

Title: Introducing a Deposit Return Scheme on beverage containers IA No: Lead department or agency: DEFRA Other departments or agencies:	Impact Assessment (IA)
	Date: 24/02/2021
	Stage: Consultation
	Source of intervention: Domestic
	Type of measure: Secondary legislation
	Contact for enquiries: David Gell John Walsh
Summary: Intervention and Options	RPC Opinion:

Cost of Preferred (or more likely) Option

Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB)	In scope of One-In, Two-Out?	Measure qualifies as
6,091m	-3,235m	347m	No	NA

What is the problem under consideration? Why is government intervention necessary? Max 7 lines
Drinks containers are often made of easily recyclable materials (PET plastic, glass, aluminium, steel), yet are frequently disposed of inappropriately, rather than recycled, generating negative externalities including increased CO2 emissions from the use of virgin material to create new products and unsightly and unhygienic litter. A Deposit Return Scheme is a system that encourages the return of the packaging to collection points through the incentive of a refundable deposit paid by consumers at the point of purchase. The deposit placed on drinks containers acts as an incentive against improper disposal, increasing the recycling rate and reducing the incidence of litter for these materials. Government intervention is necessary to achieve this step-change in behaviour as these litter benefits do not attract the engagement of the private sector.

What are the policy objectives and the intended effects? Maximum of 7 lines
The key objectives of introducing a DRS are increased recycling of drinks containers in scope of a DRS; higher quality recycling; greater domestic reprocessing capacity through providing a stable and high-quality supply of recyclable waste materials; and a reduction in litter and associated litter disamenity. The intended effect of introducing a DRS is to change behaviour of consumers, producers and retailers to deliver a significant change in the capture for recycling of empty drinks containers and the incidence of litter.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base) Maximum of 10 lines
Option 1 – Do nothing
Option 2 – Introduce an ‘All-In’ DRS to cover PET bottles, steel cans, aluminium cans and glass bottles, with no restriction of the size/format of drinks containers in-scope.
Option 3 – Introduce an ‘On-the-go’ DRS to cover PET bottles, steel cans, aluminium cans and glass bottles up to 750ml in size and sold in single format containers.
Option 4 – Introduce ‘All-in’ DRS with no glass intake. DRS to cover PET bottles, steel cans and aluminium cans, with no restriction of the size/format of drinks containers in-scope.

Will the policy be reviewed? It will/will not be reviewed. **If applicable, set review date:** Feb/2029

Does implementation go beyond minimum EU requirements?	Yes / No / N/A			
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	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: -1.9mt		Non-traded:-1mt	

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
SELECT SIGNATORY:

.....

Date:

.....

Description: Option 1 – Do nothing / baseline packaging producer responsibility reform.

FULL ECONOMIC ASSESSMENT

Price Base Year 2018	PV Base Year 2022	Time Period Years 11	Net Benefit (Present Value (PV)) (m)		
			Low:	High:	Best Estimate:

COSTS (m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant	Total Cost (Present Value)
Low			
High			
Best Estimate			

Description and scale of key monetised costs by ‘main affected groups’
 As this option represents the baseline and is included for comparative purposes, it has no incremental costs or benefits.

Other key non-monetised costs by ‘main affected groups’
 None

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

Description and scale of key monetised benefits by ‘main affected groups’
 None

Other key non-monetised benefits by ‘main affected groups’
 None

Key assumptions/sensitivities/risks	Discount rate	3.5%
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BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) m:	In scope of OITO?	Measure qualifies
Costs:	No	NA
Benefits:		
Net:		

Description: Option 2 – All drinks containers included in DRS

FULL ECONOMIC ASSESSMENT

Price Base Year 2018	PV Base Year 2022	Time Period Years 11	Net Benefit (Present Value (PV)) (m)	
				Best estimate: 5,884.5

COSTS (m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant)	Total Cost (Present Value)
Low			
High			
Best Estimate	2,150	172	6,346

Description and scale of key monetised costs by ‘main affected groups’ (discounted)
 Capital investment costs (1,760m); Organisational Set up costs (141m); IT Installation costs (7m); Training and familiarisation costs (14m); Relabelling costs (36m); Central administrative costs (239m); Enforcement costs (11m); Reverse Vending Machine (RVM) Handling costs (536m); RVM Maintenance (783m); Counting centre costs (212m); Retail rental costs (152m); Manual take-back labour costs (279m); Logistics (1,982m); Retailer opportunity costs (194m); Deposits unredeemed by consumers used to fund system (Assumed to be 50% of net costs) (-3,598m).

Other key non-monetised costs by ‘main affected groups’
 The potential cost to consumers for the time required to return drinks containers to RVMs or manual take-back points.

BENEFITS (m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant)	Total Benefit (Present Value)
Low			
High			
Best Estimate	0	1,392	12,231

Description and scale of key monetised benefits by ‘main affected groups’ (discounted)
 Reduction of disamenity from litter (11,198m); Net material revenue (347m); Direct costs of litter clean-up savings (661m); Savings from recycling (93m); Increase in greenhouse gases (GHG) from transport (-68)

Other key non-monetised benefits by ‘main affected groups’
 The provision of a high-quality stream of waste for the domestic reprocessing market.

Key assumptions/sensitivities/risks	Discount rate	3.5%
Assumption that the return rate achieved by the DRS is 85%, and that will result in an 85% reduction in drinks container litter.		
Assumption that some estimates based on Scotland can be scaled up via population to the UK.		
Sensitivities around litter disamenity estimates as this is an uncertain area of research.		

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) m:	In scope of OITO?	Measure qualifies
Costs:	No	NA
Benefits:		
Net: -266		

Description: Option 3 – ‘On the go’ drinks containers included in DRS

FULL ECONOMIC ASSESSMENT

Price Base Year 2018	PV Base Year 2022	Time Period Years 10	Net Benefit (Present Value (PV)) (m)		
					Best estimate: 282

COSTS (m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant	Total Cost (Present Value)
Low				
High				
Best Estimate	1,235		85	3,503

Description and scale of key monetised costs by ‘main affected groups’
 Capital investment costs (949m); Organisational Set up costs (141m); IT Installation (7m); Training and familiarisation (14m); Relabelling (17m); Central administrative costs (239m); RVM Handling costs (298m); RVM Maintenance (468m); Counting centre costs (163m); Retail rental costs (84m); Manual take-back labour costs (100m); Logistics (932m); Opportunity costs (97m); Material revenue from unredeemed deposits (-1,701m)

Other key non-monetised costs by ‘main affected groups’:
 The potential cost to consumers for the time required to return drinks containers to RVMs or manual take-back points.

BENEFITS (m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant	Total Benefit (Present Value)
Low	0			
High	0	0		
Best Estimate	0		431	3,785.4

Description and scale of key monetised benefits by ‘main affected groups’ (discounted)
 Reduction of disamenity from litter (3,614m); Net material revenue (99m); Direct costs of litter clean-up savings (201m); Savings from recycling (25m); Increase in GHG from transport (-21m)

Other key non-monetised benefits by ‘main affected groups’
 The provision of a high-quality stream of waste for the domestic reprocessing market.

Key assumptions/sensitivities/risks	Discount rate	3.5%
Assumption that the return rate achieved by the DRS is 85%, and that will result in an 85% reduction in drinks container litter.		
Sensitivities around litter disamenity estimates as this is an uncertain area of research.		

BUSINESS ASSESSMENT (Option 3)

Direct impact on business (Equivalent Annual) m:			In scope of OITO?	Measure qualifies
Costs:	Benefits:	Net: -182.7		

Description: Option 4 – All-in drinks containers included in DRS, excluding glass

FULL ECONOMIC ASSESSMENT

Price Base Year 2016	PV Base Year 2017	Time Period Years 10	Net Benefit (Present Value (PV)) (m)	
				3,582.3

COSTS (m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant	Total Cost (Present Value)
Low				
High				
Best Estimate	1,738		171	5,491

Description and scale of key monetised costs by ‘main affected groups’ (discounted)
 Capital investment costs (1,388m); Organisational Set up costs (141m); IT Installation (7m); Training and familiarisation (14m); Relabelling (34m); Central administrative costs (239m); Enforcement (11m); RVM Handling costs (402m); RVM Maintenance (666m); Counting centre costs (177m); Retail rental costs (116m); Manual take-back labour costs (236m); Logistics (1,903m); Opportunity costs (157m); unredeemed deposits (-2,498m)

Other key non-monetised costs by ‘main affected groups’:
 The potential cost to consumers for the time required to return drinks containers to RVMs or manual take-back points.

BENEFITS (m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant	Total Benefit (Present Value)
Low	0			
High	0	0		
Best Estimate	0		1,034	9,074.3

Description and scale of key monetised benefits by ‘main affected groups’ (discounted)
 Reduction of disamenity from litter (8,086m); Net material revenue (482m); Direct costs of litter clean-up savings (478m); Savings from recycling (86m); Increase in GHG from transport (-58m)

Other key non-monetised benefits by ‘main affected groups’
 The provision of a high-quality stream of waste for the domestic reprocessing market.

Key assumptions/sensitivities/risks	Discount rate	3.5%
Assumption that the return rate achieved by the DRS is 85%, and that will result in an 85% reduction in drinks container litter.		
Sensitivities around litter disamenity estimates as this is an uncertain area of research.		

BUSINESS ASSESSMENT (Option 4)

Direct impact on business (Equivalent Annual) m:	In scope of OITO?	Measure qualifies
Costs:	No	NA
Benefits:		
Net: -294.7		

1 Introductory note

This impact assessment is the first part of a trio of impact assessments - all relating to three major reforms to the waste sector. The other two reforms being considered alongside a Deposit Return Scheme (DRS) for drinks containers are introducing consistent municipal recycling collections in England and reforming the current packaging producer responsibility scheme.

Ordering the analysis has been an important element of producing an assessment that considers a manageable suite of options that conform with Green Book guidance utilising social cost-benefit analysis.

The economic case for a DRS for drinks containers is considered first because, if implemented, it would have an immediate effect of removing drinks containers from kerbside collections (both at household level and wider municipal) and therefore the materials that would otherwise be captured through consistency municipal recycling collections. This includes the hospitality sector (e.g. bars, restaurants, hotels) where we would not expect deposit bearing drinks containers to be taken to a return point by consumers, but rather collected separately from the hospitality retailer. Furthermore, drinks containers are specified as packaging and therefore captured under the current producer responsibility scheme. Drinks containers captured in a DRS would therefore no longer be captured in a reformed producer responsibility system.

Therefore, the analysis here serves to identify a preferred option which is then taken as a baseline for the economic analysis of consistency municipal recycling. The preferred option from this analysis then serves as the baseline to reform of the packaging producer responsibility scheme.

Implementation dates

There is discrepancy between implementation dates of the DRS in the consultation document and in this impact assessment. The analysis here within is based on an initial working assumption of a 2023 implementation date. This has now been pushed back to 2024, however due to the quality assurance and scrutiny process necessary for regulatory impact assessments, it has not been possible to factor this into the analysis without delaying the consultation. We expect the impact of this change to be small and will account for it in the final-stage impact assessment.

Impact of Covid-19

Covid-19 has dramatically altered consumption patterns and the longer-term impact it may have on consumer behaviour is currently unknown. For this reason we have not factored any impacts from Covid-19 explicitly into our analysis but welcome views during this consultation on how this might be achieved in a robust manner.

2 Policy background

The UK Government for England, Welsh Government and the Department of Environment, Agriculture and Food in Northern Ireland (DAERA) have high ambitions for the resources and waste sector, as presented in the recently published Resources & Waste Strategy for England and in the 2010 waste strategy for Wales, Towards Zero Waste.

The UK Government for England, Welsh Government and the Department of Environment, Agriculture and Food in Northern Ireland has committed in its 25 Year Environment Plan for England to reform producer responsibility systems (including packaging waste regulations) to incentivise producers to take greater responsibility for the environmental impacts of their products¹. Through the 25 Year Environment Plan, the UK Government has also committed to implementing voluntary and regulatory interventions that can cut the

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

amount of commonly littered items, and improve recycling and packaging reuse² and outlines Government's³ aim to create a better market for recycled plastic⁴.

In December 2018 the UK Government published its Resources and Waste Strategy for England⁵ detailing its commitment to tackling waste, unsustainable use of resources, and the consumption of materials in large quantities to encourage more sustainable resource use. In the strategy, the UK Government committed to introduce a deposit return scheme (DRS) for drinks containers in England, aimed at boosting recycling rates and reducing littering, subject to consultation. The 2019 manifesto on which the current Government was elected committed to introduce a deposit return scheme to incentivise people to recycle plastic and glass.

Drinks containers are currently captured under the existing packaging producer responsibility scheme, which ensures obligated packaging producers contribute towards the cost of recycling and recovery of that packaging. This system is being reformed under the Extended Producer Responsibility (EPR) for Packaging reforms, which are being consulted on alongside the DRS proposals. However, the DRS is a policy which will specifically target drinks containers in an alternative regime to EPR, so we can separately collect these materials to improve quality and rates of recycling for drinks container packaging.

Government is also committed to maintaining the same environmental standards following its exit from the EU as a minimum, and to match or where economically practicable exceed the ambitions of the EU's environmental agenda, including their Plastics Strategy. Our landmark Resources and Waste Strategy for England sets out how we will drive the shift towards a circular economy, and we intend to match EU's Plastic Strategy target to collect 77% of single-use plastic bottles placed on the market by weight by 2025, and 90% by 2029.

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 will set 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* set out high level objectives to tackle littering and to increase the range of plastic materials collected for recycling and develop more recycling infrastructure in Wales to reprocess it, including developing markets for recycled plastic in Welsh manufacturing. It specifically identified DRS as a key lever to achieve this and made the commitment to work with the other governments of the UK in developing legislation for a DRS for drinks containers.

The UK Government for England, the Welsh Government and the Department of Agriculture, Environment and Rural Affairs in Northern Ireland want to achieve far more ambitious recycling rates and reduce littering. The only way we will achieve these aims is with a step-change in behaviour. It is anticipated that a DRS will help reduce the amount of littering in England, Wales, and Northern Ireland, boost recycling levels for relevant material, offer the enhanced possibility to collect high quality materials in greater quantities and promote recycling through clear labelling and consumer messaging.

2.1 The Litter Strategy for England

As part of the Litter Strategy for England, published in April 2017, the Government established a working group to report to Ministers with advice on different incentives to improve recycling and reuse of packaging,

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

³ Unless otherwise stated "Government" refers to the UK Government for England, the Welsh Government and the Department of Agriculture, Environment and Rural Affairs in Northern Ireland.

⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

⁵ <https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england>

and to reduce the incidence of commonly littered items. In autumn 2017, this working group held a Call for Evidence on measures to reduce littering of drinks containers and promote recycling. The focus of this Call for Evidence was rigid and flexible plastic, glass or metal drinks containers that are sold sealed and used for the sale of alcoholic or non-alcoholic beverages, often for consumption outside the home ('on-the-go'). It included seeking evidence on the costs, benefits and impacts of deposit return and reward schemes.

In early 2018, Government received and reviewed the Working Group's report summarising its Call for Evidence outcomes and recommendations (in accordance with a commitment in the 25 Year Environment Plan to do so). The main conclusions of the group were that⁶:

- There is some evidence from other countries that well-designed and well-run deposit return schemes can deliver an estimated increase of around 20% in the reported amount of drinks containers collected for recycling than is currently estimated as happening in the UK.
- A DRS could be a mechanism to deliver additional collection of high-quality material for recycling from consumers outside their homes, particularly in areas of high consumer traffic.
- Changing behaviour in relation to recycling outside the home is also an area that, arguably, could have a large impact on reducing litter.
- The general assumption appears to be that receiving a monetary or other reward will encourage consumers to deposit drinks containers at a collection point instead of littering, and/or individuals/groups will be incentivised to collect 'in-scope' litter to claim the refund. Introduction of a DRS is therefore thought likely to reduce costs to local authorities associated with clearing litter.

The recommendation of the working group was that DEFRA further investigate the potential for using a well-designed DRS to encourage increased collection and recycling of drinks containers and that particular attention be paid to considering how to capture material that is consumed 'on-the-go'⁷.

The report can be found at: www.gov.uk/government/consultations/drinks-containers-reducing-litter-and-increasing-recycling-call-for-evidence.

Following this report, the Government confirmed that it would introduce a DRS for drinks containers in England, aimed at boosting recycling rates and reducing littering, subject to consultation. The report highlighted that more work would be needed to assess the implications and impacts of a DRS before one were to be introduced⁸.

2.2 Consumer Research to inform the design of an effective deposit return scheme

In 2019 Defra conducted consumer research to inform the design of an effective Deposit Return Scheme (DRS)⁹. The objective of the research was to understand how consumers in England and in Wales are likely to respond to a Deposit Return Scheme: what are their attitudes towards a DRS and how can the scheme be designed to best fit with practices, habits and decision-making to optimise its effectiveness.

The findings of the report demonstrate strong support for a DRS, though concerns around a DRS were raised as part of in-depth interviews and group discussions held, including the practicalities of using a scheme. In light of these findings, the report makes a number of recommendations to inform the effective

⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/694916/voluntary-economic-incentives-working-group-report-drinks-containers-final.pdf

⁷ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/694916/voluntary-economic-incentives-working-group-report-drinks-containers-final.pdf

⁸ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/694916/voluntary-economic-incentives-workingFor-group-report-drinks-containers-final.pdf

⁹ Consumer Research to Inform Design of an Effective Deposit Return Scheme; <http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=220&ProjectID=20253>

design of a DRS, in particular the importance of communications to highlight the need for and benefits of a DRS.

The key findings of the report are:

- 74% of survey participants supported a DRS (10% opposed). However, after further consideration, most qualitative participants came to question the idea of a DRS, which they felt asked a lot from consumers with no strong environmental benefit given the existence of kerbside recycling.
- 75-80% of survey participants stated they would use a DRS on all or most occasions for drinks consumed at home and away from home. There were some concerns raised by qualitative participants including the storage and retention of drinks containers, the practicalities of carrying around used cans and heavy glass bottles and not being able to crush bottles prior to return.
- Around half of 16-24 year old and 11-15 year old survey participants said a DRS may reduce the number of bottles or cans they buy.
- On deposit level, survey participants showed equal support for a 10p or 20p deposit (with more support for a 10p deposit from older people and those in lower social grades). Qualitative participants concluded that a 15-25p deposit would be most effective to ensure it strikes a balance between being high enough to motivate people to use the scheme but not so high as to influence affordability. Qualitative participants favoured deposit levels that are a round number and that participants are able to easily 'chunk' up into larger units of value. There were mixed views regarding whether the deposit amount should differ depending on the size of the container.
- Qualitative participants indicated a DRS should be designed to accommodate use as far as possible within existing behaviour. Return points at large supermarkets should be quick and easy to use. Machines should also be located in busy areas (e.g. transport hubs, schools and workplaces) and consideration given to returns being accommodated as part of online delivery services.
- Both the survey and qualitative findings demonstrated that older people, those in lower social grades and those without access to a household car may be less able to engage with a DRS for practical and financial reasons.
- An all-in scheme was considered to be the most effective scheme as it keeps things simple with convenience, ease of use and minimal time spent at return points
- The location of return points was the greatest driver in terms of likelihood of use of a DRS, followed by the extra time it takes to return containers, with deposit amount being considered less important.

