out by one individual. The wage we have assumed for these costs is the median hourly wage of 'advertising and market research' as reported by the ONS in 2019, we have then increased this to a 2023 wage level (assuming a 2%/annum wage increase) and then added overheads at a rate of 22% (£19.30/hour)[105] - resulting in a total cost of 1 FTE equal to £185. The familiarisation cost per small/micro businesses is expected to be £193/business. The training cost is expected to be £555/business.

We do not consider there to be any redesign costs to businesses (including small/micro businesses) due to sufficient time being given to businesses to integrate new labels into their packaging design. If businesses are required to join a national labelling scheme, membership fees will be required to cover the administration costs of such a scheme (expected to be £9m/year, or £5-£7m/year more than the baseline administration costs). Membership fees would be a matter for the scheme administrator to determine, however it is assumed that there would be a fee scale with lower fees for small/micro businesses, or if they may be exempt from paying membership fees.

SECTION 8: SUMMARY AND PREFERRED OPTION WITH DESCRIPTION OF IMPLEMENTATION PLAN

The impact of the policy will be monitored on an on-going basis. The fees levied on producers, will be estimated once the system is up and running. EPR for packaging is a commitment made in the Resources and Waste Strategy (RWS) for England. In August 2020 Defra published *The Evaluation Plan*[106] which establishes how policies implemented under the RWS will be evaluated to provide a full picture of impact. The purpose of this Plan is to clearly and transparently set out the provisions for evaluating the impact of the policies described in the RWS. It explains how Defra will monitor and report on progress of the Strategy in achieving change by identifying the extent to which policy initiatives are working and how much of the observed impacts are due to the Strategy, rather than external factors.

Given the Strategy contains close to 100 commitments, five have been identified for specific evaluation. This includes packaging EPR; the proposed scope and extent of the evaluation of this policy measure is presented in Chapter 5. The evaluation will be designed to address the following questions:

- Outcomes: What difference (if any) did the measures make?
- Mechanisms, Contexts and Attribution: Why did observed changes occur?
- How were the activities delivered, and what can we learn?

[105] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datalist?:uri=employmentandlabourmarket/peopleinwork/earningsandworkinghours/datalist&filter=datasets&page=2 *(Earnings and hours worked, UK region by industry by two-digit SIC: ASHE Table 5)*

[106] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907161/resources-and-waste-strategy-evaluation-plan.pdf

- Economic evaluation: Did the benefits justify the costs?

As well as the Evaluation Plan Defra has committed to publishing an annual Monitoring Progress Report, the first of which was published in August 2020[107]. A headline indicator is packaging waste recycled as measured in absolute terms (tonnes), kg per capita, and as a percentage of total packaging and percentage by material type (plastic, card, glass, etc). A key requirement of packaging EPR is for this outcome to be reported separately for England, Northern Ireland, Scotland and Wales as well as for the UK as a whole. More granular reporting of packaging placed on the market and packaging recycling data will be required to enable this level of reporting.

The new regulations will also be subject to a statutory Post Implementation Review (PIR) five years after they come into force. This is anticipated to be in 2028 or 2029.

SECTION 9: ANNEXES

ANNEX A: CURRENT REGULATIONS FOR OBLIGATED PACKAGING PRODUCERS

Under the current regulations, obligated producers[108] are required to meet recovery and recycling targets set by government. The regulations do not require obligated producers to collect or recycle their own packaging to meet their share of the UK packaging waste recycling targets. Rather, they must obtain evidence of recycling from accredited reprocessors or exporters to prove they have met their recycling obligation. This evidence is known as Packaging Waste Recovery Notes (PRNs) or Packaging Waste Export Recovery Notes (PERNs). These evidence notes are issued by accredited packaging waste reprocessors and exporters, respectively, and are acquired by packaging producers either directly or through a compliance scheme. An accredited reprocessor or exporter can issue PRNs or PERNs equivalent to the amount of packaging waste reprocessed (e.g. 100 tonnes of steel packaging reprocessed allows the reprocessor to 'sell' 100 steel PRNs)[109].

The evidence notes have two functions. Firstly, they are a 'counting tool' for the quantities of packaging waste that is recycled and recovered and provide the evidence on which packaging recycling rates are calculated and the achievement of targets assessed. Secondly, they are a way to channel producer funding to recycling/recovery operations since producers pay for PRNs / PERNs. This internalises some of the costs of recycling and recovery of packaging waste to producers.

However, the packaging that is handled by those exempt businesses still counts when calculating the UK's recycling performance. This is because the Packaging Directive targets are set as a percentage of the total packaging waste arising in each Member State. Business targets are therefore set for obligated businesses that are higher than the

[107] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907029/resources-and-waste-strategy-monitoring-progress.pdf

[108] An obligated producer includes any business involved in the packaging supply chain, i.e. one that manufactures raw materials for packaging, converts raw materials into packaging, uses packaging to wrap/contain goods, or sells or imports packaged products. The 'responsibility' for the packaging is currently split between these actors in the supply chain

[109] Further details on the existing regulations are available at https://www.gov.uk/guidance/packaging-producer-responsibilities

actual EU minimum target to take this exempt packaging into account. The actual amount of exempt packaging changes from year to year. Business targets are therefore set at a level to account for these fluctuations.

The Regulations establish a de-minimis threshold, exempting businesses which have a turnover below £2m and who handle under 50 tonnes of packaging a year. However, the packaging that is handled by those exempt businesses is accounted for in setting recycling targets and in reporting the UK's overall packaging waste recycling rates. This means that obligated producers also pick up a share of the cost of meeting the targets for businesses that fall below this de minimis threshold. In the cost benefit analysis presented in this IA we have assumed that under all options the de minimis threshold will be lowered to up to 25 tonnes and £1m turnover, but this has not changed our modelling as the increase in number of businesses is unknown and we have not calculated cost per individual business.

Businesses obligated under the Regulations can choose how to comply. They can:

- Contract directly with reprocessors/exporters and acquire PRNs and PERNs equivalent to their obligation (known as individual compliance); or
- Pay to join one of several approved compliance schemes, who take on the regulatory reporting and contractual duties, with greater market clout than individual producers.
- Join one of several approved compliance schemes who manage compliance on behalf of their members; this includes managing the reporting of their packaging data and acquiring evidence (PRNs/PERNs). Most obligated producers have chosen to join a compliance scheme.