The report provided recommendations on the design of a DRS based on these findings:

- *Communications*: Although most survey participants were in support of the scheme, responses in the qualitative research suggest that it will be important for communications to counter perceptions that the scheme unfairly places the burden for recycling on consumers and offers little benefit over existing recycling kerbside recycling or the provision of better on-street recycling facilities. Communications should highlight the benefits of a DRS, contextualise the consumer role and reassure about current practices (e.g. the continued role of kerbside collections)
- *Return Points*: As the survey found that individuals in lower social grades and those without access to a household car were less likely to store empty containers and take them back to return points, it will be important to prioritise convenience in the design of the scheme and distribution of return points to ensure they are accessible to all. Return points should allow for bulk returns to be made quickly and easily. While return points should be located at large supermarkets, it will also be important to have other centrally and locally placed return points to ensure access for everyone.
- *Keep it simple*: Design of the scheme should be kept simple and based on the 'all-in' model.

- *Deposit*. The deposit level should use round numbers which will allow people to easily ‘chunk’ the value of deposits; the deposit should be clear at the point of sale; and a choice of refund methods should be provided for, though cash was considered to be necessary to ensure accessibility for all.

2.3 Wales Study on Waste and Recycling

In September 2017 the Welsh Government commissioned a study on extended producer responsibility options for key food and drink packaging types in order to reduce waste, increase recycling and reduce litter. This included drinks containers, and a deposit return scheme was one of the options considered. The study included consultation with key stakeholders through a series of workshops. It concluded it would be preferable for the Welsh Government to work together with other UK countries in order to bring about a single UK-wide DRS for drinks containers. The Welsh Government subsequently agreed to consider a UK-wide DRS, taking account of the risks and benefits to existing provisions and recycling levels and to build on the progress in recycling already achieved in Wales.

One of the key challenges for the DRS in Wales is its implementation within the existing mature and successful household waste collection and recycling infrastructure that is delivering recycling rates of around 65%.

2.4 Northern Ireland Options Paper on DRS

In 2015 a Departmental paper was commissioned on options on the desirability and feasibility of a DRS scheme in Northern Ireland. The paper looked at various aspects of the introduction of a DRS scheme including its impact on littering and its effect on waste management in general. The paper concluded that whilst DRS was desirable and had the potential to increase recycling and influence behaviour on a wider environmental scope, it was not feasible to introduce a scheme on a Northern Ireland only basis. Northern Ireland continue to support the development of a DRS alongside England and Wales.

2.5 Consultation on Introducing a DRS in England, Wales and Northern Ireland

The UK Government published a consultation, with the Welsh Government and on behalf of the Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland, seeking views on introducing a Deposit Return Scheme for drinks containers covering England, Wales and Northern Ireland in February 2019¹⁰. The consultation ran from 18 February until May 2019 (12-weeks). The consultation was broad in scope and covered scheme design, scope on materials, and deposit levels.

The consultation asked questions on the following areas:

- basic principles for a DRS
- scope of a DRS, including the materials and drinks that the scheme will cover
- scheme design, including options for the scheme delivery model
- operational management of the scheme, and the proposed establishment of a Deposit Management Organisation (DMO)
- finance and administration of the scheme, including a focus on set-up, operational costs and deposit level
- monitoring and regulation, including compliance and enforcement, tackling fraud and misuse of the scheme
- proposed scheme objectives, outcomes and impacts

¹⁰ <https://consult.defra.gov.uk/environment/introducing-a-deposit-return-scheme/>

We received a total of 208,269 responses to the consultation; 1,180 of those were by email, post and citizen space, and 207,089 were via campaigns from Greenpeace, Marine Conservation Society, and 38 Degrees. Defra published the Summary of Responses to the consultation and next steps on 23 July 2019¹¹

Based on the consultation responses received, and the strong support for the introduction of a DRS, Government is committed to introduce a DRS for drinks containers. In the Summary of Responses to the consultation, the UK Government for England, Welsh Government and the Department of Environment, Agriculture and Food in Northern Ireland indicated that the introduction of a DRS was subject to receiving additional evidence and carrying out further analysis on the costs and benefits of such a scheme. This Impact Assessment presents this additional evidence and analysis, including evidence from commissioned research projects on the value of reductions in litter (in turn the value of reducing the negative effects of litter on peoples' wellbeing), consumer views on a DRS, and an assessment of the impact of a DRS on secondary material markets.

Following the publication of the Summary of Responses to the consultation, the UK Government for England, Welsh Government and the Department of Environment, Agriculture and Food in Northern Ireland has sought general primary powers in the Environment Bill to introduce deposit return schemes.

The UK Government for England, Welsh Government and the Department of Environment, Agriculture and Food in Northern Ireland have been developing proposals using further evidence and ongoing engagement with stakeholders. This consultation seeks views on our final proposals to introduce a DRS for drinks containers in England, Wales and Northern Ireland. This impact assessment assesses the costs and benefits of a DRS across the UK as a whole. This approach was taken, despite Scotland implementing its own scheme, on the basis that much data relied on for this impact assessment is based on UK-wide data as part of the existing producer responsibility scheme for packaging. Further work will be undertaken to exclude Scotland for the final impact assessment.

3 Rationale for Intervention

There are significant and ongoing negative externalities arising from the inappropriate disposal of drinks containers, including those made of glass, plastic, steel and aluminium (cans). Consumers often do not place a value on drinks containers once used or are unable to find an appropriate or convenient route for disposal. Products that could have been recycled are therefore often disposed of via black-bag waste or littered, meaning recycling rates are not as high as they might be. Whilst localised efforts may occasionally arise to try to increase people's awareness, past experience has shown that at the universal or generalised national level these would be totally unable to bring about a long-term solution to the problem. There are a number of basic reasons why this is the case. Separate and disparate initiatives will lack coordination thereby limiting interoperability between fragmented systems creating inconvenience for customers. Discrepancies would arise as to which drinks containers should be captured generating confusion among consumers. Without firm guarantees that all sections of the industry would be actively involved, the resultant gaps in provision together with the lack of consumer engagement would make it very likely that the approach would not be sufficient to achieve the wider policy objectives in this area, namely to increase the recycling rates of the targeted drinks containers and to significantly reduce litter. Therefore to establish consumer and industry confidence in any such undertaking and in order to obtain the full efficiencies from a properly synchronised system, a policy intervention is necessary to achieve the ambitious policy goals over time.

3.1 Regulatory option

¹¹ <https://www.gov.uk/government/consultations/introducing-a-deposit-return-scheme-drs-for-drinks-containers-bottles-and-cans>

A DRS introduces a refundable deposit on drinks containers when purchased, which is refunded when returned after use. The deposit level places a monetary value on empty drinks containers, reflecting the true social and environmental cost of disposal, and the DRS infrastructure provides consumers with a clear and easy method of disposal. Successful return ensures that the product can be recycled into secondary raw materials.

Recycled materials can replace virgin materials in production, thereby reducing the greenhouse gas emissions associated with creating new products.¹² In addition, recycling minimises the waste going to landfill and incineration plants, avoiding further greenhouse gas emissions that would have been emitted. This is particularly significant when considering the incineration of highly polluting materials such as plastic. Increasing recycling and encouraging the use of recyclable and recycled materials in production also helps to move towards a circular economy, keeping resources in use for as long as possible and extracting the maximum value from them.

Collecting material via a DRS also allows for a high-quality, well-defined stream of material for provision to secondary reprocessing markets. Drinks containers collected in this way are less likely to become contaminated with non-target materials, in comparison to collecting the material via a mixed recycling kerbside collection, and pre-sorting the material allows for greater certainty of the materials present. This stable provision of high-quality waste materials has the potential to stimulate domestic reprocessing markets.

Reducing the amount of drinks containers littered would also have significant wider and indirect environmental benefits. Material that is littered tends to end up in black bin waste once collected and is unlikely to be recycled due to high levels of contamination. If it is not collected, litter can harm wildlife, or enter the water system and cause a serious problem as marine pollution. It is estimated that 80% of man-made debris in the marine environment originated on land before being thrown, blown or washed into rivers, canals and the sea¹³.

3.2 Packaging Recycling Rates

Recent packaging recycling rates demonstrate that there are improvements that could be made in drinks container recycling rates, especially in relation to recycling 'on-the-go'. Material that is not recycled will generally either enter landfill via black bin waste collection, be incinerated in energy from waste plants, or be littered.

Data obtained by the Voluntary and Economic Incentives Working Group suggested that in 2016, around 74% of plastic drinks bottles in the UK were collected for recycling.¹⁴ This figure includes milk containers but does not include data from vending machines or other situations where drinks are consumed 'on-the-go'. It also does not account for the potential rejection of contaminants from the collected material tonnages. It is estimated that 1.3% of the material collected for recycling is rejected and ends up in landfill¹⁵, with associated environmental and economic costs. For these reasons, the stated figure of 74% may be higher than overall actual recycling rates for plastic drinks bottles. For the purpose of this Impact Assessment, a baseline recycling rate of 70% for PET plastic bottles has been used.

Further data obtained by the Working Group estimated that in 2016, 70% of glass drinks bottles were collected for recycling. This figure does not include data from vending machines or hospitality. Alupro, the

¹² These vary by material type but are taken from the latest Carbon Conversion Factors analysis published by BEIS, available online [here](#)

¹³ Litter Strategy for England (2017): <https://www.gov.uk/government/publications/litter-strategy-for-england>

¹⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/694916/voluntary-economic-incentives-working-group-report-drinks-containers-final.pdf

¹⁵ Analysis based on Local Authority collected waste in 2016/17 (including household and non-household). Waste that was collected and sent for recycling but rejected at the gate of the Material Recycling Facility, material that underwent further processing/sorting, and incinerator bottom ash from rejects that were sent to incineration. Please note that reporting of these figures is uncertain so this should be considered an estimation.

aluminium packaging industry body, state that in 2017 the recycling rate of aluminium drinks cans in the UK was 72%¹⁶.

In the 2017/18 financial year, all English local authorities offered kerbside collection for metal drinks cans, 99% offered kerbside collection for plastic drinks bottles and 89% offered kerbside collection for glass drinks bottles¹⁷. The Welsh Government published its Collections Blueprint for consistency in Local Authority recycling services in 2011. In the 2017/18 financial year all Welsh local authorities offered kerbside collection for plastic drinks bottles, glass drinks bottles and metal drinks cans.

In addition to kerbside collections, some Local Authorities also provide recycling bin facilities 'on-the-go', such as on high streets. The RECOUP 2018 UK Household Plastics Collection Survey found that only 49% of the local authorities who responded to the question provided a recycling 'on-the-go' service¹⁸. Where 'on-the-go' recycling bins are provided, contamination of the material collected is often an issue. The Voluntary and Economic Incentives Working Group report on drinks containers highlighted a comment from the Local Authority Recycling Advisory Committee (LARAC) that the quality of material from 'on-the-go' or street bin recycling schemes is very low¹⁹.

The WRAP, Valpak and Recoup 2019 report on consumption, recycling and disposal of 'on-the-go' drinks containers in the UK²⁰ found through surveys that consumers reported 65% of PET plastic drinks bottles; 59% of drinks cans; and 51% of glass drinks bottles consumed 'away from home' are recycled. However, adjusting for potential possible exaggeration using evidence collected for coffee cups, they suggested that actual recycling rates for on-the-go drinks consumed could be as low as 7% for plastic drinks bottles; 8% for drinks cans; and 8% for glass drinks bottles. WRAP's knowledge of disposable hot drinks cups Placed on the Market (POM) and recycling showed that for coffee cups, the Away From Home (which includes on the go) levels of recycling were over-stated by 85% in consumer self-reporting. Due to the scale and availability of on-the-go recycling infrastructure, WRAP judged that it is reasonable to assume this level of over-stating also exists for plastic, metal and glass drinks containers consumed on the go, and so these lower figures are an adjustment based on assuming similar levels of over-stating. Notwithstanding this, the higher rates have been used in this IA to provide a conservative estimate of the benefits of introducing an on-the-go DRS.

3.3 Drinks Container Litter

Drinks container litter is a serious issue which needs targeted policy action to overcome. The most recent Local Environmental Quality Survey of England (2017/18) found alcoholic drinks related²¹ litter at 25% of the sites surveyed, up from 19% in 2014/15²², and non-alcoholic drinks related²³ litter was found at 52% of the sites surveyed²⁴. Data recorded on the Love Clean Streets App during the Great British Spring Clean

¹⁶ <https://alupro.org.uk/aluminium-packaging-real-recycling-aluminium-drinks-cans-hit-72-recycling-rate-data-shows-almost-100-recycled-within-europe/>

¹⁷ Data provided by WRAP to DEFRA

¹⁸ <http://www.recoup.org/p/324/uk-household-plastics-collection-survey-2018>

¹⁹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/694916/voluntary-economic-incentives-working-group-report-drinks-containers-final.pdf

²⁰ Drinks Recycling On-the-Go', WRAP, 2019, Prepared by Valpak and Recoup: <https://wrap.org.uk/sites/default/files/2021-03/OTG%20Drinks%20Containers%20Final%20Report%20ENG017-012.pdf> These figures are based on consumer survey of drinks consumption and disposal undertaken in July 2018. Figures include drinks containers disposed of by respondents and includes both consumer (retail) and non-consumer (hospitality) consumption.

²¹ Taken from the LEQSE 2017/18 glossary: This includes cans, bottles, wine cartons, identifiable bottle tops and ring pulls etc.

²² http://www.keepbritaintidy.org/sites/default/files/resource/National%20Litter%20Survey%20201718_0.pdf

²³ Taken from the LEQSE 2017/18 glossary: Non-alcoholic drinks related – all items associated with non-alcoholic drinks, including cans, bottles, cartons, identifiable bottle tops and ring-pulls etc.

²⁴ <http://www.keepbritaintidy.org/sites/default/files/resource/National%20Litter%20Survey%20201718.pdf>

(March 2017) showed that 22% of the total number of items collected were alcoholic drinks related litter and 20% were non-alcoholic drinks related litter²⁵.

The Marine Conservation Society Great British Beach Clean 2017 Report showed drinks container litter was part of three of the top ten item categories found on beaches (plastic/polystyrene pieces (0-50cm), glass, and caps and lids)²⁶.

A recent Litter Composition Analysis Summary Report conducted by Keep Britain Tidy (KBT) and published in March 2020 found that, by volume, small plastic bottles under 750ml contributed to a quarter of all litter, and cans for a further 19%²⁷.

In Wales, the 2017/18 Local Environmental Audit and Management System report recorded drinks litter on 43.3% of the streets surveyed with the majority of these being cans (13.8%) and plastic bottles (11.7%)²⁸.

Responses to the recent HM Treasury call for evidence on using the tax system or charges to address single-use plastic waste also highlighted drinks containers often used 'on-the-go' as commonly littered items²⁹.

Keep Britain Tidy's Beacons of Litter research suggests that the presence of large items of litter (or 'beacons') such as drinks containers in an area may have a normative effect on littering, and that the presence of 'beacon' items at a site appears to encourage others to litter those same items, increasing the likelihood that other 'beacons' will accumulate³⁰. The research found that littering of drinks containers rose drastically in sites with many 'beacons' of litter (in most cases drinks containers can be classified as 'beacons' as they are fairly large, often brightly coloured or branded³¹). This suggests that targeting drinks containers may have a knock-on beneficial effect on other forms of litter. The Independent Call for Evidence held by the Voluntary and Economic Incentives Working Group also highlighted the importance of encouraging behaviour change to stop littering at source, and to ideally also promote the capture of valuable resources that can be recycled³². In order to create a change in people's behaviour and deliver a long-term reduction in the amount of litter that is dropped, we also need to reduce the amount of visible litter and address the perception of England, Wales and Northern Ireland as being littered countries, because we know that people drop less litter in a clean environment³³.

This would also reduce the burden on Local Authorities, and ultimately the taxpayer, of collecting and disposing of this material, at the expense of other local services³⁴. Responses to the HM Treasury Call for Evidence on single-use plastics (which ran from 13 March to 18 May 2018) also highlighted the negative impacts (disamenity) of litter on public spaces³⁵. Living in a littered environment can have negative consequences on people's mental and physical health, creating further strain on local services³⁶. Poor local

²⁵ <https://www.gov.uk/government/publications/litter-and-littering-in-england-2016-to-2017/litter-and-littering-in-england-2016-to-2017>

Alcoholic drinks-related: All items associated with alcoholic drinks; this includes cans, bottles, wine cartons, identifiable bottle tops and ring pulls, labels from bottles and beer/spirit/shot glasses.

Non-alcoholic drinks-related: All items associated with non-alcoholic drinks for example cans, bottles, cartons, identifiable bottle tops and ring-pulls, straws and labels from bottles. This excludes those items arising from fast food outlets, which should be classified as fast food litter.

²⁶ <https://www.mcsuk.org/media/mcs-gbbc-2019-report-digital.pdf>

²⁷ <https://www.KeepBritainTidy.org/sites/default/files/resources/20200330%20KBT%20Litter%20Composition%20Report%20-%20FINAL.pdf>

²⁸ <https://www.KeepWalesTidy.cymru/surveys>

²⁹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734837/Plastics_call_for_evidence_summary_of_responses_web.pdf

³⁰ http://www.KeepBritainTidy.org/sites/default/files/KBT_CFSI_Beacons_Of_Litter_2017.PDF

³¹ http://www.KeepBritainTidy.org/sites/default/files/KBT_CFSI_Beacons_Of_Litter_2017.PDF

³² <https://consult.DEFRA.gov.uk/waste-and-recycling/call-for-evidence-drinks-containers/>

³³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/607747/litter-strategy-for-england-2017.pdf

³⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/607747/litter-strategy-for-england-2017.pdf

³⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734837/Plastics_call_for_evidence_summary_of_responses_web.pdf

³⁶ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/607747/litter-strategy-for-england-2017.pdf

environmental quality can also discourage inward investment and may suppress property prices, damaging local economic growth³⁷.

Attempting to determine a value for litter disamenity is a complex and under-researched area. The disamenity of litter has been monetised in this IA by looking at the amount that people would be willing to pay in increased council tax to reduce litter. This primarily captures the disamenity to the individual or households, and it is likely that many people would include environmental factors in this decision making. This analysis has been updated since the 2019 IA based on a “stated preference” methodology undertaken by the environmental consultancy, Eftec.³⁸

As the deposit return scheme would require a fee from producers, it would also help to ensure the party responsible for producing pollution is responsible for paying for the damage done by it to the natural environment. This is in accordance with the ‘producer pays’ principle, which requires that producers placing products on the UK market pay towards the recycling and safe disposal of those products when discarded by the final user. Correcting these negative externalities would move towards the goal of a more circular economy and help to minimise avoidable waste.

4 Policy objectives

It is anticipated that a DRS will help reduce the amount of littering in England, Wales, and Northern Ireland, boost recycling levels for relevant material, offer the possibility to collect high quality materials in greater quantities and makes it easier for consumers to recycle through clear labelling and consumer messaging.

The primary objectives of a DRS are:

1. Increase recycling rates of in-scope containers;

Current recycling rates in the UK are around 70% which leaves approximately 4bn plastic bottles, 2.7bn cans and 1.5bn glass bottles not recycled every year.

2. Increasing the quality of recycled material to encourage closed loop recycling and circularity to ensure materials remain in use for as long as possible.