The price of evidence notes is determined by the market; they can vary in price in response to a range of factors, such as the supply of recyclable materials; the price of raw materials; the price of secondary materials; the availability of evidence; and the level at which the targets have been set. The total income raised through the sale of PRNs/PERNs has therefore varied from year to year. For example, between 2010 and 2019, the annual income from the sale PRNs/PERNs ranged from £28 million to a high of £366 million in 2019. Whilst the cost of compliance for producers has increased since the Regulations were first introduced the current system was never designed to recover from producers the full cost of managing packaging once it becomes waste. For packaging waste that is generated by householders and managed through household waste services the cost of these services in the main is borne by the taxpayer[110].

ANNEX B: MODULATED FEES IN EUNOMIA MODEL

The modulated fees in the option used in this analysis are taken from Eunomia's modulated fees analysis[111] and are made up of two parts. The **base fee** for each packaging type is calculated based on the net collection and treatment cost for that packaging type on a per tonne basis. The **modulation element** of the fees is based on the recycling rate of that packaging format. This is calculated based on the difference of the recycling rate of that packaging format from the average recycling rate of the material group it falls under. For example, the modulated fee for high-

[110] An Environmental Audit Committee 2017 report estimated that the PRN system covered around 10% of packaging waste disposal costs, with the remaining 90% funded by the taxpayer
https://larac.org.uk/sites/default/files/LARAC%20POLICY%20PAPER%20The%20future%20of%20LA%20Waste%20Funding%200418.pdf

[111] Eunomia (2019), "Study on Two Approached to Extended Producer Responsibility for Packaging"; unpublished report for Defra.

density polyethylene (HDPE) bottles is based on its recycling rate relative to the overall recycling rate for plastic packaging. Here a packaging format with a lower recycling rate than the average will face costs in addition to the base fee whereas a packaging format with a higher recycling rate will see its base fee reduced. As discussed previously, this method of modulation is used for illustrative purposes and does not imply Defra's preferred approach to modulation.

Modulated fees aim to influence producer behaviour and the model allows for producers to respond in two ways. Firstly, producers can switch from a poorly recycled packaging format to a more highly recycled substitute to reduce the fee per tonne of packaging placed on the market. The model restricts switches to those predefined by the user and therefore only substitutes which are known are included in the analysis. These switches were recommended by WRAP based on their expert judgement and are limited to more obvious substitutes. The switches illustrate the potential impacts of modulated fees without being exhaustive. It is possible that further switching would occur leading to both additional benefits as well as unintended negative consequences depending on the final method for calculating fees.

As the size of the modulated fee for a packaging format is closely linked to its recycling rate, producers will have a higher incentive to switch packaging formats with a low recycling rate and a high proportion of this packaging will switch in a given year. Subsequently poorly recycled packaging will be phased out more quickly over time. As producers substitute difficult to recycle packaging for more widely recycled alternatives, the overall recycling rate for packaging increases. Producers can also respond to modulated fees by increasing the recycling rate of the packaging they use, for example through investing in collection methods. Where producers can increase the recycling rate of a packaging format, the modulated fee reduces. It is assumed the recycling rate of packaging with lower initial recycling rates will grow more quickly in a given year. This is because there is greater potential for reducing the fee and therefore greater returns from taking action. The exception to this is packaging formats with very low starting recycling rates which are likely to be the most difficult to recycle and require large scale investment in infrastructure to improve recycling rates. As the recycling rate of individual packaging materials increases so will the overall recycling rate for packaging.

A third potential response to modulated fees by producers would be to reduce the amount of material used per item of packaging (light weighting). Light weighting has the potential to provide environmental benefits such as reducing the amount of packaging going to landfill as long as it does not compromise with recyclability. However, it is not considered within this analysis and is an evidence gap to be filled.

One concern, highlighted by Eunomia, is the ability of producers to *potentially* offset the additional financial burden of modulated fees by increasing the price charged directly to consumers. Not only would this undermine, partially at least, the 'polluter pays' principle which is at the heart of EPR, but it would also represent an additional economic cost in terms of reduced consumer welfare[112].

The extent to which producers could pass on any additional costs incurred because of modulated fees is likely to be dependent on the price elasticity of demand of the particular product. Assuming a modulated fee of £550/tonne, which factors in both the *recyclability* as well as *quality* of the material, Eunomia modelled the potential increase

[112] The loss of *consumer* welfare does not account for the potential increase in *producer* welfare. Therefore, this point does not consider the potential *net* impact on societal welfare as a whole.

in prices for consumers across a range of products and packaging types. The extent to which prices changed ranged from -0.23%-0.78%, with the highest price increases seen for those items which use packaging where the recyclability of the product is not particularly high.

Despite the potential adverse impact of modulated fees, one countervailing measure could be the dynamism of the modulated fees themselves. If modulated fees adjust frequently then it is unlikely, albeit not impossible, that producers will be able to adjust their own pricing strategies in real time. This has been the case under the current PRN system, whereby the significant volatility of PRN/PERN prices has not been reflected in consumer prices (in the short term at least). Whilst modulated fees that are frequently updated would likely entail greater administrative costs, they may help to reduce the extent to which producers could shift the burden of modulated fees onto consumers.

ANNEX C: SENSITIVITY ANALYSIS OF PRE-2023 SWITCHES

It is anticipated that producers will switch some packaging to more recyclable materials before the introduction of modulated fees. Based on recommendations by WRAP we have assumed that black plastic PTTs will be phased out completely by 2023 under the EPR option. It is assumed that this packaging will be replaced by non-black versions of the same polymers. In addition to this, it is assumed that 50% of the 2017 tonnage of PVC and PS PPTs will be replaced by more recyclable polymer alternatives by 2023. These switches are assumed to occur according to a linear trend over this period.

We expect that some of this switching will occur as a result of producers preparing for modulated fees however producers are likely to be influenced by other pressures to make these changes. In order to attribute some of the impacts of these switches to modulated fees, it is assumed that these switches would have occurred at a slower rate under the baseline option. Due to a lack of evidence, switches in the baseline are set to occur half as quickly under the EPR option. As this is an arbitrary assumption, sensitivity analysis is included. The low option here assumes that none of these switches are attributable to EPR and would have occurred under the baseline option. The high option assumes that all pre-2023 switches are attributed to modulated fees.

The consequence of these switches is that packaging is diverted from residual to recycling. This will impact the cost of collecting and treating packaging in both the HH and NHM sectors as well as increasing the amount of recycled material available in secondary material markets. Finally diverting plastic away from landfill and energy for waste (EfW) will reduce greenhouse gas emissions. Table C1 shows the costs and benefits of these switches in the period 2021-2022 under each option. This shows that there are £0.6m additional costs and £4.1m additional benefits from the central option compared to a option in which switches are fully captured under the baseline over this period. This is £3.5m net benefits. Assuming that all impacts are attributable to EPR adds £0.5m additional costs and £3.9m benefits totalling £3.4m net benefits.

Table C.1 – Discounted Additional Costs and Benefits from Packaging Switches Prior to EPR (2021-22)

£m	**Low**	**Central**	**High**
Costs			
Landfill Loss to HMT	£0	£0.3	£0.6
Increased cost of treatment and collection of NHM recycling	£0	£0.3	£0.5
Total Costs	£0	£0.6	£1.1
Benefits			

GHG emissions savings	£0	£1.2	£2.4
Additional material revenue for recycling sector	£0	£1.0	£1.9
Reduced cost of collection and treatment of HH residual waste (inc landfill tax)	£0	£1.2	£2.2
Reduced cost of collection and treatment of NHM residual waste (inc landfill tax)	£0	£0.4	£0.8
Reduced cost of collection and treatment of HH recycling	£0	£0.3	£0.6
Total Benefits	£0	£4.1	£8.0
Total			
Net benefits	£0	£3.5	£6.8

ANNEX D: METHODOLOGY IN BASELINE PACKAGING PLACED ON MARKET AND SENSITIVITY ANALYSIS

The Pack Flow reports detail the POM tonnages in both the consumer and non-consumer sectors. These sectors are used as a proxy for Household (HH) and Non-Household (NH) packaging waste within the IA. Almost all NH packaging identified in the pack flow reports is Commercial and Industrial (C&I)[113]. Non-Household Municipal (NHM) refers to the wider municipal sector that includes businesses and public organisations producing household like packaging waste. NHM is essentially the household-like element of C&I packaging waste. Within this IA the portion of C&I that is not NHM is referred to as other C&I and is not in scope of EPR modulated fees.

As EPR modulated fees is expected to cover all household and household-like packaging, whether collected from household or non-household settings, it is therefore important to determine the amount of non-consumer packaging that is household-like in nature. This is difficult as non-consumer industries may use packaging that is household-like and that which is not. The Pack Flow reports point out that packaging in the hospitality sector is likely to be almost entirely household-like. However, it is not clear to what extent other non-household sectors will use household-like packaging.

Due to the uncertainty in the data we have used several methods to calculate the amount of household-like packaging in the non-household sector on top of that contributed by hospitality. For our central estimate we assume that 56% of C&I packaging, as estimated in the Pack Flow reports, is municipal. This is the estimate of the proportion of C&I waste which is municipal using waste arising data.

It is recognised that estimates of the total amount of packaging differs when using POM methods and data on waste collected by LAs and private businesses. Waste arising data is usually higher. This is because it could be over-inflated due to moisture content or contamination, and there is uncertainty over how much of the waste collected is household like packaging specifically. In contrast there is uncertainty in the amount of packaging POM not currently captured by the NPWD, such as that handled by unobligated producers. Although the pack flow reports attempt to account for this, it is possible that this is still underestimated. Therefore, based on recommendations by WRAP, we have used the upper POM estimate from the pack flow reports[114] as the central POM estimate in the IA for both the HH and NHM POM figures.

[113] The pack flow reports also identify a small amount of Agriculture and Construction and Demolition packaging which is classed as NH but is not C&I.

[114] The upper error margins

As in the DRS and consistent recycling IAs we have taken POM data for DRS materials from Valpak's Deposit Return Scheme for Drinks Containers[115] report. Future POM projections are taken from Valpak's Impact on Packaging Policy Reforms on UK Secondary Material Markets[116] report, again in line with the consistent recycling and DRS IAs. These are based on projections from the Pack Flow reports and provide a business as usual (i.e. no DRS/consistency) view of future trends. It is assumed that consistent recycling and DRS will not impact the total amount or composition of packaging on the market, and that 85%[117] of DRS materials are captured by the scheme and as they are captured through DRS is out of scope of EPR and this IA. This amount of packaging is therefore removed from the baseline option[118] as well as all the other option.

Table D.1 shows the DRS materials placed on market in 2017. As DRS will come into place in 2023 we have assumed DRS material tonnage will increase every year in line with the total POM growth trend, based on the Valpak secondary markets report[119] for the central estimate.

Table D.1 - 2017 DRS 'all-in' Packaging placed on the market

Drinks containers	Household POM Kilo-tonnes (Kt)	NHM POM Kilo-tonnes (Kt)	Total POM Kilo-tonnes (Kt)
Glass bottles	1,377	459	1,836
Aluminium cans	109	11	120
Steel cans	33	1	34
Plastic PET bottles	224	94	318
Total	1,734	565	2,308

Source: Valpak's Deposit Return Scheme for Drinks Containers report

Non- Household Municipal

Non-Household Municipal (NHM) waste refers to waste that is household-like in nature but collected from non-household sources such as businesses and public organisations. There is a high level of uncertainty in the amount of packaging collected as waste from the NHM sector which makes it difficult to accurately calculate the cost to businesses of collecting this waste. This section discusses the uncertainty around NHM waste tonnage and provides a range of estimates of the potential cost of collecting NHM packaging waste.

To understand the amount of waste generated by the NHM sector, two key methodologies can be used. The first is using data on the amount of packaging placed on the market (POM). WRAP publish the material specific pack flow reports, which most recently estimated the amount of packaging POM in 2017. These reports compliment data provided by producers to the Environment Agency through the National Packaging Waste Database (NPWD) by accounting for packaging which is currently unobligated. The pack flow reports also estimate the split of packaging between sectors, including consumer and non-consumer, with more detailed estimates for some materials.

[115] https://www.valpak.co.uk/more/reports/deposit-return-schemes-for-drinks-containers

[116] Valpak (2020), "The Impact of Proposed Packaging Policy Reform on the UK's Secondary Materials Market", unpublished report for WRAP.

[117] In the DRS impact assessment, a more gradual introduction is assumed whereby 75% is captured in year 1, 80% in year 2 and 85% from year 3 onwards. For simplicity the analysis in this impact assessment assumes an 85% capture rate for DRS materials from year1. This simplification is expected to have minimal impact on the result.