A DRS will ensure that material collected is of a high enough quality to be reprocessed. If scheme containers were returned that did not meet the quality required (i.e. they were contaminated), an RVM would not accept the material and the consumer would lose their deposit. A DRS enables the separate sorting of drinks containers at source by material as opposed to them be collected as part of kerbside services where materials streams are often mixed. This will reduce the level of contamination and the amount of recycling that is subsequently rejected. For example, the operational contamination rates at UK reprocessors are about 5.85% (2012), with the cost impact of poor and inconsistent quality of recyclate for a group of 9 UK reprocessors was 51m annually representing an average cost per tonne of 15.67.³⁹ Increased costs disincentivise investment in reprocessing infrastructure. Moreover, contamination of materials means that they cannot be recycled to the highest quality and may be down-cycled to make other products like textiles rather than keeping the same materials in use as drinks containers.

3. Reduce littering of in-scope containers;

³⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/607747/litter-strategy-for- england-2017.pdf

³⁸ Eftec (forthcoming) Amenity value benefits of a Deposit Return Scheme for drinks containers

³⁹ Resource Association, Cost of Contamination Report (2012)

It is estimated that 80% of man-made debris in the marine environment originated on land before being thrown, blown or washed into rivers, canals and the seas.⁴⁰ KBT surveys have found high levels of drinks related litter including 52% of surveyed sites containing non-alcoholic drinks related litter and 20% of litter on beaches has been demonstrated to be as a result of food and drink packaging.

There are also some secondary benefits which ought to be maximised during the design of a DRS:

- *Job creation.* Studies have shown that the introduction of a DRS could increase the number of jobs available by between 3,000 and 4,300.⁴¹ These jobs would all be part of a Green Recovery from the current pandemic.
- *Increase in UK reprocessing capacity.* The UK Government's Resources and Waste strategy clearly states Defra's intention to increase the reprocessing capacity of the UK to prevent reliance on waste exports and make the UK more self-sufficient.⁴² A guaranteed supply of high-quality DRS materials should incentivise investment in the industry. There are some risks we have identified in terms of high-quality DRS material being exported which could undermine these first two secondary benefits.
- *Financial benefits to the voluntary sector and social enterprise.* International experience demonstrates that voluntary sector organisations have been able to benefit from the introduction of a DRS. For example, the Return and Earn⁴³ scheme in New South Wales (NSW), Australia, sees a new set of schools, charities, community and sporting groups feature on reverse vending machines (RVM) across NSW every six months. They are Return and Earn donation partners and people returning containers and redeeming their deposits can instead choose to donate these refunds to such third sector organisations. So far more than 430 donation partners have shared in more than AUD\$1 million of refunds as part of the NSW scheme.

There is therefore scope for this model to be applied to this DRS. RVMs can offer the opportunity for consumers to donate their redeemed deposits to charity, or charities/community organisations can set up and operate return points in order to reclaim deposits that might otherwise remain unredeemed. Polling by Ipsos Mori in 2011 demonstrated that 12% of British adults would always donate recovered deposits to a local charity when given the option to do so and a further two thirds said they would donate their deposit 'most of some of the time'. The tender process to appoint a DMO could incorporate questions to understand how the bidder would look to involve third sector organisations in the DRS, through mechanisms such as those described above, and this is explored further in the consultation.

- *Wider behaviour change.* A DRS targets consumer's behaviour rather than solely producers or delivery bodies. These changes could have wider effects on society in terms of environmental awareness.

4.1 Basic principles for a deposit return scheme

English, Scottish and Welsh ministers agreed on the below principles for co-operation on a deposit return scheme, should one be introduced⁴⁴:

- Such schemes should seek to change behaviour of consumers, producers and retailers to deliver both a step change in the capture for recycling of empty drinks containers and reduce litter.

⁴⁰ Litter strategy for England (2017): <https://www.gov.uk/government/publications/litter-strategy-for-england>

⁴¹ From waste to work: the potential for a deposit refund system to create jobs in the UK, CPRE.

⁴² Resources and Waste Strategy, DEFRA, 'End of Life'

⁴³ https://www.exchangeforchange.com.au/cache_51b2/content/653197000008035.pdf

⁴⁴ In the absence of a NI Minister NI officials have worked with UK colleagues to consider DRS in a UK context, and are content with these principles which maintain the historic direction of Ministerial travel for a UK wide producer responsibility regime

- A DRS should form part of a coherent system for improving recycling and reducing use of virgin materials, alongside producer responsibility obligations, kerbside collection and consideration of other appropriate fiscal measures. These measures should work effectively together in a way that is understandable and fair for consumers and industry.
- Schemes should be underpinned by legislation in order to maximise their effectiveness.
- The system should be clear and understandable for consumers, and provide convenient means of returning drinks containers and reclaiming deposits.
- There should be a clear definition of materials to be included within the schemes.
- The design of schemes should take into account the need to effectively serve both urban and remote and rural communities, and disabled people, and should also address other access challenges to make it as fair and equitable as possible.
- Schemes should ensure producers and retailers of products take responsibility for the material they put onto the market, while not creating unfair or unreasonable costs of compliance.
- Schemes should be underpinned by strong measures to promote compliance and limit the opportunities for fraud.

Other DRS principles which industry stakeholders have suggested and Government support:

- Schemes should be transparent in reporting on performance
- Schemes should be incentivised to manage costs and efficiencies
- The organisation managing the operation of the DRS should be not-for-profit
- Schemes should be operationally workable for those running return points

Respondents to the consultation overwhelmingly agreed (84%) with the proposed principles of a DRS.⁴⁵ Several reasons were presented from respondents as to why implementing the scheme would have a positive impact, including that a DRS would incentivise consumers to recycle containers, leading to higher overall recycling rates and an associated reduction in littering and waste production.

Other principles that were highlighted in consultation responses and which have been considered in the final scheme design of a DRS are the need to consider the environmental ambitions of the scheme; that there should be no cross-subsidisation of materials and that the DRS should focus on material rather than product.

4.2 Deposit Management Organisation (DMO)

The Deposit Management Organisation (DMO) is the central body whose role is to set up and manage the operation of the DRS. A majority of respondents thought the day-to-day running and management of the DRS should be entirely independent from Government. This is a model that has been successfully implemented in international schemes⁴⁶.

Defra will run a competitive tender to appoint the DMO. This process will incentivise the best designed scheme in alignment with the outlined objectives of a DRS, provide greater long term flexibility by having a contract rather than relying on regulations only, give certainty for industry regarding the expectations of a DRS system and help prevent issues that may arise from public body classification. Defra expects that industry will come together and form consortiums to bid for the scheme. The tender process will require that any successful bid must demonstrate the support and/or representation of obligated industries (retailers and drink producers).

It is essential that the governing bodies primary goal is to ensure the objectives and purpose of the scheme are met. The DMO should not ultimately be viewed as a conglomeration of industry representatives but a

⁴⁵ Government response to the 2019 consultation on a Deposit Return Scheme for drinks containers, available online [here](#).

⁴⁶ Examples include Infinitum, Norway, or Dansk Return system, Denmark.

board in itself with clearly set goals and guidelines via a combination of regulations and contractual agreements.

Further information on the DMO and proposed methods of set-up, administration and operation are outlined within the DRS consultation. The functions of the DMO will include but are not limited to:

a. Be legally responsible for high collection targets set by Government.

Regulations will impose an obligation on the DMO to collect (collecting material streams separately from each other and other forms of waste) a percentage of DRS drinks containers, separated by material stream, placed on the market. To comply with these targets, the DMO will have to manage the day to day operations of a DRS. This will involve decisions regarding the deposit level, whether to have a variable or fixed deposit, the necessary infrastructure, communications with consumers and retailers and how to best utilise technology to encourage returns. The appointed DMO will need to show fair representation from stakeholders across the value chain of a DRS, to ensure decisions taken are fair and suitably scrutinised. This will be explored in the tender process when appointing the DMO. In addition, Government will place collection targets on the DMO, set out in legislation, which the DMO will need to meet to avoid being penalised, which again will ensure there are no perverse incentives for producers making decisions on scheme attributes listed above.

b. Set producer/importer fees.

The DMO will be able to comply with these producer obligations on behalf of registered producers and will charge a fee to cover the costs of the scheme accordingly. These fees will cover the costs of enforcement, administration costs and the costs of treating and collecting the types of packaging that each producer places on the market.

c. Be responsible for tracking deposits, financial flows and material flows in the DRS.

The DMO will:

- o Monitor the payments of deposits as they move around the system and action payments to return points as containers are returned by consumers;
- o Collate placed on market data from drinks producers;
- o Monitor and manage revenue streams;
- o Manage and negotiate contracts awarded as well as make payments in relation to running the scheme. This could be in the form of handling fees, transportation contracts, deposit repayments, counting centre costs etc.

d. Set and distribute handling fees for return points.

Regulations will outline what a reasonable handling fee, paid from the DMO to return points, ought to cover. There will be an equivalent fee for online takeback services. The DMO will be responsible for interpreting these regulations and calculating reasonable handling fees for each in-scope retailer.

e. Own the material returned by consumers.

The DMO will own the material that is returned to return points. It will make decisions regarding where to sell these containers whilst taking into account the objectives of the scheme.

f. Reimburse and manage the contracts of those transporting drinks containers to recyclers/counting centres.

The DMO will put in place the necessary contracts for the collection of drinks containers from return points to either counting centres and/or recycling facilities.

g. Measure and report recycling rates to Government.

The DMO will be expected to report recycling rates of collected materials to the regulator.

h. Setting deposit levels within parameters set by Government.

Regulations will set parameters within which the DMO will be able to set the deposit level. This gives the DMO a lever with which it will be able to incentivise better scheme performance to ensure that targets can be met. The DMO will also decide whether to have a fixed deposit for All-In-scope containers or whether to vary the deposit level based on container size.

i. Run communications campaigns to aid consumer and retailer understanding of the DRS.

Social research studies have demonstrated that communications campaigns will be vital to the success of a DRS. These need to clearly explain to consumers why a DRS is beneficial and why they are being asked to return containers through a DRS system. Equally, retailers will need clarity concerning their role in this process. The DMO will have to set out how return points should operate and how payments will be managed.

j. Be responsible for ensuring that there are appropriate provisions for drinks containers in place and that these are accessible to all populations.

The DMO will be responsible for ensuring that return points are accessible. This is important because as certain retailers apply for exemptions, the DMO will have to maintain the accessibility of the scheme by working with alternative return point hosts such as businesses, third sector organisations and/or local authorities.

k. Ensure financial provisions are made available to pay LAs for DRS materials appearing in kerbside.

Neither Local Authorities (LAs) nor EPR producers should lose out financially from DRS materials appearing in kerbside collections because they have not been collected by the DMO.

l. Interact with other DMOs.

The DMO will have to interact with the administrator(s) of the Scottish DRS to ensure alignment and minimise any negative consequences from having two schemes operating in the same market.

5 Description of options considered

We have considered and come to the conclusion that a voluntary approach is not a feasible option to achieving the desired outcomes a DRS should deliver, given the inability for Government to have any control and oversight of the scheme. This would not meet the policy objectives for introducing a DRS. As mentioned under Chapter 2 – Policy Background, drinks containers are already captured under the existing packaging producer responsibility system, which is currently being reformed under the EPR for packaging proposals. If DRS was not being considered, these materials would instead remain regulated for under the proposed EPR scheme so there is no alternative policy tool to regulation being considered. However, section 5.5 and 5.6 consider what a non regulatory and light touch approach might look like, and what our rationale is for not considering these as viable options.

5.1 Do Nothing

The baseline is a 'do-nothing' option with no direct policy intervention for drinks containers, and current litter and recycling rates for DRS target materials (PET, glass, aluminium and steel drinks containers)⁴⁷.

5.2 'All-in' option

⁴⁷ The current recycling rate for drinks containers has been held constant due to a lack of historical data to show a growth trend for these materials. As drinks containers are a small subset of packaging materials, this is still consistent with overall increasing packaging recycling rates.

This option would cover PET drinks bottles⁴⁸, steel drinks cans, aluminium drinks cans and glass drinks bottles. There would be no restriction on the size/format of drinks containers in-scope, although our consultation proposes a maximum limit of drinks container size of 3 litres.

Drinks containers in-scope of the DRS would need to be returned by consumers to DRS return points for the deposit refund to be reclaimed. If consumers chose not to return their drink container to a designated return point, they could still place this in their household kerbside recycling collection, but they would forfeit their deposit value. The consultation further explores the options for dealing with DRS containers in local authority waste streams. A local authority or waste management company may choose to sort drinks containers to claim the deposit or they will be treated in standard recycling plants and forfeit the deposit value.

It should be noted that alternative materials that could be used to make drinks containers (i.e. other than from plastic, glass or steel/aluminium) will be captured under packaging Extended Producer Responsibility reforms - due to be implemented alongside the DRS simultaneously. There is inherent uncertainty on whether the two regulatory systems will create any material substitution effects. This depends on the relative costs of the scheme to producers which in part will be determined by factors such as the deposit level and the treatment of unredeemed deposits. For the purpose of this analysis we assume no material substitution effects across all options, i.e. the relative cost of placing a drinks container on the market remains the same regardless of whether they are captured in the DRS or packaging Extended Producer Responsibility scheme.

The Deposit Management Organisation (DMO) will be responsible for setting up and running the DRS. Reverse Vending Machines (RVMs) are assumed to be the main method of take-back, primarily to be installed in supermarkets, with manual take-back points hosted in smaller convenience stores. The DMO will be responsible for covering the costs of these, as well as for transporting, sorting and selling the collected material. We are keen to ensure return points are not limited to RVMs and manual take-back infrastructure, should alternative methods of return prove themselves to meet the criteria and objectives of the DRS. We are therefore placing an obligation for retailers to host a return point only, giving the flexibility for other technological innovations (e.g. smart bins) to be used if deemed appropriate. The sale of material collected for recycling will part-fund the costs of the scheme, with the remainder to be covered by a fee from the producers of drinks containers in-scope and unredeemed deposits. These costs are monetised in this Impact Assessment.

The main benefits are generated from the increased recycling rate for these materials (with an 85% capture rate assumed via the DRS, but likely to be higher overall when taking into account the containers still recycled through the kerbside collection), and from the reduction in litter, which results in reduced clean-up costs for Local Authorities and a fall in associated litter disamenity.

Some groups argue that, for greatest behaviour change (litter reduction and increased recycling rates), participation in a DRS has to become the 'norm' for consumers regardless of where they consume the drink and of the size/format of its container.

The majority (69%) of the 672 respondents to our first consultation preferred the 'all-in' option, all campaign responses from Greenpeace, the Marine Conservation Society and 38 degrees were in support of an 'all-in' option.

⁴⁸ For both DRS Options, it is being proposed that HDPE is also included as an in-scope material. However, milk is not being proposed as an in-scope drink of a DRS, as it is viewed as an essential product. There is limited data available on how many HDPE drinks containers would therefore be in-scope of a DRS, though industry estimates suggest that most HDPE drinks containers are used for milk and would therefore not be in-scope. For this reason, only PET drinks containers have been considered as part of this impact assessment.

Consumer research commissioned by DEFRA in 2019 also supported the introduction of an ‘all-in’ DRS⁴⁹. The research found that simplicity would be essential to the success of a DRS. It recommended an ‘all-in’ model in order to reduce the cognitive load on the public, to help instil habitual behaviours and to minimise any impacts on purchasing behaviour. 80% of respondents to this study preferred a DRS that included containers of all sizes.

5.3 ‘On-the-Go’ option

A second option is to introduce an ‘on-the-go’ DRS. An ‘on-the-go’ DRS would cover the same materials as the ‘all-in’ DRS option (described above) but would restrict the drinks containers in-scope to those less than 750ml in size and sold in single format containers, in order to target those most often sold for consumption outside of the home (‘on-the-go’). This was decided based on data from WRAP’s ‘Drinks Recycling On-the-Go’ report⁵⁰, which indicated that the majority of drinks consumed on the go were in containers of <750ml.

As with Option 2, the DMO is proposed to be responsible for setting up and running the DRS. They will incur similar costs and benefits, but on a smaller scale due to the more limited scope of material. Drinks containers consumed on-the-go have a lower recycling rate and a higher propensity to be littered, which means that the possible benefits are lower overall, but proportionally more significant than for an all-in DRS.

The Voluntary and Economic Incentives Working Group in their report which covered DRS stated “...the scope of a DRS could focus on smaller drinks containers more likely to be used outside the home. Changing behaviour in relation to recycling outside the home is also an area that, arguably, could have a large impact on reducing litter”. This could also minimise the potential impacts of a DRS on kerbside collections for recycling, as people may more commonly dispose of drinks containers within this scope outside of their homes.

It should be noted this report does not identify whether an on-the-go DRS could incentivise substitution towards out of scope drinks containers. Nevertheless, as with an all-in approach all out-of-scope drinks containers will be captured under the packaging Extended Producer Responsibility reforms. Again, there is inherent uncertainty on whether the two regulatory systems will create any material substitution effects.

This option would mean that consumers would dispose of similar drinks containers in different ways – some would have a deposit and be eligible for a refund on return and some would not. One risk with this option is the increased potential for confusion navigating the system with only some drinks containers in-scope.

From consultation responses, 15% preferred an ‘on-the-go’ scheme.

5.4 No Glass option

This is largely similar to the All-in option with the important difference that glass beverage containers would be excluded from the scope of a DRS and costs would be captured instead in the packaging extended producer responsibility reforms considered separately to this analysis. Thus the scope would be confined to PET plastic bottles and aluminium and steel cans. Responses to the first consultation demonstrated strong support for the inclusion of glass bottles (86%). At the same time, significant concerns were raised from industry on the inclusion of glass in a DRS. The main concerns raised were the significant increase in handling costs and equipment complexity due to the weight of glass; that given the weight of glass packaging, consumers may prefer not to take their glass packaging back to return points and that, by taking the majority of glass out of kerbside recycling, the recycling of the remaining glass collected at kerbside

⁴⁹ Kantar, “Consumer research to inform the design of an effective deposit return scheme”; <http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=220&ProjectID=20253>
⁵⁰ Drinks Recycling On-the-Go’, WRAP, 2019, Prepared by Valpak and Recoup: <https://wrap.org.uk/sites/default/files/2021-03/OTG%20Drinks%20Containers%20Final%20Report%20ENG017-012.pdf>

could be undermined. Given the concerns raised by industry, this analysis includes a cost benefit analysis of an all-in DRS without glass bottles.

5.5 Non-regulatory option

Non-regulatory options were appraised as part of a long-list of possible approaches to improving the recycling rates of drinks containers. There are various non-regulatory approaches that could have been taken. They include voluntary educational schemes and campaigns, businesses support via specific grants and tools.

With regards to educational schemes and campaigns there are example of such approaches to draw on. Recycle Now⁵¹ is the national recycling campaign for England and Northern Ireland, which aims to motivate more people, to recycle more things, more often. WRAP work with and alongside brands, retailers, waste management companies, local authorities and Government to bring about real sustainable change. Recycle Now works at the forefront of consumer insights on recycling behaviours. Through the delivery of key campaign moments, ongoing citizen interaction, partnerships and Recycle Week, the annual recycling awareness week, Recycle Now works to educate and encourage citizens to modify their behaviour in recycling. The campaign is about 20 years old, e.g. the first Recycle Week was back in 2003⁵². It is a successful campaign, but it does not deliver against the policy objectives we want to achieve with in this area.

With regards to business support, including grants, a range of voluntary initiatives operate in this space (e.g. the business recycling and waste services commitment and recycle at work campaigns)^{53,54}. There are a number of publicly funded capital grants to help improve recycling⁵⁵ but generally this approach remains the exception and requires collective action to identify financial savings as well as increase recycling.

These approaches have already been used in the sector. Although they have encouraged some individual organisation or individual LA action, they have not led to a systematic change to deliver against the policy objectives set out in this consultation IA.

Voluntary DRS

Building on the above non-regulatory approaches, a further consideration has been given to the development of a voluntary DRS by industry collaboration instead of Government regulation. DRS is the only proven policy tool to achieving such high quality collection rates on a national scale, and we have considered the merits in essentially encouraging industry to come together to set up a voluntary DRS.

The industry would need to set up a DMO, or similar, and work with retailers to ensure the return point infrastructure was in place for consumers to return drinks containers too.

However, we have a number of concerns with the effectiveness and feasibility of this approach, which are outlined below:

- **Lack of convenience for consumers.** Convenience is a key factor in the likelihood of consumers to recycle (as was clearly indicated in the findings of the Kantar social research)⁵⁶. Given the absence of an overarching coordinating authority (such as Government), the likelihood is that the return point arrangements would not be synchronised, limiting interoperability between different

⁵¹ <https://wrap.org.uk/taking-action/citizen-behaviour-change/recycle-now>

⁵² Based on WRAP

⁵³ <https://www.recyclenow.com/recycle/recycle-work-1>

⁵⁴ <https://wrap.org.uk/resources/guide/business-recycling-and-waste-services-commitment#download-file>

⁵⁵ <https://wrap.org.uk/media-centre/press-releases/wrap-launches-new-ps1-million-grant-increase-business-waste-recycling>

⁵⁶ Kantar, "Consumer research to inform the design of an effective deposit return scheme"; (2019) <http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=220&ProjectID=20253>

retail chains and outlets. As a consequence, return rates could significantly fall as would recycling rates whilst litter rates and black bag refuse rates would rise (relative to the preferred option).

- **Unclear scope and obligations.** The voluntary approach would be heavily reliant on industry coming together and working to find a common solution without a structured regulatory framework to start from. This could lead to discrepancies as to which drinks containers should be captured by the scheme, and a risk that the scheme would be set up and run without sufficient consideration for smaller producers/retailers, as well as less clarity with regards to producer/retailer obligations. Without any binding guarantees that all of industry would sign up to the voluntary scheme, there is a credible risk that the approach would not be sufficient to increase the recycling rates of the targeted drinks containers, and wider policy objectives in this area.
- **Inefficiencies of post-return collections.** The inherent inefficiencies in unsynchronised post-return collections of containers would be difficult to justify economically (relative to the preferred option under regulation). Such additional costs would act as an incentive to those bearing these expenses to curtail their engagement thereby reducing the overall effectiveness of the scheme in achieving the policy goals of significantly raising recycling rates and reducing litter.

We therefore do not consider this approach to be an appropriate one to pursue, given the lack of Government oversight and control to ensure a fair and coherent DRS is implemented. For this reason, we have not included these approaches in the short-list of options for quantitative appraisal.

5.6 Light touch option

Building on the above discussion of a voluntary DRS, we have considered whether a light touch approach would be possible in achieving the policy goals. Under the reforms to the existing packaging producer responsibility system to implement EPR for packaging, we considered whether to target drinks containers without mandating the implementation of a DRS. This light touch approach would instead mean that a high collection rate target is set within the EPR regulations on drinks containers that would have otherwise been captured under a DRS. Producers would then need to meet this collection rate or face heavy penalties.

However, given that a DRS is the only proven policy tool to achieving such high quality collection rates on a national scale, we might or would expect to see industry coming together to set up some kind of a voluntary piecemeal or shadow DRS. Nonetheless, for the reasons outlined above in section 5.5, we do not believe this is a desirable method to achieving the intended policy goals. The risks of inefficiencies to the return and collection of containers, and the lack of accountability to an impartial body such as Government to set a regulatory framework for the scheme means this is not an appropriate option to pursue.

As concluded in option 5.5, no economic analysis has therefore been undertaken for this light touch approach, due to the ineffective outcomes we believe it would achieve.

6 Costs and Benefits of each option

6.1 Option 1: Do Nothing

The option has no monetised or non-monetised costs or benefits as it represents the baseline. It is taken in comparison with the other options and therefore has no incremental costs and benefits in itself. Baseline levels of recycling are established for Options 2 and 3 in Tables 3 and 4

6.2 Option 2: All-In DRS

This option covers all drinks containers PET bottles, steel cans, aluminium cans and glass bottles drinks containers placed on the market. Comprehensive data specific to England/Wales were unavailable for many variables, and hence the following figures relate to the UK unless otherwise stated.⁵⁷

In order to establish the amount of material placed on the market in scope of an All-In DRS, estimations were gathered and provided to Government by WRAP.⁵⁸

Table 1: Containers placed on the market in scope of DRS (tonnes)

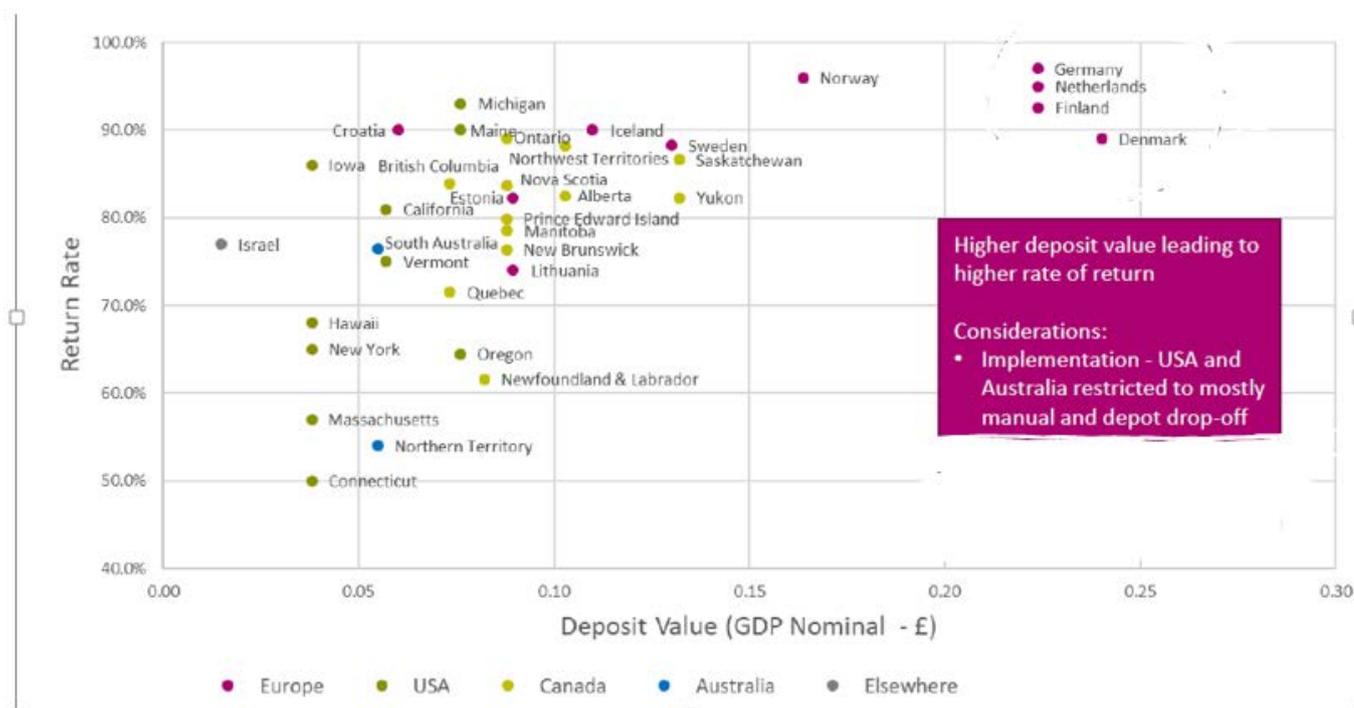
Container Type	2019	2020*
Glass (drinks bottles)	1,882,623	1,901,263
Aluminium (drinks cans)	124,396	127,537
Steel (drinks cans)	34,721	34,704
Plastic (PET Bottles)	319,312	320,256
Total	2,361,052	2,383,760

* Projections

Return rates

The expected return rate of eligible drinks containers for the scheme was determined based on the capture achieved by other international deposit return schemes. The charts below show the interaction between deposit levels and return rates for international schemes⁵⁹.

Figure 1: Comparison of deposit levels and return rates in international schemes by country/region⁶⁰



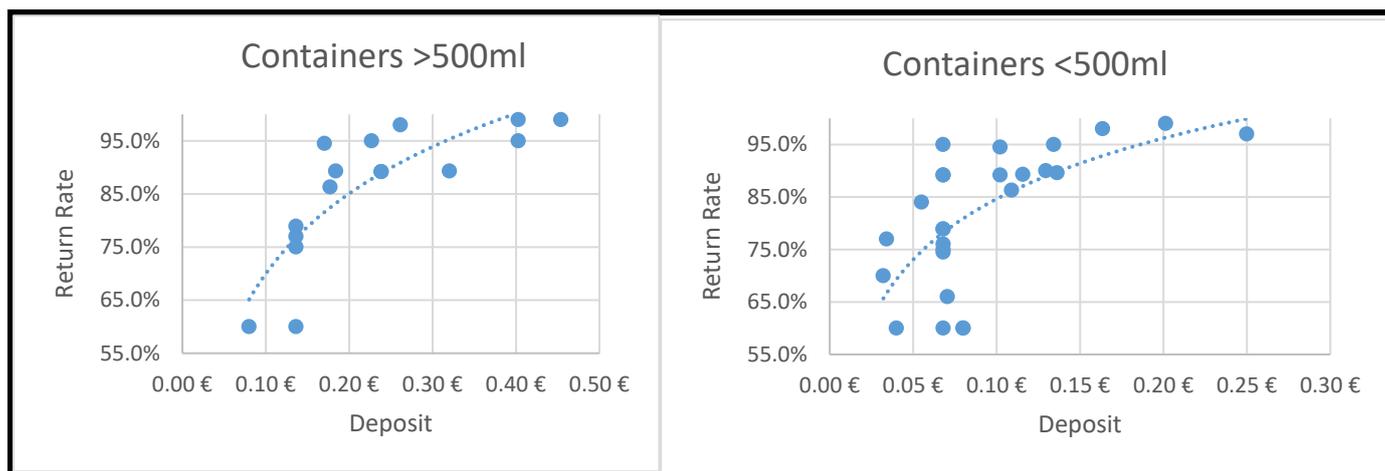
⁵⁷ The Scottish Administration, whilst wishing to conduct its own consultation, has indicated that it is open to the possibility of having a single UK-wide deposit return scheme.

⁵⁸ UK's secondary materials markets : The impact of proposed packaging policy reforms. Mitchell, P. et al., (Valpak/WRAP, Banbury, 2019). p. 32

⁵⁹ The countries included in this comparison are Canada, Germany, Sweden, Norway and Denmark. Data from 'Options and Feasibility of a European Refund System' by Hogg, D, Elliot T and Corsdells, November 2011, Appendix 6. Although the study did not specifically control for variations in income level, most of the countries included would be regarded as relatively high income countries.

⁶⁰ Source: BRC Deposit Return Schemes in the UK: Implications for retailers

Figure 2: Relationship between deposit level and return rate for different containers, by country



The deposits should be set in accordance with the principle that they should not be lower than the market price and material price of the end of use beverage packaging.⁶¹ If the deposit is too low, there will be lower incentive for consumers to return the drinks container. Deposits that are deemed to be excessive can affect beverage sales and would be likely to raise objections by the producers. The graphs indicate that there is likely to be a breakpoint, below which it will be difficult to achieve a high return rate, but above which subsequent increases will achieve only marginal increases in returns. Experience from international schemes indicates a broadly positive though variable relationship between the deposit charged and the return rate achieved. Some international deposit return schemes show the potential to deliver high recycling rates for certain materials under certain conditions, for example, Germany, Norway⁶² 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% respectively⁶³. The average return rate achieved by international schemes with a deposit of more than or equal to \$0.10 (USD) is 86.7%⁶⁴. Canada, USA and Australia typically have lower deposits and lower return rates. However, it is important to note that USA and Australia are restricted to mostly manual and depot drop off, increasing the inconvenience to return and so this could be a contributing factor to the lower rates of return. Canada's return rates vary from as low as 61.6% and as high as 88.2%. For comparison, the current UK household recycling rate is 45.7%⁶⁵, with plastic drinks bottle collection/ recycling estimated to be at c. 70%.

The positive relationship between deposit value and return rates is also demonstrated in the following graph, showing return rates as a function of deposits in PPP-adjusted GBP.

⁶¹ Journal of Cleaner Production, A systematic review of the deposit-refund system for beverage packaging, Zhou et al, 2019

⁶²In Norway, 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.

⁶³ Voluntary & Economics Incentives Working Group Report:

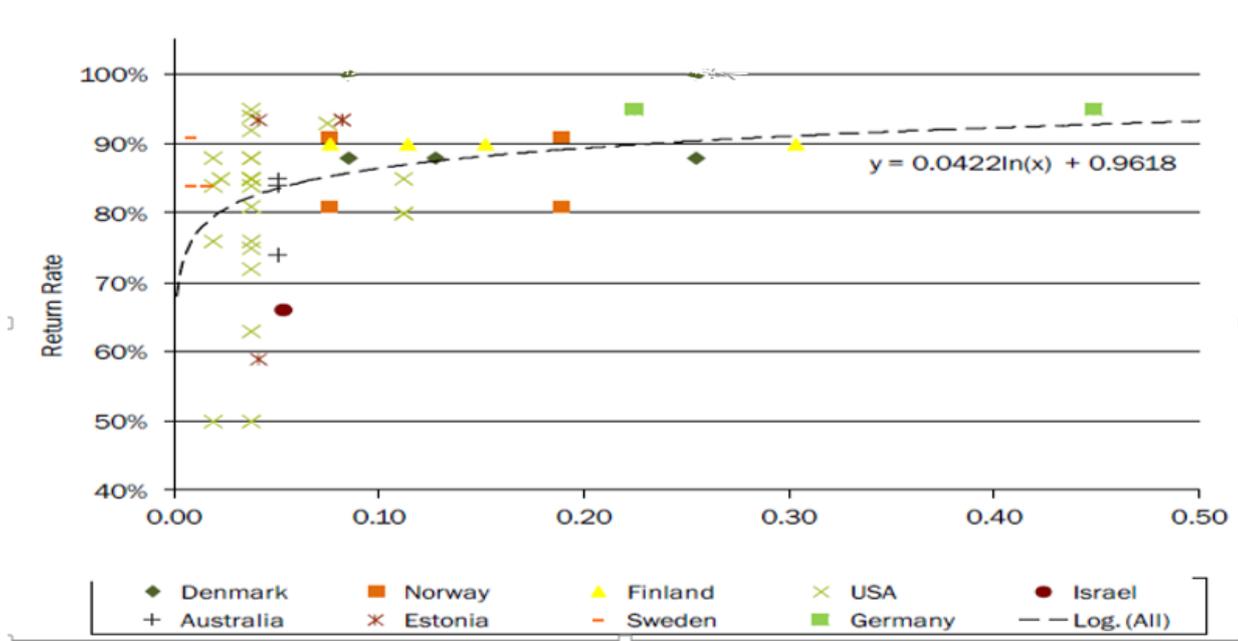
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/694916/voluntary-economic-incentives-working-group-report-drinks-containers-final.pdf

⁶⁴ Comparison of 38 international schemes by CM Consulting and Reloop, Deposit Systems for One-Way Beverage Containers: Global Overview 2016: <http://www.cmconsultinginc.com/wp-content/uploads/2017/05/BOOK-Deposit-Global-24May2017-forWebsite.pdf>

⁶⁵ UK household recycling rate for 2017, UK Statistics on Waste, DEFRA, 2019:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/778594/UK_Statistics_on_Waste_statistical_notice_Feb_2019.pdf

Figure 3: Return rates as a function of deposits in PPP-adjusted GBP



Source: Eunomia⁶⁶

It can be observed that the return rate approaches 98% asymptotically, meaning at lower deposit levels the relationship is relatively strong, but at higher deposit levels, the relationship becomes less strong, when other factors, such as convenience, are likely to become significant and influence the return rate. As the graphs show, there is variation within the return rates achieved by deposit return schemes⁶⁷. These variations can arise from many different factors such as: difference in design of the DRS systems, the time and context they were introduced, what the reported data on collection for recycling rates represents, the exact way in which wider waste management systems work, the cultural differences between countries, and differences in relative income. Some studies suggest that in determining return rates, convenience and frequency of collection points may be a much more significant variable than the size of the deposit⁶⁸.

Deposit Level

For the purpose of the analysis in this preliminary draft of the IA, the proposed deposit level of 0.20 is expected to result in a return rate of 75% in the first year, 80% in the second year, rising to 85% from the third year. This can be seen as a stress test of the scheme by applying levels that some would regard as unduly conservative. We consider that a well-designed, well-performing scheme could result in return rates of 90% or higher. In a subsequent scenario an alternative postulation of the scheme attaining a 90% return rate will be assessed. Please see Section 6.3.2 for a sensitivity analysis taking into consideration the potential impacts if a lower than expected return rate is achieved.

The deposit level will not be fixed in legislation. Legislation will set out a minimum and, possibly, maximum deposit leaving the deposit level to be set by the DMO. We want the DMO to have the flexibility and control

⁶⁶ Hogg et al, Options and feasibility of a European refund system for metal beverage cans, final report, appendix 6: cost benefit analysis, 2011

⁶⁷ For example, some studies suggest that a more important variable than deposit size in determining the return rate is the frequency and convenience of collection points. (Deposit Return Evidence Summary. Zero Waste Scotland, June 2017, p. 29)

⁶⁸ Deposit Return Evidence Summary. Zero Waste Scotland, June 2017

to ensure it is able to meet its statutory collection targets. We believe the ability to set and then change the deposit level is a critical lever to ensure the DMO can meet these targets.

Flat rate or variable deposit level

Our first consultation sought views on whether there should be a flat rate or a variable deposit level. With a flat rate deposit, all drinks containers in scope will have the same deposit placed on them. This would be a simpler design and might be easier for consumers to understand. In a variable system, different drinks containers in scope will have different deposit levels placed on them. The most popular way of placing a variable deposit in response to the first consultation was by size. This would be more complicated but might prevent significant shifts in consumer behaviour to reflect the greater proportion of multipacks in the UK. For example, with a flat deposit rate a 6x330ml multipack would attract the cost of 6 deposits, compared to a single deposit for a 2 litre drinks container.

57% of respondents to our consultation thought that the deposit level should be a flat rate. Reasons given included financial and revenue forecasts being easier to calculate and less confusion for consumers. Of the respondents that were opposed to a flat rate, 34% viewed a variable deposit set by container size as the best mechanism for setting the deposit level.

When asked if alternative deposit levels should be applied to multipack containers, the majority of respondents (75%) stated that the deposit level should be the same for both single and multipack containers. However, industry has raised concerns that if a flat rate deposit was applied it could lead to market shifts with consumers opting for larger plastic bottles over multipacks of cans, adding more single use plastic to the UK's waste stream.