[118] DRS covers the following beverage containers: PET bottles, aluminium and steel cans and glass bottles.

[119] Valpak, (2019) The impact of proposed packaging policy reforms on the UK's secondary materials markets

Although POM refers to where packaging enters the market rather than where it is collected it is possible to make some inference of this. Consumer packaging is that which is sold by retailers directly to consumers. It can be assumed that the majority of this packaging is consumed, and therefore collected as waste, at home. Conversely it is expected that non-consumer packaging will largely be collected from businesses and public organisations. There is however likely to be some exceptions, for example where consumers purchase food from a supermarket which is then eaten, and the packaging disposed of, at work. The reverse is also possible for example where a drink is purchased at a café and then consumed at home. It is not known to what extent this occurs nevertheless POM data is able to give an indication of the amount of packaging in circulation and where is likely to be disposed of.

Alternatively, waste arising data can be used to determine where packaging is disposed of. Generally waste arising methods combine an estimate of the amount of waste produced with waste composition analysis where samples of waste are examined to determine the make-up of waste from a particular sector. NHM waste is a subset of total Commercial and Industrial (C&I) waste and NHM waste arising estimates generally adapt C&I data to determine the amount that is municipal. WRAP have developed a model in the consistent recycling collections analysis using Waste Data Interrogator (WDI) data and sector specific waste composition analysis to estimate the amount and composition of NHM waste.

As explained above, waste arising estimates tend to be higher than POM estimates.

The sector where the strongest data exists is the household or consumer sector and here POM and waste arising estimates differ by a relatively small amount. For example, pack flow reports estimate 5,377 Kt of consumer packaging POM in 2017[120]. WRAP waste arising estimates give a figure of 5,950Kt of waste collected from households in the UK in 2017[121]. This is around 11% higher than the POM estimate. There is however a much higher amount of uncertainty with NHM data.

The main estimates in this analysis are calculated based on POM figures using the pack flow reports and additional assumptions. The pack flow reports break non-consumer estimates down into sub-sectors. From there it is possible to determine C&I packaging. It is however difficult to then extract the amount of packaging that is household-like

[120] Pack Flow report -plastic packaging, https://wrap.org.uk/resources/report/metal-flow-2025-metal-packaging-flow-data-report ;https://wrap.org.uk/resources/report/paper-card-flow-2025-paper-packaging-flow-data-report; https://wrap.org.uk/resources/report/wood-flow-2025-wood-packaging-flow-data-report ; https://wrap.org.uk/resources/report/glass-flow-2025-glass-packaging-flow-data-report

[121] England estimates taken from WRAP's household waste collection costs modelling. Figures uplifted to UK level using methodology outlined in Section 5.

as different sectors will use this type of packaging to differing extents. The three main estimates are calculated using different methods of calculating the amount of C&I packaging which is non-household municipal.

From here, a *cost per tonne* approach has been adopted as to model the potential cost of collecting NHM packaging waste. For the NHM sector, this was achieved by applying WRAP's estimated dry mixed recycling collection per tonne to our internal estimations of recycling tonnage for NHM sector. The results are reflected in table D.2:

Table D.2 - NHM tonnage and costs estimates 2023

	Tonnage	**Total collection and treatment cost**	**Recycling collection and treatment costs *only***
Low	589kt	£99m	£40m
Central	3,326kt	£549m	£249m
High	4,976kt	£821m	£375m

Low estimate

The pack flow reports recommend that hospitality packaging is likely to be primarily household-like but predominantly collected away from the home. It is however unclear the extent to which the other sectors covered in these reports place household-like packaging on the market. We therefore use hospitality packaging only as the basis for our low estimate. In addition to hospitality POM further research was done to determine any sectors or businesses types that would produce a significant amount of household-like packaging which would be disposed of by businesses but not explicitly mentioned in the pack flow reports. Although a number of business-types were identified, appropriate data was only found for one of these; sellers of electrical goods. A significant amount of electrical goods sold to businesses are expected to be similar to those purchased by consumers and therefore use household-like packaging. An estimate of the amount and composition of packaging from products sold to businesses was estimated in two parts. Firstly, Waste Electrical and Electronic Equipment POM data collected by the Environment Agency (EA) was used alongside publicly available data on the weight of electrical products to estimate the number of products sold for each of the 12 categories in the EA data. Confidential data provided by businesses was then used to estimate the average weight of packaging for five key electrical categories. Lastly assumptions were made about the proportion of this packaging sold to businesses, based on consultation with experts from WRAP. We were then able to estimate the total IT equipment packaging expected to be disposed of in NHM settings. The total additional tonnage produced by this method inflated the low estimate by only a small amount.

Overall this method produced a figure of 589Kt of packaging in 2023 after DRS materials were removed and a collection cost of £99m/year, of which £40m relates to recycling.

Central estimate

The central estimate uses an alternative method to determine the amount of NHM packaging. For this estimate we use high level waste arising data to calculate the proportion of total C&I waste which is NHM. It is then assumed that this proportion would be similar to the proportion of **C&I packaging** which is municipal. For the first consistent

recycling consultation impact assessment, WRAP estimated the total amount of NHM waste to be 20.3Mt[122] in England in 2017. Defra have estimated that in the same year there was 36.1Mt of C&I waste in England[123]. 56% of C&I waste is therefore estimated to be NHM in 2017.

At a material level 56% of metal C&I packaging was assumed to be municipal. Based on discussions in the glass pack flow reports 100% of non-consumer glass was assumed to be household-like. 18% of non-consumer wood was considered the maximum proportion that could be household-like. This is the proportion composed of cases, boxes, crates and drums. This may still be an overestimate however at this proportion wood only makes up 6% of the estimated total NHM packaging. To account for the reduced proportion of wood considered municipal, the municipal proportion of paper/card and plastic were inflated slightly to 62% and 59% respectively.

Within the paper/card and plastic pack flow reports, C&I is made up of hospitality, retail back of store and manufacturing and other sectors. As discussed, hospitality is likely to be made up almost entirely of household-like packaging. For the other two categories it is unclear to what extent this packaging is municipal. Retail back of store packaging is likely to include transit packaging not in scope of EPR modulated fees. WRAP, within their NHM waste arising analysis, however, estimate that 44% of municipal materials which could be collected as dry recyclates are collected from retailers and wholesalers. A significant amount of this material is likely to be packaging. In both reports the manufacturing and other category makes up the highest proportion of C&I packaging (56% and 65% respectively). In the paper/card report manufacturing makes up around a third of this packaging while other services make up around two thirds. Other services represent European Union NACE codes G-U[124] and includes a number of sectors identified by WRAP within their waste arising analysis as producing municipal waste such as education, health and office. WRAP also identify a small amount of manufacturing waste which is municipal. A similar combination of sectors is included within this category in the plastic report however it is less clear of the proportional splits. It is therefore reasonable to assume that there is a significant amount of municipal packaging in these sectors.

The method to further break down the tonnage for each material into the individual packaging formats for use in the modulated fees model is as follows. The tonnage for each material was split into hospitality and other NHM. The composition of the hospitality tonnage remained the same as estimated for option 1. The composition for the remaining tonnage was assumed to match the overall non-consumer composition from the pack flow reports.

This method produced a total NHM POM estimate of 3,326k in 2023, again with DRS materials removed, and a total collection and treatment cost of £549m, of which £249m relates to recycling.

High estimate

WRAP have updated their waste arising estimates for the second consistency recycling impact assessment and estimate 26.9Mt of NHM waste in 2018. Defra's 2018 estimate of C&I waste is 37.2Mt[125]. This gives a considerably higher estimate of the proportion of C&I waste which is NHM at 72%. This was uplifted to 80% for the high estimate.

---

[122] https://consult.defra.gov.uk/environmental-quality/consultation-on-consistency-in-household-and-busin/supporting_documents/recycleconsistencyconsultia.pdf

[123]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918270/UK_Statistics_on_Waste_statistical_notice_March_2020_accessible_FINAL_updated_size_12.pdf

[124] NACE code are the statistical classification of economic activities for the EU

[125]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918270/UK_Statistics_on_Waste_statistical_notice_March_2020_accessible_FINAL_updated_size_12.pdf

Based on the analysis in the pack flow reports it is unlikely that 80% of their estimated C&I packaging is municipal considering the likely proportion of non-household-like packaging such as retail transit, manufacturing and the high proportion of wooden pallets. However, this figure was used to highlight the uncertainty in the data when also considering waste arising estimates and to understand the impacts of a high NHM cost option.

For this option, the tonnages in the central estimate were scaled up such that each material retained the same proportion of the overall total, with the exception of glass which was already assumed to be 100% municipal packaging in the central option.

- Using this method an estimate of 4,976Kt of packaging, excluding DRS materials, was produced for 2023 which resulted in costs of £821m, of which £375m relates to recycling.

Reformed Approach

The limitation of the cost/tonne approach is that it merges fixed and variable costs into *one* overarching figure, which our modelled tonnage is then multiplied by.

However, according to WRAP analysis, business costs are primarily driven by the *fixed* costs associated with time taken to collect and empty bins (c. 70% of cost). On the other hand, only a small proportion of waste collection costs (c.30%) are in fact driven by the NHM tonnages. Consequently, a cost per tonne approach is likely to underestimate the true cost of NHM recycled waste collection as it assumes that variable costs are the sole driver of total costs, when in actuality the majority of costs arise *independently* of the recycled tonnage.

To reconcile these limitations, we have adopted a new approach. The calculation is as follows:

Business costs = (NHM recycled tonnages * (WRAP's estimated dry mixed recycling collection per tonne * 30%)) + (WRAP's estimated dry mixed recycling collection per tonne * 70%)

Table D.3 – Reformed NHM cost estimates 2023

	Option 1		**Option 2/3**
Total	Central	High	
	£1544m	£1568m	£1530m

Nonetheless, this cost remains uncertain for several reasons:

- **The lack of robust data on the tonnages of commercial and industrial waste arising from businesses, the proportion of which is packaging, and the costs of managing this.** This is a well-known, longstanding issue for the sector which government is seeking to address through mandatory electronic waste data tracking.
- **The numbers of businesses in scope of producer full net cost payments under packaging EPR and the costs of managing this**. WRAP have undertaken considerable analysis for England and Northern Ireland to improve data in this area, but it remains a key sensitivity, partly due to the challenge of obtaining commercially sensitive cost data.
- **Current and future efficiency of collections**. Unlike household collections where there are significant efficiencies through having a single collector for any given area, and where there has been significant

pressure to minimise costs, business collections, while competitive, have seen much less pressure to optimise services. WRAP analysis suggests that through the sharing of bins between small and microbusinesses, and through the introduction of zoning, business management costs could be reduced by 20%. This does not take account of other potential efficiencies such collecting bins less frequently, particularly in areas where businesses have space for larger or multiple bins.

- **WRAP's estimated dry mixed recycling collection per tonne may be overstated due to the fact that it has been assumed that the '*Most Frequently Used*' collection scheme should be applied to *every* business size, in each sub-sector**. In practise, there is a multitude of schemes available to businesses, which all present a variety of costs. However, by not factoring in these different costs through a weight scheme, WRAP's estimated costs, and in turn our modelled costs, are unlikely to be representative of the true cost. As per above, this is partly due to the challenge of obtaining commercially sensitive cost data.

Given this uncertainty, we are proposing that a range of our original amount (£249m) and updated calculation (£1,544m) is used for the time being. Further analysis will be undertaken prior to the completion of our final IA as to improve the robustness and certainty of these results.

ANNEX E: RECYCLED TONNAGES IN BASELINE METHODOLOGY

Recycled tonnages for each packaging material are also taken from the Pack Flow reports.

Again, the reports provide a useful amount of detail of recycling tonnages for different packaging formats however additional assumptions from Eunomia's analysis were also used to provide further granularity. Unlike with the POM estimates, the Pack Flow reports do not provide recycling estimates by sub-sector for the non-consumer sector. Eunomia use commercial municipal[126], complemented by household[127], waste composition data to estimate the recycling rate of individual NHM packaging materials. These recycling rates are then multiplied by the NHM POM by packaging material to estimate the recycled tonnage as shown in Table E.1. We assume the remaining non-consumer recycled tonnage from the Pack Flow reports to be 'other' C&I waste.