Alupro, which represents the UK's aluminium packaging industry, conducted a survey of 2,000 UK residents, where they asked people to imagine a 20p deposit on every can or bottle of any size. A scenario was presented whereby a 20p deposit is included on all individual containers which would mean that for a 24 can multipack consumers would pay a deposit of 4.80 as opposed to a deposit of 80p for four large plastic bottles containing the same volume of liquid. 2/3 of people said they would likely switch to the plastic bottles to save money. This became 51% when the deposit value decreased to 10p.⁶⁹

There is therefore a possibility that consumer's purchasing habits in relation to multi-packs could be influenced and changed if a flat rate deposit is set. Our proposal to allow the DMO to set the deposit level will allow industry to include such consideration when choosing to set a flat rate or variable deposit level. There is evidence from other countries where the deposit has been set in relation to the size of the drinks container. However, at the present time there is insufficient data to enable an extended modelling of general scenarios with respect to potential multi-pack switching. This issue is something on which we are seeking more detailed information and we shall be including a request for this in the forthcoming consultation document accompanying the IA.

The proposals for leaving the deposit level to be set by the DMO will allow the DMO to set either a flat rate or a variable rate deposit level.

⁶⁹ Resource. Alupro issues Scottish DRS warning, 2019 ([here](#))

7 Option 2: All-In DRS Option

7.1 Economic Costs of the All-In DRS

The following key costs were estimated:

1. Set up costs
2. Re-labelling costs
3. Reverse Vending Machines
4. Manual take-back costs
5. Logistics
6. Counting centres and central administration

In order to tentatively estimate a number of costs for this consultation stage impact assessment, the feasibility study prepared for a consultation on a Scottish DRS was utilised as a starting point to cover the UK as a whole. This study was prepared for the Scottish Government and provides an empirical starting point based on overseas experience from which to further develop this analysis. Assumptions have been made about the ability to scale costs estimates for Scotland to the UK as a whole on a population basis⁷⁰. Although measures have been taken to ensure the robustness of this approach, the associated estimation risks should be noted, such as discrepancies between Scotland and other parts of the UK, and factors such as economies of scale that may not be accounted for.

7.1.1 Set Up Costs

Set up costs include the construction and set up of counting centres & bulking points. Construction and building costs for the centres were taken from the Scottish consultation on a Scottish DRS⁷¹, scaled up to the UK. The costs estimated for 'Example 3: Take back to any point of purchase' were deemed the most similar to the proposed DRS system in this IA⁷². This option assumes that consumers can take their drinks containers back to any retailer that sells drinks in disposable containers. For international comparison, Scandinavia and the Baltic States use this kind of system and see over 85% of drinks containers recycled⁷³.

In the Scottish consultation this cost was estimated at 12m; scaled to the UK population this gives approximately 146m. This scaling method may have limitations, for example, confidential industry analysis predicted that there would need to be at least 10 centres and additional depots for cities such as London due to the density of population and higher number of take-back points collecting drinks containers. These have not been accounted for in this estimate, however, it's also likely that there would be economies of scale in counting centre costs, meaning that overall this approach has been taken as a conservative estimate of the costs. For this reason, we also keep the costs scaled at a UK level, rather than subtracting costs for the Scottish scheme that will run separately to an England, Wales and Northern Ireland scheme.

7.1.2 Re-Labelling costs

New label design and re-labelling would also be required. We will be consulting on what these labelling requirements could cover, but it is envisaged that labelling would at least be required so that drinks

⁷⁰ UK population is estimated at 66,040,200 and the Scottish population at 5,424,800 (mid-2017 estimates, <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates>)

⁷¹ https://consult.gov.scot/environment-forestry/deposit-return-scheme/supporting_documents/DRS%20%20Outline%20Business%20Case.pdf

⁷² Other options considered in the Scottish consultation were: 'Take back to dedicated drop-off points'; 'Take back to dedicated drop-off points and some shops (with cartons and cups included)'; and 'Take back to any place of purchase (with cartons and cups included)'. The proposed UK-wide system in this analysis would allow consumers to return drinks containers in-scope to any point of purchase (primarily to be hosted in supermarkets and convenience stores).

⁷³ <https://consult.gov.scot/environment-forestry/deposit-return-scheme>

containers display information for consumers about how to return their bottles, and a barcode to allow containers to be scanned by RVMs. Eunomia estimated this cost at 4.8m for Scottish industry; this was scaled up via placed-on-market (POM) data to give a labelling cost for all containers placed on market in the UK of 58m. Again, to ensure the estimate is conservative we retain a UK level cost rather than subtracting the costs of a Scottish scheme due to uncertainty. These costs are one-off transition costs that would occur in year 1 of the policy.

7.1.3 Reverse vending machines (RVMs)

As 'return to retail' is our proposed method of returning containers, all retailers selling in-scope drinks containers would be required through legislation to allow for the take-back of empty in-scope containers from consumers on their premises and payment of redeemed deposits to the consumer returning the item⁷⁴. We propose this obligation is necessary to ensure it is as easy and accessible for consumers to return an in-scope container as it is to purchase the container in the first place.

Reverse vending machines (RVMs) capable of accepting all of the materials in scope would be installed in retail outlets wishing to operate a return point via this method. However, the obligation will be for retailers to host a return point only. This means retailers will be able to choose to host a return point with an RVM, or alternatively host a manual return point. This will be agreed with the DMO.

The number of RVMs required (36,749) was estimated by reference to the number of retail outlets.

Costs of the RVMs were taken from evidence submitted to the call for evidence and corroborated with information from RVM manufactures and industry stakeholders. Capital costs varied depending on the size of the machine, however a best estimate of 30,000/unit was assumed. The installation costs were a further 2,700 per machine. For the purpose of this analysis, it was assumed that machines could either be bought outright, or instead obtained on a loan scheme. The estimated life span of an RVM at 7 years was provided from stakeholder data, and following from Eunomia's estimates of a DRS for Scotland, a 7-year loan term at 6% APR was assumed.

Operating and maintenance costs per annum (including, for example, the costs of replacing paper roll for receipts, and the costs of replacing compacting machinery) were calculated at 10% of the capital costs⁷⁵.

Retailers will be reimbursed from the DMO for all the costs that they incur. These would involve any losses incurred in hosting a return point via a handling fee, including training and familiarisation costs. The same would apply for retailers who would face a space cost of placing an RVM on the shop floor, and of storing bottles after unloading from machines⁷⁶. This was calculated on the basis of estimated rental values for the various locations in the shops.⁷⁷ The opportunity costs were estimated by applying the potential profits in the relevant retail category lost to the average floor space required.

Labour time would also be required for retailers to process receipts from RVMs and issue the required refunds to customers, in addition to emptying an RVM once full and storing containers for collections. It is estimated that approximately 4.5m hours will be required in the supermarket sector each year to handle these containers via RVMs.⁷⁸ Per supermarket, this is an average of approximately 36 minutes a day

⁷⁴ The proposed DRS system currently suggests that Government will obligate all retailers to operate a return point (either via an RVM machine or manual take-back, section 5.2.1.3).

⁷⁵ Based on communication with RVM manufacturer by Eunomia for 'A Scottish Deposit Refund System' http://www.eunomia.co.uk/wp-content/uploads/2015/05/ZWS-DRS-Report_APPENDIX_Final.pdf

⁷⁶ It is predicted that bottles will be transported relatively soon after emptying an RVM, for example by making use of back-filling supermarket delivery vans.

⁷⁷ Calculated by using retail data provided in British Retail Consortium Deposit Return Schemes in the UK: Implications for retailers

⁷⁸ Customers are assumed to return an average of 15 containers in one transaction, and the retailer to take 10 seconds to process the receipt and issue a monetary refund. It is assumed that an 'average sized' RVM has a storage capacity of 500 glass, or 800 plastic bottles, or 3,500 metal cans, and that it takes 5 minutes to empty a machine and store the containers once full. Assumptions based on: http://www.eunomia.co.uk/wp-content/uploads/2015/05/ZWS-DRS-Report_APPENDIX_Final.pdf

processing receipts and 18 minutes a day clearing and storing bottles once RVMs are full⁷⁹. Costs were estimated using the national minimum wage, plus 30% for on-costs.⁸⁰

The fee paid to retailers to reimburse them for these costs will be based on a series of criteria which will be set out in legislation taking into account all the likely costs to a retailer of operating a return point. These criteria should take into account the requirements for costs of purchase, lease, maintenance or upkeep of any collection/storage infrastructure, including any vehicle used for collections; costs of materials for collection/storage of containers; space requirements and opportunity costs associated with return point; staffing and utility costs of operating the return point (e.g. electricity). The calculation of the retailer handling fee will be left to the DMO to determine, most likely using a third-party consultancy/accountancy firm to model the fee based on various criteria of a retailer's circumstances. In addition, and separate to the handling fee, the DMO will also reimburse retailers for the deposits they pay out on containers returned by consumers to their return point.

Handling fees are a common feature of international DRS, compensating retailers for their efforts in collecting, sorting, and packaging empty beverage containers to be returned to the DMO. They typically cover the criteria covered above, but the specific details of reimbursement vary by scheme. Scheme administrators / Government pay a set price per container returned to a retailer, which can vary depending on the type of return point (RVM or manual) and container material, plus reimbursement of longer term costs (space, training etc) which are more nuanced to each retailers requirements.

We intend to use the consultation to test our handling fee criteria with stakeholders to ensure we are proposing the right types of cost that are to be covered by the fee. Based on responses, we will then look to update our criteria, if necessary, for the final impact assessment, whilst recognising that our intention is to leave the specifics of the handling fee calculation down to the DMO to decide.

7.1.4 Manual Take-Back

For some stores, RVMs will not be an economic solution (for example, small convenience stores). Such stores would be required to take back drinks containers manually instead. This would be done by collecting and scanning containers and placing them in provided bags to allow the DMO to collect these as part of their collection logistics. There was not enough data available to calculate the threshold number of bottles per day at which point an RVM would be economically viable, however convenience stores represent the most likely market, so manual take back costs have been estimated using data for the full convenience sector.

As with shops hosting RVMs, labour time would be required to process refunds and store containers. Again, costs were estimated using the national living wage, plus 30% on-costs, for the approximately 51,373 convenience stores in the UK⁸¹. It is estimated that on average a convenience store will spend 1.3 hours a week on manual take-back⁸². The opportunity costs of storage space in manual take-back is included (totalling 17.3m per year⁸³). Further evidence on the costs arising from manual take-back, both pecuniary and opportunity costs, will be sought in the forthcoming consultation.

⁷⁹ Based a total of 13,838 supermarkets.

⁸⁰ National Minimum Wage for employees aged 25 and over: <https://www.gov.uk/national-minimum-wage-rates>. It is assumed that these tasks are likely to be undertaken by shop assistants rather than managerial level.

⁸¹ 49,918 convenience stores in Britain, scaled to the UK via population; The Local Shop Report 2017: https://www.acs.org.uk/sites/default/files/local_shop_report_17_low_res.pdf

⁸² It is assumed that 20% of bottles are returned to the DRS via manual take-back; that each DRS transaction will take approximately 45 seconds for a member of staff to process; and that the average number of containers returned in one transaction is 15. Assumptions based on: http://www.eunomia.co.uk/wp-content/uploads/2015/05/ZWS-DRS-Report_APPENDIX_Final.pdf and the Association of Convenience Stores response to the Call for Evidence.

⁸³ ACE submission to CfE for VEIWG

In certain cases, retailers will be able to apply to the DMO for an exemption to the mandatory obligation to host a return when they sell in-scope drinks containers. The exemptions are based on either close proximity or a breach of safety. Under the close proximity exemption, where a retailer believes they are in close proximity to another return point and would therefore prefer to not host a return point themselves, they could apply to the DMO for an exemption to hosting a return point. The breach of safety exemption is also available to retailers to apply to the DMO for an exemption where the logistics of hosting a return point (e.g. location or layout, of the retail premises) would make it difficult to continue the operation of that return point without breaching health and safety obligations on the site. It is most likely that it will be smaller retailers hosting manual return points who may apply for such exemptions. The exemption process would be managed by the DMO who will be responsible for ensuring adequate provision of return points. However, as the number of exemptions that will be provided is unknown, for the purpose of this analysis it is assumed that all retailers will host a return point.

7.1.5 Logistics

Once bottles have been deposited in RVMs or manually collected by stores they will need to be collected and transported to bulking points and then further on to counting centres. There is possibility for backhauling or reverse supply chain logistics to be utilised to reduce the costs of transportation as is the case in some international DRS schemes. This is where delivery vehicles fill their empty space when returning to the depot with returned drinks containers and is likely to be particularly effective for large retailers that are supplied by one Distribution Company, rather than a number of smaller traders.

Estimates from Eunomia on logistics costs⁸⁴ for Scotland and the UK gave very tentative and approximate indications of costs arising in this regard. Because it is not possible to determine the extent of the mileage that will be involved in this operation, the effect that this aspect will have on GHG emissions is incapable of being estimated at this stage.⁸⁵

7.1.6 Counting Centres and Central Administration

Counting centre running costs were taken from the Scottish consultation on a Scottish DRS scheme⁸⁶ scaled up to the UK. As above, the costs estimated for 'Example 3: Take back to any point of purchase' were deemed the most similar to the proposed DRS system in this IA.

7.1.7 Overall Costs

The detailed costings are set out in the following tables⁸⁷. The payments for the capital equipment are presented here on an accrual type basis. However, we have also presented how this could be converted into an annualised cost of capital financing system, which would be equivalent to loan or leasing arrangements.

We expect that the upfront costs of a DRS will be financed through a private loan to the DMO. To capture this, an accounting provision has been used in the table at the end of the relevant time horizon. This is solely to account for the remaining asset value of the equipment, the RVMs. The normal life span of an RVM is 7 years and those that will be replaced from that year will still have an asset value at end of this appraisal period. The net remaining asset value is entered as a negative cost.

An alternative financing provision under which a loan or leasing arrangement would be undertaken on the basis of an annualised cost is also modelled.

⁸⁴ <http://www.eunomia.co.uk/reports-tools/a-scottish-deposit-refund-system/> and [Have we got the bottle: Eunomia](#); Sept. 2010

⁸⁵ If a pattern were to emerge of consumers using their cars to return containers in bulk this would also generate GHG emissions, but it is not possible to quantify this.

⁸⁶ <https://consult.gov.scot/environment-forestry/deposit-return-scheme>

⁸⁷ These figures are presently UK based but it is intended to extract the Scottish component at the first opportunity.

The precise timing is something to be determined. Our analysis assumes that operation of the DRS will commence in early 2024 but for this to occur some preparatory payments will have to be made in the preceding periods.

The following table sets out the range of estimated costs at the UK level over the appraisal period. It recognises that there will likely be a phased introductory period as the scheme will become more widely implemented and utilised over time. This staged adoption time span is assumed to be three years. The row in yellow presents the accrual costs. The row in blue are annualised costs. These costs will be the responsibility of Deposit Management Organisation and will be funded using a mix of producer fees, material revenues and unredeemed deposits. An estimation of costs to business assuming they cover 50% of costs is presented in Table 20 later in this document.

During the consultation we will seek views on whether unredeemed deposits should be fully reinvested into the system to keep the costs imposed on producers to a minimum, or whether unredeemed deposits should complement a minimum (e.g. 50% of net costs) producer fee. This decision will give clarity on where the funding for these scheme costs fall. This matter remains subject to gathering further views and discussion taking place, with a final decision to be made following the consultation.

Table 2: Economic Costs of All-In DRS

Costs m	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Capital investment costs	971.61	182.18	121.45	0	0	0	0	971.61	182.18	121.45	-607.26
Cost of Capital - annualised	192.06	192.06	192.06	192.06	192.06	192.06	192.06	192.06	192.06	192.06	192.06
Organisational Set up costs	146.00	0	0	0	0	0	0	0	0	0	0
IT Installation		7.20	0	0	0	0	0	0	0	0	0
Training & familiarisation (initial)		15.00	0	0	0	0	0	0	0	0	0
Central admin costs		29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
Enforcement		1.55	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31
Counting centre costs		20.63	24.75	27.50	27.50	27.50	27.50	27.50	27.50	27.50	27.50
Relabelling		38.67	0	0	0	0	0	0	0	0	0
RVM maintenance costs		76.15	91.38	101.54	101.54	101.54	101.54	101.54	101.54	101.54	101.54
RVM Handling (Labour) costs		52.10	62.52	69.47	69.47	69.47	69.47	69.47	69.47	69.47	69.47
Retailers opportunity costs		18.89	22.67	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19
Retail rental Costs		14.75	17.70	19.67	19.67	19.67	19.67	19.67	19.67	19.67	19.67
Manual take-back labour costs		27.12	32.54	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16
Logistics (post-return)		192.79	231.34	257.05	257.05	257.05	257.05	257.05	257.05	257.05	257.05
Total Cost	1,117.6	676.82	635.48	567.68	567.68	567.68	567.68	1539.29	749.86	689.14	-39.57
	338.06	686.71	706.09	759.75	759.75	759.75	759.75	759.75	759.75	759.75	759.75

Present Value (Costs) (2022-32)	6,346
	6,315

EAC Gross
(2022-32)

£681.16

7.2 Economic Benefits of the All-In DRS

The following key benefits were estimated:

1. Net incremental Material Revenue to the DMO
2. Greenhouse gas emissions (GHG) reductions
3. Reduction in litter cleaning costs
4. Reduction in disamenity value/cost of litter

7.2.1 Net Incremental Material Revenue to the DMO

The material collected by the DMO would be sold to reprocessors for recycling. We assume this material ends up being sold to parties who value it most highly, which might be domestic or international reprocessors, though ultimately, we'd expect it to be a mix. This sale of the recycling material stock has a value associated with it that is determined by quality, and the DMO would use this income to partly fund the DRS operation. The remainder of the cost would be covered by a contribution from producers, covered below (see Table 20).

In order to assess the increase in recycling caused by the DRS, a baseline amount of recycling had to be established for the DRS material in scope. The following rates and tonnage of recycling were established for the baseline 'do nothing' scenario. To estimate this, placed on market and recycling data was derived from work by Valpak and Wrap, which they compiled in connection with the secondary materials report. Recycling rates are assumed to remain constant between 2020-23 in the absence of any other policy intervention and therefore considered to be a suitable baseline.

Table 3: Baseline Average POM & Recycling rates for DRS materials, 2020-23

Container type	POM (Tonnes)	Average Recycling rates (%)	Average Recycled (Tonnes)
Glass bottles	1,902,195	67.8	1,288,888
Aluminium cans	131,307	70.5	92,584
Steel cans	34,684	70.6.	24,495
PET bottles	321,671	70	225,170
Total	2,389,857	-	1,658,700

This baseline level of recycling means that some of the material collected and sold by the DMO would not be additional recycling, but material diverted away from current waste management systems to the DRS. The revenue gained from the sale of this proportion of material is treated as a transfer between stakeholders (8.1m), from current waste collectors to the DMO, rather than an incremental benefit of the system.

Although the total material revenue received is used to part-fund the DRS, only the revenue from the incremental or additional recycling created by the DRS (including kerbside recycled DRS materials) is treated as a national economic benefit of the system in the IA. Evidence from the international experience of implementing DRS systems, particularly in the case of Germany, informs us that the systems are unlikely to be fully operational in the year of its introduction. Therefore, it is deemed necessary to allow for a 2-3-year transition period after which DRS is assumed to attain a steady state rate of 85% for the remainder of the appraisal period.

Under the current waste disposal system, 65-70% of DRS scope materials are recycled. It is assumed upon the introduction of the scheme, most of the remainder of materials in scope that are not captured by the DRS will go through kerbside recycling at the projected baseline recycling rates. Total additional recycling from the scheme therefore includes both materials recycled through DRS and kerbside.