Table E.1 - Baseline recycling projections in tonnes (excluding packaging captured by DRS 'all-in') – best estimate

Packaging material	2023 Recycling, Kt			2027 Recycling, Kt			2032 Recycling, Kt		
	HH	NHM	Other C&I	HH	NHM	Other C&I	HH	NHM	Other C&I
Plastic	313	88	460	358	127	466	379	130	472
Wood	26	126	348	25	122	336	24	118	323
Aluminium	26	3	15	28	4	15	30	4	16
Steel	237	78	120	237	81	118	231	79	115
Paper/Card	1,061	1,477	1,418	1,112	2,141	1,446	1,154	2,195	1,483
Glass	470	80	0	474	108	0	465	105	0
Total	2,134	1,852	2,360	2,234	2,583	2,381	2,283	2,630	2,409

[126] WRAP, 2019, National municipal commercial waste composition, England 2017, Prepared by Eunomia Research & Consulting Ltd

[127] WRAP, 2019, Bristol, National Household Waste Composition 2017, prepared by Eunomia Research & Consulting Ltd.

This leads to NHM recycling rates that are generally lower than those for other C&I. That non-household household-like packaging has a lower recycling rate than non-household-like packaging is not an unreasonable assumption for some materials, however the other C&I recycling rates for plastic and paper/card are particularly high.

For plastic this seems reasonable based on the pack flow reports. The reports estimate significantly higher non-consumer plastic recycling rates than those for consumer plastic largely driven by a close to 100% plastic film collection rate. It can be assumed that household-like film will have a very low recycling rate whereas C&I film, not in scope of EPR modulated fees, is known to be widely recycled. The majority of the recycled film identified by the reports is therefore likely to be other C&I.

It is less clear from the pack flow reports whether the same trend should be expected for non-consumer paper/card however other C&I paper/card will include a significant amount of transit packaging.

The pack flow reports estimate high metal recycling rates, particularly for steel, which is estimated to have a consumer recycling rate above 100%. As discussed in the report, it is possible that some steel recycling captured as consumer is from non-consumer sources. One uncertainty here is calculating the proportion of metal recycling recovered from Incinerator Bottom Ash (IBA). For this analysis the tonnages of metal collected for recycling (i.e. at the kerbside, HWRC, bring bank) were based on the pack flow reports with the method for calculating IBA taken from Eunomia's modulated fees analysis. This approach enabled greater flexibility in the modelling by allowing us to break the IBA recovered tonnage down by individual packaging format and for different sectors. For example, the former was useful for incorporating the impacts of DRS in the baseline.

The method of calculating the amount of metal collected for recycling through IBA consisted of extracting the tonnage of residual sent to incineration for each packaging format and calculating the proportion of this which is recovered through IBA. The residual tonnage was assumed to be the POM tonnage not recycled. Using Defra waste management statistics[128] it was estimated that 75% of residual waste was sent to incineration in England in 2017. We assume this percentage is consistent across the UK. Estimates of the proportion of the tonnage sent to incineration which is extracted from IBA for each metal was then applied to these figures. It was assumed that 70% of steel and 30% of aluminium sent to incineration is recovered for recycling from IBA[129]. The recycling rates in table 4 include metal recycled from IBA. The tonnage recovered through IBA using this estimate is lower than in the pack flow reports leading to a slightly lower overall metal recycling rate.

The impacts of consistent recycling are taken from WRAP's modelling of the HH and NHM collection costs in the consistent recycling IA. DRS is assumed to capture 85% of the tonnage of in scope materials and this tonnage is removed from the analysis in this IA. The amount of recycled tonnage for these materials is removed proportionally so that the recycling rate of the remaining 15% of DRS materials does not change other than to account for the impacts of consistent recycling.

[128] https://www.gov.uk/government/statistical-data-sets/env18-local-authority-collected-waste-annual-results-tables

[129] Grosso M, Biganzoli L and Rigamonti L (2011) A quantitative estimate of potential aluminium recovery from incineration bottom ashes, Resources, Conservation and Recycling, 55, pp1178-84

Once we had established historical recycling tonnages for the sector, we applied the change in recycling growth rate from WRAP's analysis for the consistent municipal recycling collections IA to these tonnages[130]. This was done on a material basis and only applied to the core packaging materials in scope of consistent recycling. For household materials it was possible to extract the increase in recycling for each packaging material. For the NHM sector this was not possible due to limitations with waste arisings data. For the NHM sector the recycling rate was therefore increased by the same proportion for all materials in scope.

Table E.2 shows the recycling rates under a baseline option which excludes DRS materials. The removal of 85% of DRS materials reduces the total packaging recycling rate, as well as the recycling rate for the relevant material types, as DRS materials tend to be highly recycled compare to other packaging types.

Table E.2 - Baseline recycling rates excl. DRS 'all-in' materials – best estimate (includes HH, NHM and C&I)