Table 4: DRS recycling (tonnes) from 2025/26¹

Container type	POM	DRS Return Rate	DRS Recycling
Glass bottles	1,895,299	85%	1,611,004
Aluminium cans	142,662	85%	121,262
Steel cans	34,638	85%	29,442
Plastic bottles	326,057	85%	277,148
Total	2,398,655	85%	2,038,857

The net material revenue arising from the DRS system can be understood to be made up from two components; the quantity component, which refers to revenue accrued from the increased volume of recycled material and the quality component, which refers to the increased quality of materials recycled through the DRS.

In order to estimate the net material revenue from the sale of this additional recycled material, the recycled tonnages were valued using the projected prices of basic quality material and high-quality material. DRS materials recycled via kerbside are comingled and contaminated with other materials out of the DRS scope and are therefore valued at the basic quality material price.

Material recycled solely through DRS channels will be of higher quality due to a lack of contamination and therefore commands higher value in secondary material markets.

7.2.2 Material Revenues Benefits

It is expected that a deposit return scheme would allow for a greater amount of material of higher quality to be collected than via kerbside collection. This will likely translate into greater certainty that the materials will be recycled, rather than rejected due to contamination issues. This has associated environmental benefits, reducing waste going to landfill or incineration sites, as well as providing a stable, separate and high-quality stream of waste materials for secondary reprocessing markets. This has the potential to stimulate greater domestic reprocessing capacity as well as exports of high quality recycle.

In attempting to quantify these benefits the most difficult aspect is the requirement to project forward and predict not only future changes in the flow of materials but also the even more complex problem of forecasting price movements over the relevant 10-year time horizon. In making forward projections of virgin materials, POM derivations from an earlier study by Mitchell et al. (2019)² on long-run supply trends in the UK market were utilised – see annex C for further details.

¹ 2026 is used as this is the year in which the DRS is considered to be fully operational, after taking into account the transition period.

² UK's secondary materials markets: The impact of proposed packaging policy reforms. Mitchell, P. et al., (Valpak/WRAP, Banbury, 2019).

7.2.3 Greenhouse gas emissions (GHG) reduction

Greenhouse gas emission reductions arise from this increase in recycling as a result of the DRS. As above, only the additional tonnages collected by the DRS system will be analysed and monetised as a benefit. This does not include material already being recycled via current collection systems before the introduction of a DRS.

Emission savings are calculated based on BEIS Carbon Factor³ and Carbon valuation⁴ reports. This has been estimated in two parts. The first takes the per tonne emissions of closed-loop recycling; this is the carbon saving from replacing virgin materials in production with recycled materials. These are typically captured as traded emissions savings. The second is the avoided emissions from materials no longer going to residual waste treatment such as landfill and Energy from Waste. These are typically captured as non-traded emissions. This provides the following CO₂e emissions per tonne on a traded and non-traded basis following HMT green book supplementary guidance on greenhouse gas emission appraisal.⁵

Using Carbon values from 2023 to 2032, we get an estimated total carbon savings (both traded and non-traded) over the appraisal period of 3.52 million tonnes, rising from 0.12 million tonnes in 2023 to 0.46 million tonnes in 2032. This is presented by drinks container and as a total in Table 5 below, including traded and non-traded emissions:

³ <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018>

⁴ <https://www.gov.uk/government/collections/carbon-valuation--2#update-to-traded-carbon-values:-2017>

⁵ <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

Table 5: GHG emissions savings (t CO2e per year)

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Glass (drinks bottles)												
Traded (t CO2e)		- 11,770.8	- 20,212.4	- 28,640.6	- 28,526.6	- 28,412.7	- 28,298.9	- 28,185.2	- 28,071.6	- 27,958.0	- 27,844.6	- 27,731.2
Non-traded (t CO2e)		- 1,307.9	- 2,245.8	- 3,182.3	- 3,169.6	- 3,157.0	- 3,144.3	- 3,131.7	- 3,119.1	- 3,106.4	- 3,093.8	- 3,081.2
Total (t CO2e)		- 13,078.7	- 22,458.3	- 31,822.9	- 31,696.3	- 31,569.7	- 31,443.3	- 31,316.9	- 31,190.7	- 31,064.5	- 30,938.4	- 30,812.5
Aluminium (drinks cans)												
Traded (t CO2e)		- 39,615.8	- 74,935.8	- 111,268.5	- 120,034.2	- 128,960.0	- 138,048.9	- 147,303.7	- 156,727.6	- 166,323.5	- 176,094.8	- 186,044.5
Non-traded (t CO2e)		- 25,165.4	- 47,601.9	- 70,681.8	- 76,250.0	- 81,920.0	- 87,693.6	- 93,572.6	- 99,558.9	- 105,654.7	- 111,861.7	- 118,182.1
Total (t CO2e)		- 64,781.2	- 122,537.7	- 181,950.3	- 196,284.3	- 210,880.1	- 225,742.4	- 240,876.3	- 256,286.5	- 271,978.2	- 287,956.5	- 304,226.7
Steel (drinks cans)												
Traded (t CO2e)		- 2,179.3	- 4,370.5	- 6,561.9	- 6,552.6	- 6,543.4	- 6,534.1	- 6,524.9	- 6,515.7	- 6,506.4	- 6,497.2	- 6,488.0
Non-traded (t CO2e)		- 17.2	- 34.4	- 51.7	- 51.6	- 51.5	- 51.4	- 51.4	- 51.3	- 51.2	- 51.2	- 51.1
Total (t CO2e)		- 2,196.5	- 4,404.9	- 6,613.6	- 6,604.2	- 6,594.9	- 6,585.6	- 6,576.3	- 6,567.0	- 6,557.7	- 6,548.3	- 6,539.0
Plastic (PET Bottles)												
Traded (t CO2e)		- 22,543.8	- 44,496.2	- 66,440.0	- 67,478.0	- 68,519.0	- 69,563.1	- 70,610.2	- 71,660.3	- 72,713.5	- 73,769.8	- 74,829.2
Non-traded (t CO2e)		- 13,631.2	- 26,904.7	- 40,173.0	- 40,800.6	- 41,430.1	- 42,061.4	- 42,694.5	- 43,329.5	- 43,966.3	- 44,605.0	- 45,245.5
Total (t CO2e)		- 36,175.0	- 71,400.9	- 106,612.9	- 108,278.6	- 109,949.1	- 111,624.5	- 113,304.7	- 114,989.8	- 116,679.9	- 118,374.8	- 120,074.7
Total	(t CO2e)	- 116,231.3	- 220,801.8	- 326,999.7	- 342,863.4	- 358,993.8	- 375,395.7	- 392,074.1	- 409,033.9	- 426,280.2	- 443,818.1	- 461,652.9

7.2.4 Reduction in Litter Cleaning Costs

One of the main objectives of a DRS is to reduce the levels of litter in the UK. Local Authorities spend significant amounts of money on litter clean up and street sweeping costs every year, and a reduction in the level of litter could have beneficial cost impacts. There are various ways of measuring litter (including by volume, count and weight). Count and weight were deemed the most appropriate metrics in this case, because litter clean up tends to occur due to the number of items in areas or streets, with their cost efficiencies based on the number of items to be picked up and weight to be transported. In contrast, volume is more related to the unsightly aspect of litter, but can be compressed when collected.

Drawing on a Zero Waste Scotland report¹, WRAP conducted a study on the costs of litter clean-ups². It found 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 leads to count-based units influencing the percentage attribution more than other units.

In order to determine costs, the study made an assumption regarding staff time – approximately 90% of staff time was assumed to be spent on manual sweeping and picking and 10% emptying bins. However it stated that for typical drinks containers (DRS 1), the costs are more 50:50, because of their particularly large ‘volume: count’ ratio resulting in a smaller proportion of staff time for litter picking (which in their model is related to count). This makes ground litter costs less for DRS1 items³ than they otherwise would be⁴.

They found that for litter materials in scope of a DRS (drinks containers made of plastic, metal or glass) there was a fairly steady relationship of labour and equipment costs, being around 50:50 (Table 16), because of their particularly large volume:count ratio (Table 8)”. (p.34). Hence after an initial short-term adjustment period, in the medium-term as the amount of litter was reduced the equipment costs would tend to be modified roughly pro rata with labour costs.

The most pertinent findings of the WRAP study for this IA are summarised in the following table.

Table 6: Percentage Costs of Packaging and its streams

	UK spend (000s)	Proportion of total
Total (packaging and non-packaging litter)	560,364	100%
Packaging	198.634	35%
of which: DRS 1 (drinks containers made of plastic, metal or glass)	100,914	18%
of which: DRS 2 (cardboard cartons and plastic pouches)	2,871	1%
of which: DRS 3 (coffee cups)	7,400	1%

¹ According to the Zero Waste Scotland study approximately 5% of the count of items would be DRS material and 22% by weight of litter. Zero Waste Scotland (2013) *Scotland's Litter Problem*: It estimated that Scottish local authorities spend £36m on direct litter costs per year, <https://www.zerowastescotland.org.uk/sites/default/files/Scotland%27s%20Litter%20Problem%20-%20Full%20Final%20Report.pdf>; Eunomia (2015) A Scottish Deposit Refund System: <http://www.eunomia.co.uk/reports-tools/a-scottish-deposit-refund-system/>

² Financial Cost of Packaging Litter (November 2019).

³ (beverage containers made of plastic, metal or glass)

⁴ (pp.34-35).

From this it can be seen that the drinks containers actually coming within the scope of the proposed DRS costs amount to over 100 million a year. It has been assumed that with a return rate of 85%, there will be approximately an 85% reduction in drinks containers being littered. The rationale behind this assumption is that a deposit on a container makes consumers more likely to return it in order to get their money back, and therefore less likely to litter. In addition, drinks containers that are littered are likely to be picked up by other people in order to gain the deposit⁵.

7.2.5 Reduction in Disamenity Value of Litter

Further to the reduction in the direct litter cleaning costs, a reduction in the amount of material being littered also reduces the disamenity associated with litter. As previously discussed, valuing the disamenity of litter is a complex and under-researched area. In order to estimate this potential benefit, stated willingness to pay to reduce litter via council tax has been used. This is a proxy that is likely to encompass a number of negative impacts, as people take into consideration factors such as a perceived impact on property prices and visual disamenity. However, it should be noted that this is unlikely to be a perfect approximation and that there are uncertainties associated with aggregating these findings over the whole population. In addition, there is likely to be an omission of some important impacts, such as the full impact of litter that reaches the oceans.

A study by the University of Leeds for DEFRA⁶ on valuation of local disamenity found that people were willing to spend 3.95 per month on council tax for a 1 point improvement on a 10 point scale, and 39.50 for a move from the worst situation to the best. This provided very useful background information and corroboratory evidence of the importance that households attach to reducing litter and their willingness to pay to decrease the disamenity arising from it.

A recent extended study on the subject has been conducted by Eftec. The study applied a stated preference approach and used two complementary choice task formats: (i) a dichotomous choice contingent valuation (DCCV) question that directly asked households their willingness to pay (WTP) for reduction in drinks container litter; and (ii) a discrete choice experiment (DCE) that examined how households' preferences and WTP for reducing litter disamenity varied according to aspects such as location and accumulation of litter. The greatest disamenity to households was found to be from significant accumulation of litter in residential areas, with a disamenity value – i.e. cost – of around 75 per household per year. Disamenity values for significant accumulations of litter in recreation areas and the water environment were a little lower (approximately 55 per household per year and 61 per household per year, respectively). These results are consistent with different 'uses' of these location types by households.

At the overall national level, the main findings on litter disamenity are summarised in the following table.

⁵ This assumption states that 85% of the bottles that people would have chosen to litter without a DRS, will be returned following the introduction of a scheme (either due to not being littered, or due to someone else actively picking up the litter in order to get the deposit). There is limited hard evidence in this area, however positive international achievements provide support. For example, research from the Danish Society of Nature Conservation reported that 95% of the cans collected on clean-ups were not part of their deposit system (DEFRA 2008 review of Packaging Deposit Schemes); and drinks containers make up just 2.8% of litter in South Australia (Keep Australia Beautiful National Litter Index). Research by Eunomia suggests that reductions of up to 95% of litter could be expected following the introduction of a DRS in England. <https://www.mcsuk.org/media/eunomia-report-on-drs.pdf>.

⁶ This study used a large sample size of 561 respondents, covering three cities, and a blend of inner-city, suburban and rural settings. Mark Wardman, Abigail Bristow, Jeremy Shires, Phani Chintakayala and John Nellthorpe (2013) Estimating the Value of a Range of Local Environmental Impacts, Report for Dept. for Environment, Food and Rural Affairs, 1 April 2011

Table 7: Estimated aggregated benefits for DRS “All-in” – 85% reduction in drinks container litter (2020; bn)*

	Annual value (2023)
England	1.5 (0.8 - 2.2)
Wales	0.1 (<0.1 - 0.1)
Scotland	0.2 (0.1 - 0.2)
Northern Ireland	< 0.1 (<0.1 - 0.1)
UK	1.8 (1.0 - 2.6)

Notes: 95% confidence interval in parenthesis.

7.3 Total Economic Benefits of an All-In DRS

The following table sets out the range of estimated benefits for UK over the ten-year appraisal period. As in the case of costs, it recognises that there will be a phased receipt of the benefits as the scheme will become more widely implemented and utilised. This staged adoption period is assumed to be three years.

Table 8: Total Economic Benefits of an All-In DRS

Benefits (m)	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Reduction of disamenity from litter	1089	1307	1452	1452	1452	1452	1452	1452	1452	1452
Net additional material revenue	14.62	28.27	42.64	45.28	47.61	49.06	50.77	52.74	54.78	56.73
Direct costs of litter clean-up savings	64.33	77.20	85.78	85.78	85.78	85.78	85.78	85.78	85.78	85.78
GHG emissions										
Savings from recycling (GHGs)	1.79	4.65	8.58	9.98	11.47	13.06	14.74	16.53	18.83	21.27
Increase from additional transportation (GHGs)	-3.31	-3.61	-4.32	-5.74	-8.57	-10.02	-11.78	-12.11	-13.52	-15.26
Total Benefit	1,166	1,413	1,585	1,587	1,588	1,590	1,592	1,595	1,598	1,601

Present Value (Benefits)
(2022-32), £ 12,231m

Taking the benefits and costs together the overall situation is:

Table 9: BCR and NPV of an All-In DRS

B - C	-1117.61	489.61	777.83	1011.2	1016.4	1022	1023.4	52.15	843.70	906.39	1638.5
	-338.06	479.72	707.21	819.14	824.34	829.90	831.32	831.70	833.81	835.77	839.17
NPV (B-C)	£5,884.5										
BCR	1.927										

7.3.1 Non-monetised benefits

Eunomia examined the potential of a DRS to generate an increase in employment⁷.

Although it has not been possible for this study to verify their estimated figures, they have provided a broad indication of a possible impact on employment from the introduction of a DRS.

Assuming that all additional reprocessing jobs are created in the UK, Eunomia estimate the introduction of a DRS leads to a 4,248 to 4,292 increase in full-time equivalent (FTE) posts, with a higher net increase in jobs from 80% compared to the 90% return rate scenario. This is because an 80% return rate results in a smaller reduction the amount of material needing to be collected through existing kerbside collection services

Even without the inclusion of any FTE posts from reprocessing, there remains an overall increase in FTEs posts ranging from 3,062 to 3,156 for the 90% and 80% return rate scenarios respectively. The majority of jobs created are at a similar skill level to the existing jobs, though there is perhaps a slight increase in the total number of higher skilled jobs. The bulk of these jobs will be created in collection/transport, retailers and counting centres. One hundred jobs are created in the central administrative system in database and accounting work.

This suggests the number of additional jobs created from introduction of an all-in DRS could be in the region of 3,000 to 4,300, and are highlighted as a secondary benefit of the scheme in the consultation.

7.4 Differential impacts on stakeholders

7.4.1 Producers of Drinks Containers

In order to pay the costs of running the DRS, as detailed above, it is assumed that the DMO would rely on three revenue streams; the onward sale of material for recycling, producer fees and unredeemed deposits.

Producers in the UK that place DRS-scope material on the market, whether domestically produced or those that import beverage products from abroad, would be required to register with the DMO before they can place in-scope products on the market, and would be charged a registration fee to cover costs that are not met by the other two financial streams.

- Producer registration fees would be expected to cover the costs to the DMO of operating the scheme. These include the administration costs and the activity-based costings by material type of collecting and transporting materials. Moreover, these registration fees will cover the costs of the regulator. We are seeking views in the consultation on whether producer fees for small producers should be reduced/waived to minimise the cost impact on these businesses.

⁷ From Waste to Work: Potential of a DRS to create jobs in UK. Hogg et al. (Eunomia, CPRE), July 2011, p.6

- The DMO will own the DRS materials it collects and will raise revenue by selling this stream of high-quality materials to recyclers.
- In any DRS system, there are always going to be a % of consumers who choose to forego their deposit for whatever reason. These unredeemed deposits provide a revenue stream to the DMO as those deposits will not be refunded by them to consumers. Although, it is important to note that these unredeemed deposits will impact the DMOs ability to meet producer's legal obligations.

In this way, the material revenue and unredeemed deposits gained by the DMO act as an indirect benefit to producers by reducing the fees they pay. We would expect to see this vary year-on-year dependent on the price for secondary materials and the return rates achieved. It is also important to take into consideration that the DMO will be fined if targets are not met, these fines will limit the indirect benefit achievable from unredeemed deposits if return rates fall below legal obligations. The consultation outlines proposals to set in legislation a collection target of 90% after three years from the introduction of the scheme, with a view to this target being phased in over the three-year period. This will ensure that no perverse incentives exist in the system to achieve low recycling rates so that unredeemed deposits cover the full costs (rather than producer fees).

The material revenue gained by the DMO is dependent on the amount of material captured by the DRS, and hence on the return rate. Those generated by an 85% return rate (RR) are set out below. Those that are incremental increases in UK recycled materials directly attributable to the DRS are determined and presented.

The incremental increase due to the DRS is set out in the following table:

Table 10: Overview of post DRS recycling. Incremental increase in UK Recycled DRS Materials post-DRS

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
	(Tonnes)											
Glass (drinks bottles)	130,787	224,583	318,229	316,963	315,697	314,433	313,169	311,907	310,645	309,384	308,125	
Aluminium (drinks cans)	9,830	18,594	27,610	29,785	32,000	34,255	36,552	38,890	41,271	43,696	46,165	
Steel (drinks cans)	1,716	3,441	5,167	5,160	5,152	5,145	5,138	5,130	5,123	5,116	5,109	
Plastic (PET Bottles)	17,476	34,493	51,504	52,308	53,116	53,925	54,737	55,551	56,367	57,186	58,007	
Value of increase in UK Recycled DRS Materials post-DRS												
	£	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Glass (drinks bottles)		2,322,779	4,109,635	5,934,828	5,999,762	6,039,222	5,433,476	4,979,950	4,806,189	4,706,862	4,507,050	4,332,771
Aluminium (drinks cans)		8,579,700	16,359,012	24,553,514	26,766,126	28,996,620	31,118,578	33,314,983	35,617,951	38,039,120	40,589,102	43,277,661
Steel (drinks cans)		228,486	469,431	740,136	781,794	815,156	836,406	846,232	845,702	835,881	817,827	792,592
Plastic (PET Bottles)		3,488,392	7,330,689	11,407,239	11,729,833	11,758,617	11,667,283	11,625,650	11,473,908	11,198,273	10,811,486	10,327,282
		14,619,357	28,268,767	42,635,716	45,277,515	47,609,615	49,055,743	50,766,815	52,743,750	54,780,135	56,725,465	58,730,306

The total volume of drinks containers will comprise that which will be newly generated recycling materials and also that which will be diverted to the DMO from other streams, such as the local authorities, the hospitality sector, etc. Estimates of this volume of material and its value are set out in the following tables.

Table 11: Recycled material in the DRS

										2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
Quantity of Recycled DRS Materials post-DRS										-	-	-	-	-	-	-	-	-	-	-	-
(Tonnes)										-	-	-	-	-	-	-	-	-	-	-	-
Glass (drinks bottles)										1,424,829	1,518,624	1,612,271	1,611,004	1,609,739	1,608,474	1,607,211	1,605,948	1,604,687	1,603,426	1,602,166	
Aluminium (drinks cans)										101,307	110,072	119,087	121,262	123,477	125,732	128,029	130,367	132,749	135,173	137,642	
Steel (drinks cans)										25,999	27,724	29,450	29,442	29,435	29,428	29,421	29,413	29,406	29,399	29,391	
Plastic (PET Bottles)										242,315	259,333	276,343	277,148	277,955	278,764	279,576	280,390	281,207	282,026	282,847	
										1,794,450	1,915,753	2,037,151	2,038,857	2,040,606	2,042,399	2,044,236	2,046,119	2,048,048	2,050,023	2,052,047	
<u>Value UK Recycled DRS Materials post-DRS</u>																					
Total recycled valued@ high price										£	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Glass (drinks bottles)											25,304,980	27,789,290	30,068,113	30,494,583	30,793,979	27,794,851	25,557,536	24,746,169	24,314,053	23,358,389	22,529,248
Aluminium (drinks cans)											88,419,893	96,838,573	105,903,789	108,971,117	111,888,126	114,219,286	116,691,506	119,398,149	122,352,117	125,562,050	129,033,689
Steel (drinks cans)											3,461,777	3,781,810	4,218,580	4,461,204	4,657,007	4,783,985	4,845,841	4,848,476	4,797,790	4,699,674	4,560,014
Plastic (PET Bottles)										-	48,369,140	55,114,858	61,205,460	62,148,625	61,533,221	60,314,007	59,379,961	57,914,224	55,866,462	53,319,348	50,356,553
											165,555,790	183,524,530	201,395,941	206,075,530	208,872,333	207,112,129	206,474,844	206,907,018	207,330,421	206,939,462	206,479,504

The equivalent annualised value of these receipts taken over a 10-year period would amount to about 192.3 m

The difference between the total costs and total material revenue would be covered by the producer fee. This is likely to vary but would generally be equivalent to approximately 4p per unit in year 1, falling to 3p per unit from then onwards, based on current POM figures. This would result in all the costs of the operation of the DRS being met from these revenue sources.

Producers may go on to buy the material recycled via the DRS off the market for use in drinks container production. Indeed, the planned tax on plastic packaging that does not have 30% recycled content is likely to ensure demand for recycled plastic bottles. This cost has not been taken into account as buying material forms part of their costs with or without a DRS. It is also expected that a DRS will generate the availability of a better quality of recycled material.

7.4.2 Hospitality Sector (HORECA)

The hospitality sector, comprising hotels, restaurants and bars, etc., will be fully integrated into the DRS. The scheme will treat them essentially as retailers selling in-scope containers, although our policy proposal in the consultation sets out a nuanced position with regards to such businesses. Where drinks are consumed on site, in a closed-loop environment, HORECA will be required to pay the deposit price on drinks they purchase for sale on their premises but will not be required to pass the deposit price on to the consumer. Businesses may still choose to pass the deposit price on to the consumer, but if they do they will then need to provide a take-back service in line with the requirements set out above for retailers.

Proprietors of HORECA businesses will be able to collect the drinks containers customers consume on site and then arrange for collection of these materials with the DMO, thereby reclaiming the deposits. Currently most larger businesses in this sector have commercial arrangements with waste removal contractors, which will likely be the agents who will actually collect the containers from retailers/HORECA businesses anyway. It will be a matter of negotiation between the hospitality proprietor and the removal contractor to determine the extent to which revenue accruing from the deposits will be reflected in the service charges.

The introduction of a DRS would not occasion any further loss to local authorities' kerbside collections of this commercial stream of containers because it is already diverted to private sector contractual business. To the extent that the hospitality businesses extract the financial benefits of the deposits on returned containers there would be no economic reason for them to alter the retail price to the customer and competitive pressures would likely limit its widespread occurrence. On the other hand, if a pattern emerged that customers were taking containers away off premises to claim the deposit then the business may choose to simply add the deposit onto the containers they sell, to avoid any losses incurred here from losing the opportunity to redeem deposits on containers they sell.

7.4.3 Local Authorities and Packaging Producer Responsibility Reform

DRS is proposed as an extension of the proposed packaging producer responsibility reform, with a specific focus on tackling drinks containers. Under this reform, the costs currently incurred by Local Authorities for dealing with packaging material waste (such as the cost of kerbside waste collection) will be covered by packaging producers. Please see the impact assessment on reforming packaging producer responsibility for a full explanation of this policy.

The introduction of all three major waste reforms will have an impact on Local Authorities (LAs) kerbside collections. Under the reforms for packaging producer responsibility, the costs currently incurred by LAs for dealing with packaging material waste will be covered by packaging producers. The costs of collecting and treating in-scope DRS containers that end up in kerbside should be covered by DRS producers – not those producers responsible for extended producer responsibility (EPR) materials, or the LAs. These points are important to consider since any DRS containers ending up in kerbside means the material has not been collected via the schemes intended points of return (e.g. RVMs and manual return points hosted by retailers). Therefore, the approach

for managing containers in kerbside needs to take into account both the financial and practical considerations for reimbursing LAs appropriately for dealing with the material via their collections, yet also address the wider implications of the scheme to ensure DRS material is returned primarily through the intended network of adequately available return points.

Once a DRS is up and running, 85%-90% of DRS containers placed on the market are expected to be collected through the scheme. Of the remaining 10-15%, and taking into account the assumptions that 70% of DRS containers are currently recycled, we would expect 70% of the remaining containers to go through kerbside collections. As a result, we expect approximately 7%-10% of all DRS containers placed on the market to continue to be collected by kerbside collections. We are considering options to deal with the cost to local authorities of DRS containers that still go through kerbside collections and other waste streams, taking into account the above criteria. Local Authorities may be able to redeem the deposit value on drinks containers that are returned into the DRS system, if they meet sufficient quality criteria. We would expect Local Authorities would only do this if the value of the deposit was to more than cover the cost of collecting and treating the waste. Even if this was the case, not all drinks may be captured and some will be found in residual waste, either at kerbside, street bins or litter clean-up. To address these costs there could be a funding formula to calculate the net costs of collecting and treating DRS material in local authority waste streams for which deposits are not redeemed that would then be paid by the DMO. These options will be presented in the accompanying consultation and costings worked up for the final Impact Assessment.

Although the removal of drinks containers is anticipated to reduce kerbside collection costs as less material will be collected, we would also expect material revenues from recycle to fall because typically drinks containers are of relatively high value. Together, this will change the full net costs of packaging waste management. However, these costs will become the responsibility of producers as part of the extended producer responsibility scheme rather than Local Authorities. Tables 12 and 13 illustrate the potential kerbside material revenue changes with and without an all-in DRS for an 85% and 90% recycling rate respectively, however it should be noted that the net costs of managing packaging waste with an all-in DRS will be assessed in the upcoming packaging extended producer responsibility consultation stage IA.

Table 12: LA Material & Financial effects of an 85% recycling rate for household kerbside collections

Container type	Baseline average recycling rate	Commercial NH (Non-kerbside) disposal	Pre DRS Kerbside recovery rate	Post DRS LA Kerbside recovery rate	Net recovery recycling rate	Putative non- DRS Kerbside recovery; tonnages	Post DRS Kerbside recovery in tonnages	Difference in LA material recovery; tonnes	Material Base prices per tonne	Difference in LA Material Value with & without DRS at base price
		If hotels & 50% of bars, restaurants dispose commercially	Baseline minus commercial rate; col 1 - col.2	15% * col. 1 (approx. to nearest decimal point)	Actual pre minus post DRS recovery rate; col.3 – col.4	POM * Pre DRS kerbside recovery rate - (i.e. what kerbside would have received in 2024)	POM * Post DRS kerbside recovery rate; (col 4 * POM)	cols. 6 - 7	(Predicted 2024 when DRS is operational)	
	col 1	col 2	col 3	col 4	col 5	col 6	col 7	col 8	col 9	col 10
Glass (drinks bottles)	68%	14.7%	53.3%	10%	43.3%	1,014,222	190,300	823,922	£10.59	£8,725,337
Aluminium (drinks cans)	71%	14.7%	56.3%	11%	45.3%	73,213	14,306	58,908	£841.00	£49,541,230
Steel (drinks cans)	67%	14.7%	52.3%	10%	42.3%	18,141	3,469	14,672	£99.99	£1,467,094
Plastic (PET Bottles)	70%	14.7%	55.3%	11%	44.3%	177,610	35,332	142,278	£135.72	£19,310,003
										£79,043,664

If a return rate of 90% were to be achieved the situation with respect to Local Authorities' direct losses to revenue receipts from materials sales is shown follow-on table.

Table 13: impacts on LA Materials & Finances of a 90% return rate for household kerbside collections

90% RR	%	%	%	10%*col.1; %	%	'000 t	t	t	£/t as above	£
Glass	68	14.7	53.3	6.8	46.5	1014.30	129184	885116	"	9,373,377
Aluminium	71	14.7	56.3	7.1	49.2	73.22	9590	63628	"	53,511,112
Steel	67	14.7	52.3	6.7	45.6	18.14	2323	15820	"	1,581,868
Plastic PET	70	14.7	55.3	7.0	48.3	177.62	22616	155007	"	21,037,578
										85,503,934

The full impacts of this on the kerbside collection system are explored in Scenario 2 of the packaging producer reform impact assessment. It is proposed that producers obligated under the DRS would not be obligated under a packaging producer responsibility reform for the same items, to avoid being charged twice.

On the positive effects Local Authorities will gain from the introduction of a DRS due to the reduction in litter cleaning costs, amounting to approximately from 64m to 85m per year, as discussed in section 5.3.1.3.

7.4.4 Consumers

Consumers pay a deposit to the retailer, which is reimbursed when the container is returned. Whilst this might have an initial effect on consumer demand, it is difficult to apply standard demand price elasticity in this situation. One might expect to see reduced consumption in the initial period of introduction on the DRS. However, once the first sets of deposits are redeemed one would anticipate that consumption levels would revert back to a considerable degree.

The final pattern of outturns will depend on the nature of the market and the response behaviour of various cohorts of consumers. Unfortunately, detailed and disaggregated statistics on these aspects are not available, but looking at a general overview of the UK drinks market and available demand price elasticities (nationally and internationally) will help to gain an understanding of the complex nature of the sector being analysed.

Competition

The soft drink production industry has a moderate level of market share concentration. The companies holding the largest market share in the soft drink production in the UK industry include Coca Cola European Partners Great Britain LTD, Britvic plc and A G Barr plc.¹

Hence whilst given the gaps in market information, it would be difficult to determine whether and if so, to what extent, there is a significant likelihood in practice that producers might seek to pass on some or all of the producer fee cost to consumers in the form of higher prices for their products, there are a number of relevant factors, as outlined above, that suggest any such effects are likely to be minor, although some uncertainties on this remain:

- If the full cost were passed onto consumers this would amount to around 3p per container (and less if the initial start-up year is excluded).
- Not all containers are included in the DRS. Therefore, if an appreciable charge were passed onto consumers, there would be a counteracting response in switching to excluded products, such as drinks in cardboard cartons, milkshakes, etc. However, it should be noted that these excluded products would be captured in packaging extended producer responsibility regulation. Consequently, it is judged that the extent of such occurrences would be relatively minor.
- Between drinks producers included in the DRS, competition would tend to generate some restraints on the ability in practice to pass on more than a minor element of cost change².

Storage

Consumers dispose of used drinks containers either through existing kerbside recycling (either at the household or in other municipal recycling services e.g. in offices. Drinks containers may also be disposed in mixed waste (e.g. black bag waste in households, street bins) or illegally as litter. The introduction of a DRS will require some storing of bottles before they are taken to a return point. However, storing of drinks containers for the purposes of kerbside recycling is already common practice and we expect any associated costs of separating drinks containers from other recyclates to be negligible, though we acknowledge the issue was raised by some in the small number of qualitative interviews by Kantar.³

Unredeemed deposits

¹ Ibisworld UK market research reports soft drink production industry ([here](#))

² Such effects would depend in part on price elasticities of supply and demand and associated cross-price elasticities with unaffected product, on which detailed empirical information is presently unavailable. It would also be influenced by the incidence on producers of the DRS costs, which in turn will depend on the allocation of unredeemed deposits (URDs)

³ Kantar, "Consumer research to inform the design of an effective deposit return scheme"; <http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=220&ProjectID=20253>

Unredeemed deposits are a loss to consumers. Experience from similar schemes abroad indicates that there will probably always be some proportion of consumers who will not return their containers for a refund regardless of the size of the deposit. Consumers that prefer to continue using existing household recycling infrastructure would lose the value of their deposit. An interesting question arises as to whether this return profile indicates market dysfunctionality, e.g. information failure, or alternatively economically rational decision making by consumers optimising over time and price⁴. Further research would be needed to distinguish the effects of psychological, and demographic determinants on consumer behaviour. A detailed analysis of these issues is beyond the scope of the present IA.

There would likely be sub-groups, broadly speaking along the following lines:

- (i) Those who would return their empty bottles as part of their regular shopping visit. In most cases the incremental time of returning the container would be minimal.
- (ii) Those who treat the deposit as a form of recompense for their time involved and make an economically rational decision accordingly. If they have time abundance with a low value on a marginal unit of their time they may consider the return deposit as a positive recompense on this time and vice versa for those whose time is scarce and who thereby place a high marginal value on it. As an example, it has been reported that in South Australia when a DRS was introduced, wealthy, busy, people would leave bags of empty containers outside their gates so that poor or unemployed people, would return the bottles to collect the deposits. If the former do not do this but feel that their time is more valuable than the amount of the deposit, they may simply not return the bottles.
 - It could be argued that those who will decide not to return their containers might then regard the deposit as in effect a price increase and respond negatively in terms of their demand. However it is not unreasonable to postulate that consumers whose income or wealth is such that they have a relatively high monetary marginal valuation of their time and thereby will be less likely to return the containers to obtain the deposit, will also tend to have lower price elasticity of demand⁵ and so ceteris paribus will be less reactive to a perceived relatively small price increase.
- (iii) Those who will participate and return bottles for a civic duty or an altruistic motivation. They will mainly not be interested in the cost of their time involved in this context.

Returning drinks containers.

Consumer research by Kantar identified that away from home convenience was typically prioritised with return points needing to be in a range of places (from large supermarkets to on-the-go locations) to ensure convenience, with a majority of survey respondents feeling they could easily fit the scheme into their everyday lives.⁶ With this in mind the impact assessment has been designed with sufficient return points to reflect the policy intention that deposits can be redeemed in settings that fit different consumer daily routines. For instance the number of return points, including the number of the latest design RVMs (which being automated are high speed), will be much higher pro rata in this case than pertains in comparable schemes elsewhere⁷. For these reasons, viz. (i) the automated RVMs will minimise delays, (ii) the wide distribution will tend to enhance proximity to consumer

⁴ There are reports that in some instances, e.g. South Australia, people who place a low value on their time (e.g. unemployed, or retired people) search out discarded items as a source of income, effectively cleaning up the environment, and once they have collected enough, they make one visit to a central collecting point to claim their refund. (Seminar, DEFRA, 21.11.2018)

⁵ In absolute terms. Nonetheless some negative response is still possible and such an eventuality is examined in a sensitivity analysis scenario later in the IA in connection with an increase in the deposit level.

⁶ Kantar, "Consumer research to inform the design of an effective deposit return scheme"; <http://sciencesearch.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=220&ProjectID=20253>

⁷ Using data from the main European DRS schemes on average they allow 1 RVM per 1,900 people. Scaling this to the UK population gives an estimate of 34,758 RVMs for the UK.. However because of the stipulation that an obligation will be placed on virtually all retail outlets ,to have return points, using detailed figures from the British Retail Consortium the estimated number of RVMs in the planned All in DRS would be about 52,280.

communities, one might anticipate conditionally that the burden of [any](#) trips specifically required return containers would be largely minimal and costs, (such as opportunity time costs, disutility, “hassle”, etc.), practically speaking, almost negligible⁸. However one can recognise that in the absence of detailed empirical data it is difficult to be very certain on this point. For this reason it is planned to conduct further research on consumer attitudes and likely practices in this area. This could also include exploring the extent to which consumers generally apply economic rationality in this area or view the deposit as a price change.

Thus it is recognised that there would be a loss to consumers in the form of the time spent collecting deposits at a return point, and the need to store and transport empty containers⁹. However the impact assessment did consider these costs but concluded in the light of the foregoing circumstantial evidence on the relatively very extensive distribution of RVMs¹⁰ that the costs for individual consumers would generally be low or almost negligible,. The authors have discussed with the Better Regulations Unit the principle of extending the current scope of IAs to include the wide-ranging issue of incorporating such possible time costs of agents affected by regulation, such as consumers, in the future economic analysis for IAs, and we would welcome clarification from the Regulatory Policy Committee on this issue.

In the present case looking at the issue at each stage of the transaction process, the initial condition with respect to the container purchase is that this transaction generates a deferred social cost associated with the container’s disposal. The essence of the DRS proposal is to charge the consumer a fee/levy in the form of a deposit, which would be aimed towards partly rebalancing the costs arising from the full life-cycle cost associated with consumption of drinks in single use containers.

In principle this would not be dissimilar to an environmental tax¹¹; providing a financial signal towards consumers responsibility for mitigating the environmental and social costs associated with their consumption behaviours. Whilst the level of the deposit is not necessarily set to equal actual environmental costs, it is a payment that is related directly and individually to each relevant transaction.

A consumer (or someone else) eliminates the environmental and social cost by taking the time to return the container to a return point and are returned the full deposit. Each consumer can make a choice on whether to return the container or not, based on his/her personal valuation of the time taken to do so. We continue to apply the approach taken in the 2019 impact assessment¹² of considering the time, storage and transport costs to be negligible though welcome further views on this position during consultation.

In terms of the cost-benefit analysis, the deposit is treated as a transfer payment and so is not included in the overall CBA figures, e.g. NPV, BCR¹³. Correspondingly the return of the deposit to the consumer is also not included.

Devolved Administrations

Direct and ongoing contacts are maintained with the Devolved Administrations on the understanding that at least initially the proposed DRS would cover England, Wales and Northern Ireland.¹⁴ Territorial data that will allow a bottom up compilation of estimations at that level are being sought. However, at the time of writing these are not available and hence for this iteration generally the data that were available for most of the tables in this draft relate

⁸ In terms of attempting to robustly quantify such disutilities and to monetise such values.