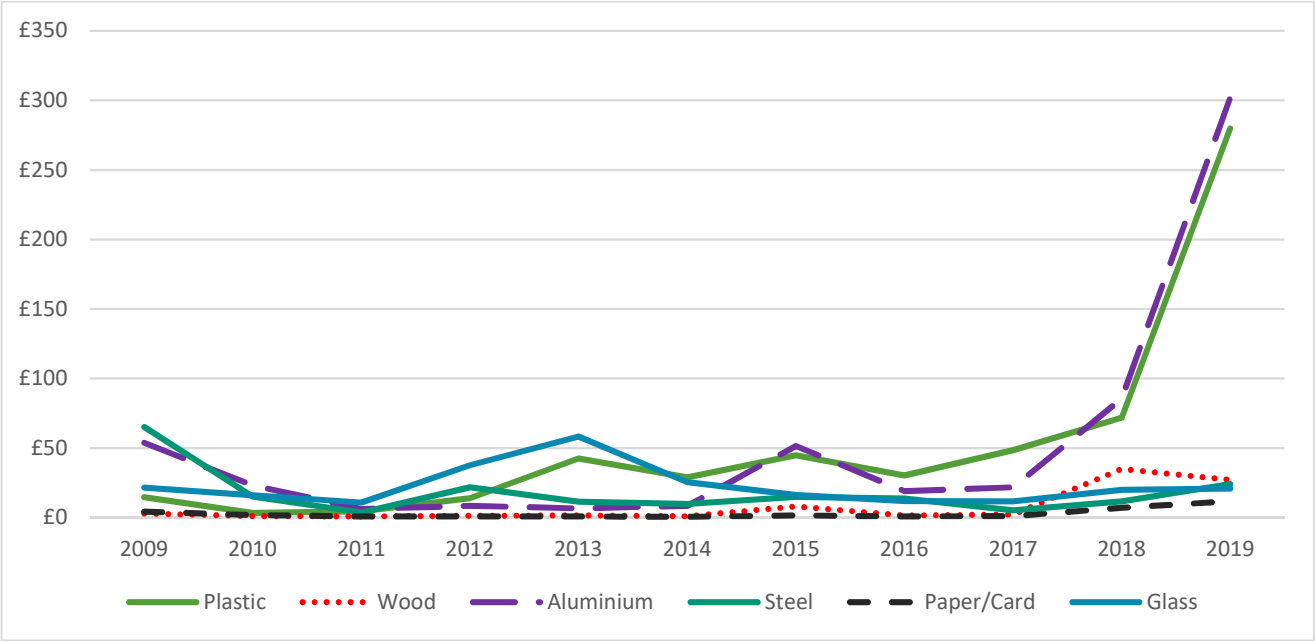
	2023				2027				2032			
	HH	**NHM**	**Other C&I**	**Total**	**HH**	**NHM**	**Other C&I**	**Total**	**HH**	**NHM**	**Other C&I**	**Total**
Plastic	24%	21%	95%	39%	27%	30%	95%	43%	28%	30%	95%	43%
Wood	37%	55%	34%	38%	37%	55%	34%	38%	37%	55%	34%	38%
Aluminium	38%	31%	21%	37%	38%	34%	21%	38%	39%	34%	21%	38%
Steel	87%	60%	96%	83%	88%	64%	96%	85%	89%	64%	96%	85%
Paper/Card	62%	61%	95%	71%	63%	87%	95%	82%	64%	87%	95%	82%
Glass	68%	60%		67%	70%	83%		72%	71%	83%		73%
Total	52%	56%	73%	60%	54%	77%	73%	67%	54%	77%	73%	68%

ANNEX F: COMPLIANCE COSTS FOR PACKAGING PRODUCERS IN BASELINE

Under the current packaging producer responsibility system, obligated producers are required to meet certain recovery and recycling targets set by government. Producers must purchase evidence (PRN/PERNs) of recycling from accredited reprocessors or exporters to prove they have met their obligation. The cost of this evidence varies by material depending on several factors, including how economically feasible it is to recycle it and the market perception of how much evidence is available. The PRN price per material has varied over time, with some materials showing more volatility than others. We assume that the PRN price per material in 2032 is the highest annual average price seen in the period 2009 – 2019. This is because going forward we expect increased long-term packaging recycling targets, as a result, we assume that on average the PRN prices would shift to a higher price equilibrium. This is because producers need more evidence and thus are willing to pay more for it. For the years in between (2020-2032) the price would grow linearly to the assumed 2032 price of the PRN. For materials where there is no increase the highest value between 2009-2019 was in 2019. The figure below shows historical trends of PRN prices per tonne of evidence by material.

Figure F.1 - Historical trends of PRN price per tonne of evidence by material 2009-2019 observed data

[130] The reason for only using the growth rates is due to the differences between the datasets being used for the NHM waste estimates, in which WRAP data includes both packaging and non-packaging recycling. WRAP's NHM tonnage estimates use data from the Waste Data Interrogator (WDI) which is significantly different from the POM estimates produced by WRAP and Valpak. Thus, we applied the annual growth improvements from WRAP's NHM data to the actual POM tonnages.



Source: *Source: The Environment Exchange – average PRN prices*

It should be noted that this is not an attempt to forecast future prices rather is a option which considers the impact of future targets. We assume that higher recycling targets would imply higher PRN prices as obligated producers are demanding more evidence of recycled tonnages and thus are willing to pay, on average, more per tonne than now. In Table F.2 we show the projected PRN prices assumed for 2023, 2027 and 2032.

Table F.2 Projected PRN price for baseline, £ - best estimate

	2023	2027	2032
Plastic	279.8	279.8	279.8
Wood	29.7	32.0	35.0
Aluminium	302.2	302.2	302.2
Steel	36.9	49.4	65.2
Paper/Card	11.8	11.8	11.8
Glass	32.4	44.0	58.4

To estimate the cost to producers of purchasing evidence to comply with their recycling obligation in a specific year, the total obligated tonnage per material[131] is multiplied by the relevant PRN prices. For the best estimate, the cumulative undiscounted cost to businesses is projected to be £4.85bn over the appraisal period, 2023-2032.

Table F.3 Compliance costs to packaging producers of purchasing PRN evidence – best estimate

Packaging material	2023 (£m)	2027 (£m)	2032 (£m)
Plastic	297.5	301.0	305.3

[131] The obligated recycling tonnage is the amount of packaging waste that is required to be recycled for obligated producers to meet their obligations and achieve the statutory packaging recycling targets. Obligated producers demonstrate they have met their obligations by purchasing PRNs or PERNs from accredited reprocessors and exporters.

Wood	11.1	11.6	12.2
Aluminium	32.2	32.9	35.2
Steel	15.4	20.2	25.9
Paper/Card	45.2	46.1	47.3
Glass	52.9	70.0	90.3
Total	**453.3**	**481.9**	**516.2**

Operational costs (PRN scheme)

To project future operational costs for the baseline we researched a number of datasets. A public register of registered producers is published on the National Waste Packaging Database (NWPD). UK and individual regulator reports can be generated. The future number of obligated producers has been estimated by using the average growth rate over the last 5 years (2015-2019) which is 0.4% and assuming this rate would be constant between 2020 and 2032**.**

Table F.4 - Projected number of obligated producers up to 2032

	2019*	**2023**	**2027**	**2032**
No. of obligated producers	7,030	7,132	7,235	7,366

*Observed figure

Membership fees and related services as the basis on which compliance schemes compete with each other. The evidence on the membership fees of a compliance scheme is based on Valpak data. For the best estimate, the cost per producer of joining flat membership fee based on the level of their obligation. The average of this reported fee is £1,438 per producer per year. For group members the level of membership fee is based on the total group obligation. This cost is assumed to be constant in nominal terms over the appraisal period as we have not found any published evidence showing historical trends and this figure has not change in the last four years at least. The costs of procuring PRNs are based on Waste Care's charges[132]. This is an additional charge that compliance schemes charge their members on top of the price of the PRN. This ranges from £0.5-£2 per tonne or PRN, the conservative price of £1 has been assumed[133].

Table F.5 - Baseline PRN annual compliance scheme membership fees and issuing costs – best estimate

	2019	**2023**	**2027**	**2032**
Compliance scheme annual membership fee	£1,438	£1,438	£1,438	£1,438
Charge for procuring PRNs (per tonne)	£1	£1	£1	£1

Table F.6 shows the total estimated operational costs of the current PRN system.

Table F.6 - Total PRN system operational costs

	2019 (£m)	**2023 (£m)**	**2027 (£m)**	**2032 (£m)**
Compliance scheme membership fees	£10.10	£10.25	£10.40	£10.59
Cost of procuring PRNs	£7.39	£7.42	£7.45	£7.50
Total projected operational costs	**£17.49**	**£17.67**	**£17.86**	**£18.09**

[132] Waste Care PRN charge - http://www.wastecare.co.uk/compliance-services/packaging-compliance/costs-and-fees

[133] We have used the lowest proposed price from WasteCare research, £1 and to avoid overestimating the net benefit of an EPR system compared to the current PRN system.

The overall cost to obligated producers of the current PRN system comprises the cost of purchasing evidence of recycling (PRNs) to show that they have met their business obligations (compliance costs) plus, for those that choose to do so, the costs associated with being a member of a compliance scheme.

Table F.7 - Overall costs of the current PRN system to producers in baseline

Costs	2023 (£m)	2027 (£m)	2032 (£m)
Compliance costs	£453.34	£481.90	£516.19
Compliance scheme operational costs	£17.67	£17.86	£18.09
Total cost	**£471.01**	**£499.75**	**£534.29**

ANNEX G: VOLUNTARY LABELLING ASSUMPTIONS AND COSTS IN BASELINE

In the baseline option, it is assumed that producers can decide on a voluntary base to label their packaging and decide whether to join a labelling scheme. The On Pack Recycling Label (OPRL) scheme is a well-developed scheme that has been operating for 10 years. It has a substantial membership, so we have captured the costs associated with being member of this scheme in this assessment. As the membership of OPRL is voluntary, it is assumed that the cost of joining the scheme is equal to the benefit that the scheme offers. As a result, the cost associated with being a member of the OPRL scheme is not captured in the baseline. However, when calculating the costs to producers of complying with a mandatory labelling requirement the estimated costs of being a member of OPRL were deducted (equivalent to the number of businesses that are already members of OPRL).

Voluntary members of the OPRL scheme

In March 2020, OPRL estimated that the number of businesses currently using OPRL labels on their packaging is 479. In the baseline option, it is assumed that 20 new businesses will join the OPRL scheme each month between March 2020 and the start of 2023. This is due to:

- Producers becoming increasingly aware of the importance of effective waste-management and expected future requirements to label packaging; and
- Effective marketing by OPRL.

It is then assumed that as of 2023 this growth rate in the baseline will plateau to 10 new businesses per month, due to a large proportion of businesses already having become members. This growth rate is then assumed to plateau further from 2027, to 5 new members per month.

Table G.1 – Expected growth and number of OPRL voluntary members

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Baseline (OPRL) growth per year (rounded)		~10%	~9%	~8%	~4%	~4%	~4%	~3%	~3%	~3%
Baseline (OPRL) voluntary members	1199	1319	1439	1559	1619	1679	1739	1799	1859	1919

OPRL membership and compliance costs

OPRL membership fees

In the baseline, membership fees will be paid by businesses who voluntarily join the OPRL scheme. The published membership fees from April 2021 for different business types/sizes are outlined below, along with the estimated

proportion of businesses that fall within each category. All fees are inclusive of VAT. It is assumed that these fees are fixed for the period 2023-32.

Table G.2 – OPRL annual membership fees from April 2021[134]

Fees (inc. VAT)	Membership Category
£6,000	Major brands, retailers, packaging + materials manufacturers (businesses assumed to handle >1 billion pieces of packaging per annum) and waste management companies
£4,200	Large brands, retailers (assumed to handle 250m-1bn pieces of packaging per annum) and other packaging + materials manufacturers (assumed to handle <1bn pieces per annum)
£2,700	Supply chain – design agencies, packer/fillers, compliance schemes, consultancies
£2,160	Standard brands and retailers (<250m pieces of packaging per annum)
£474	Small independents and businesses exempt from PRNs

Labelling redesign costs

It is expected that there will be routine changes to OPRL packaging rules in the baseline. Where businesses need to amend their labelling, Defra considers that OPRL give their members sufficient time to comply with their rule changes so that businesses can incorporate the new requirements into their redesign processes as much as possible. As such, the costs associated with redesigning packaging due to OPRL rule changes are assumed to be £0.

Training costs

In the baseline, we expect OPRL members to undertake training to comply with the OPRL scheme. OPRL is in the process of rolling out new tools for their members to use and are producing a suite of short webinars for members to download so that members can ensure that their teams are adequately trained. As a result of these new tools, we expect each member to complete 1.5 FTE days of training on OPRL rules and processes each year. The wage we have assumed for this cost is the median hourly wage of 'advertising and market research' as reported by the ONS in 2019, we have then increased this to a 2023 wage level (assuming a 2%/annum wage increase) and then added overheads at a rate of 22% (£17.52/hour)[135] resulting in a total cost of 1 FTE equal to £185. The total estimated baseline training costs associated with OPRL membership are summarised in table G3.

Table G.3 - Total costs to businesses associated with learning about OPRL rules and processes (2023-2032), £m

2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
0.33	0.37	0.40	0.43	0.45	0.47	0.48	0.50	0.52	0.53

Labelling scheme administrator running costs

The 2019 baseline administration costs were provided by OPRL. We have assumed that these costs will increase each year in line with the expected growth in baseline membership. These include:

[134] https://www.oprl.org.uk/get-involved/advance-notification-of-planned-fee-increase/

[135] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datalist?:uri=employmentandlabourmarket/peopleinwork/earningsandworkinghours/datalist&filter=datasets&page=2 *(Earnings and hours worked, UK region by industry by two-digit SIC: ASHE Table 5)*

- Staff and employment costs
- Rent
- Accounting/Audits/HR

Table G.4 - Total estimated costs of running the OPRL scheme (2023-2032), £m

2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
2.2	2.5	2.7	3.0	3.0	3.2	3.3	3.4	3.6	3.7