⁹ The 2019 consultation impact assessment drew criticism in a report by the Institute for Economic Affairs for not accounting for these costs. <https://iea.org.uk/publications/a-load-of-rubbish-introducing-a-deposit-return-scheme-to-the-uk/>.

¹⁰ Together with keeping in line with current standard practice in conducting IA economic analysis.

¹¹ Known technically as a Pigouvian tax

¹³ Similarly tax payments, environmental or otherwise, or the time spent making such payments, are not included in the CBAs for IAs.

¹⁴ Scotland is already proceeding with a DRS and discussions are ongoing on how the two schemes can be kept compatible and where possible harmonised.

to the UK level. However, as an interim measure a proxy attempt at determining overall magnitudes of variables at the level of England, Wales and Northern Ireland by adjusting downwards the UK estimates by their proportion of total UK GDP¹⁵. If these data are not forthcoming by the time of the next IA, which will be done soon, a second-best arithmetical adjustment will be made whereby an approximate proportion of the Scottish elements will be extracted from the UK data.

The following tables give the derived cost estimates for England, Wales & Northern Ireland.

Table 16: All-in DRS for England, Wales & Northern Ireland

Total Economic Costs													
	£m												
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Capital investment costs			898.737	168.513	112.342	112.342	0.000	0.000	0.000	0.000	898.737	168.513	-617.882
Cost of Capital - annualised			177.659	177.659	177.659	177.659	177.659	177.659	177.659	177.659	177.659	177.659	177.659
Organisational Set up costs			135.050										
IT Installation				6.660									
Training & familiarisation (initial)				13.875									
Central admin costs				27.565	27.565	27.565	27.565	27.565	27.565	27.565	27.565	27.565	27.565
Enforcement				1.434	1.215	1.215	1.215	1.215	1.215	1.215	1.215	1.215	1.215
Counting centre costs				19.078	22.894	25.438	25.438	25.438	25.438	25.438	25.438	25.438	25.438
Relabelling				35.766									
RVM maintenance costs				70.441	84.529	93.921	93.921	93.921	93.921	93.921	93.921	93.921	93.921
RVM Handling (Labour) costs				48.195	57.835	64.261	64.261	64.261	64.261	64.261	64.261	64.261	64.261
Retailers opportunity costs				17.473	20.967	23.297	23.297	23.297	23.297	23.297	23.297	23.297	23.297
Retail rental Costs				13.647	16.377	18.196	18.196	18.196	18.196	18.196	18.196	18.196	18.196
Manual take-back labour costs				25.085	30.102	33.447	33.447	33.447	33.447	33.447	33.447	33.447	33.447
Logistics (post-return)				178.327	213.992	237.769	237.769	237.769	237.769	237.769	237.769	237.769	237.769
Total Cost		0.0	1033.787	626.059	587.817	637.450	525.108	525.108	525.108	525.108	1423.845	693.621	-92.774
		0.0	312.709	635.205	653.134	702.767	702.767	702.767	702.767	702.767	702.767	702.767	702.767
NPV₁ (2021-32)			5625.74										
NPV₂ (2021-32)			5643.76										
EAC₁ (2021-32)			562.487										
EAC₂ (2021-32)			564.288										

¹⁵ The proportion of these combined territories' GDP to that of the UK was 92.5% (Source, ONS)

Table 17: All-in benefits for England, Wales & Northern Ireland

Benefits												
Reduction of disamenity from				1007.325	1208.790	1343.100	1343.100	1343.100	1343.100	1343.100	1343.100	1343.100
Net material revenue				9.476	42.323	59.672	62.418	64.224	66.144	68.348	70.663	72.942
Direct costs of litter clean-up savings				59.508	71.409	79.344	79.344	79.344	79.344	79.344	79.344	79.344
GHG emissions :												
	savings from recycling			1.882	4.300	7.940	9.232	10.610	12.078	13.638	15.290	17.415
	increase from additional transport			-3.060	-3.343	-4.000	-5.312	-7.927	-9.269	-10.896	-11.206	-12.508
Total Benefit		0.0	0.0	1075.131	1323.480	1486.055	1488.780	1489.351	1491.398	1493.533	1497.190	1500.293
NPV (2021-32)		11,068.31										
B - C		0.00	-1033.79	449.07	735.66	848.60	963.67	964.24	966.29	968.43	73.35	806.67
		0.00	-312.71	439.93	670.35	783.29	786.01	786.58	788.63	790.77	794.42	797.53
NPV(B-C)		5442.57										
		5424.56										
BCR				1.967								
				1.961								

A more detailed and disaggregated analysis for England, Wales and Northern Ireland can be conducted when the requisite statistics can be procured.

7.4.5 Higher rates of return

There is an aim for the DRS that the consumers would return as high a number of drinks containers as practically feasible and would achieve in time a rate of return of 90%. This objective will be incorporated into the general regulatory framework. Hence a scenario based on this proposition was run in the model. The results are set out in the following table.

Table 18: UK DRS costs with a 90% return rate

90 RR Costs Summary , £m												
Costs	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Capital investment costs		991.04	185.82	123.88	0.00	0.00	0.00	0.00	991.04	185.82	123.88	-619.40
Organisational Set up cost		146.00	-	-	-	-	-	-	-	-	-	-
IT Installation			7.20	-	-	-	-	-	-	-	-	-
Training & familiarisation (initial)			15.00									
Central administration costs			29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
Enforcement			1.55	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31
Counting centre costs			21.66	25.99	28.88	28.88	28.88	28.88	28.88	28.88	28.88	28.88
Relabelling			38.67									
RVM Handling costs			54.71	65.65	72.94	72.94	72.94	72.94	72.94	72.94	72.94	72.94
RVM maintenance costs			77.68	93.21	103.57	103.57	103.57	103.57	103.57	103.57	103.57	103.57
Opportunity costs			18.89	22.67	25.50	25.50	25.50	25.50	25.50	25.50	25.50	25.50
Retail rental Costs			14.75	17.70	19.67	19.67	19.67	19.67	19.67	19.67	19.67	19.67
Manual take-back labour costs			28.47	34.17	37.97	37.97	37.97	37.97	37.97	37.97	37.97	37.97
Logistics			202.42	242.91	269.90	269.90	269.90	269.90	269.90	269.90	269.90	269.90
Total Cost	0	1137.04	696.62	657.29	589.54	589.54	589.54	589.54	1580.58	775.36	713.42	-29.86

NPV (2021-32) 6,327.9

EAC (2021-32) 632.69

Table 19: UK DRS benefits with a 90% return rate

Benefits 90% RR

£ m

Benefits	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Reduction of disamenity from litter			1,105.3	1,326.4	1,473.8	1,473.8	1,473.8	1,473.8	1,473.8	1,473.8	1,473.8	1,473.8
Net material revenue			15.2	29.4	44.3	47.1	49.5	51.0	52.8	54.9	57.0	59.0
Direct costs of litter clean-up savings			67.5	81.1	90.07	90.07	90.07	90.07	90.07	90.07	90.07	90.07
GHG emissions:												
savings from recycling			1.88	4.88	9.01	10.48	12.04	13.71	15.48	17.36	19.77	22.33
increase from additional transport			-3.47	-3.79	-4.54	-6.03	-9.00	-10.52	-12.37	-12.72	-14.20	-16.03
Total Benefit	-	0.00	1,186.5	1,437.9	1,612.7	1,615.4	1,616.4	1,618.1	1,619.8	1,623.3	1,626.4	1,629.1

NPV_B (2021-32) **£12,447**

BCR **1.967**

The BCR for the 90% RR is a little higher than that for an 85% RR

7.4.6 The Deposit Management Organisation (DMO)

It is proposed that the DMO would be responsible for running the DRS. As explained above, they would incur the economic costs of running the system and pay for this using the total material revenue, unredeemed deposits and the producer fee. The proposed requirements that will be placed on the DMO are being outlined in the accompanying consultation document. For the purpose of this analysis on policy advice it has been assumed that producer fees will make up 50% of the DRS net costs and any additional unredeemed redeposits needed to fund the day-to-day costs of the scheme will be reinvested into the scheme. As a result, for the EANDCB in the IA, we have taken an average of the producer fee covering 50% of the DRS net costs under 85% & 90% return rates.

In terms of the total revenue and costs of the DMO the following gives a very approximate indication of the general situation, whilst recognising that the particular situation will vary from year to year. The analysis here provides an illustration of how the DRS scheme could be funded and covers two scenarios: one with an 85% return rate and the other with a 90% return rate. It is estimated by first taking the equivalent annualised cost of setting-up and running the all-in DRS system (taken from the cost analysis above). Next the anticipated additional net material revenues are subtracted for this. It is then assumed that producers are responsible for 50% of the remaining costs with the other 50% paid for by unredeemed deposits.

It can be seen in the 85% scenario, there are enough unredeemed deposits to fund the entire DRS system should it all be used to reduce costs to producers. Here 738m in unredeemed deposits are collected to cover 571m in annualised costs net of material revenues. For a recycling rate of 90% this is no longer the case with unredeemed deposit revenue falling to 492m with costs net of material revenue being 712m.

For the purposes of this impact assessment the Equivalent Annualised Net Direct Cost to Business (EANDCB) has been calculated for the 85% recycling rate assuming producers are responsible for 50% of costs, regardless of there being excess unredeemed deposits. During the consultation we will seek views on whether unredeemed deposits should be fully reinvested into the system to keep the costs imposed on producers to a minimum, or whether unredeemed deposits should complement a minimum (e.g. 50% of net costs) producer fee. This matter remains subject to views and further discussion with a final decision made following the consultation. The EANDCB for the final impact assessment will be revised on this basis.

Finally, it is important to note this analysis is based on annualised costs and in reality costs will be higher in years with capital investment and lower in years without.

Table 20: Funding the DRS £m

Funding the DRS: All-In			
URD @ 85% RR	738.55	URD @ 90% RR	492.37
EAC to businesses (85%) (2022-32)	681	EAC to businesses (90%) (2022-32)	703
Material revenue - Equiv. Annual revenue of recycling materials	37	Material revenue - Equiv. Annual revenue of recycling materials	40
Net cost as EAC	644	Net cost as EAC	663
Producers' fees obligation @ 50% liability for EAC _B	322	Producers' fees obligation @ 50% liability for EAC _B	332
URD requirement (for outstanding/remaining costs)	322	URD requirement (for outstanding/remaining costs)	332
Excess URD @ 85% RR	416.55	Excess URD @ 90% RR	161.37

8 Option 3: On-the-Go (On-the-Go) DRS

This option covers drinks containers less than 750ml in size, sold in single format PET bottles, steel cans, aluminium cans and glass bottles. Based on international comparison, a 20p deposit level is predicted to generate a return rate of 85%. As with Option 2, there are uncertainties surrounding the reliability of directly applying international findings to the UK, and further considerations such as whether 'on-the-go' consumers may be less inclined to retain bottles for return. This is not implausible in practical terms when people in transit and making transport connections may not have the time, the information nor retention capacity to return containers. Therefore, please see section 6.3.3 for sensitivity analysis testing the effects of the return rate for on-the-go containers that would be lower than that for the All-in version of the DRS. An additional problem with trying to determine the outturns for on-the-go scenarios is the lack of comprehensive data for the relevant categories, i.e. Containers that are less than 750ml. There are suitable detailed data for the various categories only for 2017¹; this has been used as the foundation for deriving estimates for subsequent years on the basis of assumption that the proportions of on-the-go to all containers in each category of materials remain the same over time. Because of this data gap it will not be possible to examine the breakdown of the various effects for the on-the-go in as much detail as for the All-in option.

As with Option 2, in order to establish the amount of material placed on the market in scope of an All-In DRS, estimations were gathered and provided to DEFRA by WRAP:

8.1 Costs of On-The-Go DRS

The following key costs were estimated:

1. Set-up costs
2. Re-Labeling Costs
3. Reverse vending machines (RVMs)
4. Manual take back
5. Logistics
6. Counting Centres and Central Administration

8.1.1 Set-Up

The same methodology for set-up costs in Option 2 was applied for Option 3. The set-up costs were not reduced for the lower scope of material. The reason for this is that the required number of counting centres, depots and central administration are estimated as being the same in both options, with only the flow of material through these centres differing. This would therefore only impact the operational costs. There is a possibility for centres to be of a smaller size to compensate for the reduce scope of the DRS, but insufficient data were available to apply a reduction in the costs for this impact assessment. The set-up costs are therefore estimated at £146m in year 1.

8.1.2 Re-Labeling Costs

Re-labelling costs used the same estimates as Option 2, however these were reduced by the scope and smaller scale of this DRS. OTG material by unit makes up just 31% of the 'All-In' material². Therefore, the

¹ Drinks recycling On the Go., Thompson, H. & Morgan, S. (WRAP, Valpak & Recoup), Banbury, 2019.

² 23bn total POM (units per year), 7.4bn units in the scope of the On-the-Go DRS which gives 31%.

costs for labelling in Option 2 were reduced to 31% giving a labelling cost of 18.6m³. It is possible that these costs may be higher if producers choose to extend their re-labelling to a wider range of bottles whilst undertaking a re-design, however this has not been taken account of, and these costs only apply to those bottles in-scope of the On-the-Go DRS.

These costs are one-off transition costs that would occur in year 1 of the policy only.

8.1.3 Reverse Vending Machines (RVMs)

Following the same approach as described in section 5.2.1.2, the number of RVMs estimated to be needed for an On-the-Go DRS was then reduced accordingly whilst still providing sufficient return points to achieve the rates of return desired, using the base infrastructure of the large and medium size retail outlets as previously. The number of RVMs required for 'on-the-go' locations (such as public transport hubs, parks, etc.) was kept the same as in Option 2 in order to ensure customers the ability to return containers whilst on the move. This also goes some way to account for the diseconomies of scale likely to be present in this option, in comparison to an 'all-in' DRS. To take account of the considerable intake of containers machines of small dimensions and lesser costs (equivalent to a reduction of a third) per RVM were applied to this option compared to Option 2.

8.1.4 Logistics

The same methodology as presented in section 5.2.1.4 was used to estimate the logistic costs under Option 3. The final costs were discounted by the reduced material in scope. However, as the cost of collecting and transporting materials depend on the tonnage of material as well as the number of units, the scaling was done on a composite weighted average basis. Also a proportion of the logistic handling costs would be fixed and not directly related to unit numbers.

8.1.5 Counting Centre and Central Administration

To establish the on-going counting centre and central administration costs, the same methodology as the all-in option was used. Some of the counting centre costs would similarly be fixed, e.g. those related to plant, IT., etc.; variable costs were reduced by the lower number of units in scope (31%), due to each counting centre having to process a fewer number of containers.

The central administration costs were kept the same as Option 2, as the number of staff required to run the scheme would be very similar regardless of the reduced scope of DRS. Therefore, the central administration costs are estimated to be 30m per annum. The counting centre costs are £17m per year in Option 3, compared to £56m per year in Option 2.

There may also be additional central administration costs arising from having to cooperate with the packaging producer responsibility regulator to identify those materials that are in the scope of the DRS, and drinks containers >750ml that would be under the reform of packaging producer responsibility instead, but we do not have the data to estimate these at this time.

8.1.6 Non-Monetised Costs

As with Option 2, the potential time cost of physically placing bottles into an RVM or of giving them to a shop assistant has not been included for the Impact Assessment, though we welcome further views on this position during consultation. For on-the-go consumers in particular, RVMs should be easy to access so that this transaction can replace a normal disposal method. It is also expected that consumers will make a

³ It is possible that this cost could be higher as some brands selling On-the-Go drinks containers, will also sell these containers in a multipack format or larger format. Therefore, the cost of redesigning containers for All In drinks, may not be too much greater than the On-the-Go cost. Or similarly, the On-the-Go relabelling cost may not be significantly less than the All-In cost.

rational decision as to whether receiving the deposit is worth the time taken to return the bottle and can choose to avoid the transaction if they judge that it is not worthwhile.

8.1.7 Total Economic Costs of On-the-Go DRS

The total costs for this option are set out in the following table below.

Table 21: Total Economic costs for On-the-Go

£m	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Capital investment costs	564.52	105.85	70.57	0.00	0.00	0.00	0.00	0.00	564.52	105.85	-362.91
Organisational Set up costs		146.00	0	0	0	0	0	0	0	0	0
IT Installation		7.20	0	0	0	0	0	0	0	0	0
Training & familiarisation (initial)		15.00									
Central administration costs		29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
Counting centre costs		15.88	18.94	21.18	21.18	21.18	21.18	21.18	21.18	21.18	21.18
Relabelling		18.62	0	0	0	0	0	0	0	0	0
RVM Handling costs		28.94	34.73	38.59	38.59	38.59	38.59	38.59	38.59	38.59	38.59
RVM maintenance costs		45.49	54.59	60.66	60.66	60.66	60.66	60.66	60.66	60.66	60.66
Opportunity costs		9.44	11.33	12.58	12.58	12.58	12.58	12.58	12.58	12.58	12.58
Retail rental Costs		8.12	9.74	10.83	10.83	10.83	10.83	10.83	10.83	10.83	10.83
Manual take-back labour costs		9.70	11.63	12.93	12.93	12.93	12.93	12.93	12.93	12.93	12.93
Logistics		90.64	108.77	120.86	120.86	120.86	120.86	120.86	120.86	120.86	120.86
Total Cost	564.52	530.68	350.10	307.42	307.42	307.42	307.42	307.42	871.94	413.26	-55.49

NPVc (2022-32) £ 3,503

EAC Gross
(2022-32) £350.27

8.2 Economic Benefits of On-the-Go DRS

The following key economic (national level) benefits were estimated:

1. Net incremental material revenue to the DMO
2. Greenhouse gas emissions (GHG) reductions
3. Reduction in litter cleaning costs
4. Reduction in disamenity value/cost of litter

8.2.1 Material Revenue and Net Material Revenue for the DMO

As with Option 2, the material collected by the DMO and sold to reprocessors for recycling would generate revenue, which would then be used to partly fund the DRS operation. The remainder of the cost would be covered by a contribution from producers (see section 5.3.3.1).

POM and recycling data were taken from Valpak's flow reports and the On-the-Go drinks container reports to establish the baseline tonnage of recycling. This calculation also uses the consumer survey reported recycling rates from WRAP's OTG report. WRAP judge that this is likely to be an overestimate (due to predicted over-reporting of recycling)¹, however in the absence of empirical evidence to the contrary, the original rates have been used. This aspect is something for which further evidence can be sought in the consultation.

This baseline level of recycling means that some of the material collected and sold by the DMO would not be additional recycling, but material diverted away from current waste management systems to the DRS². The revenue gained from the sale of this proportion of material is treated as a transfer between stakeholders rather than an incremental benefit of the system. Although the total material revenue received is used to part-fund the DRS, only the revenue from the incremental or additional recycling created by the DRS is treated as a national economic benefit of the system in the IA.

Table 22: OTG DRS recycling (tonnes). Annual average in base period 2020 - 2022

Container type	POM	Return Rate %	DRS Recycling %	Additional Recycling
PET Bottles	118,540	65	85	23,708
Steel cans	1,497	59	85	389
Aluminium cans	16,723	59	85	4,348
Glass bottles	457,312	51	85	155,486
Total	594,072	54	85	183,931

¹ Drinks Recycling On-the-Go, Valpak/WRAP, 2019; p.26

² The greater quality in the materials collected by a DRS system in comparison to kerbside recycling is likely to translate into greater certainty that the materials will be recycled, rather than rejected due to contamination issues. This benefit has not been quantified in this Impact Assessment.

8.2.2 Greenhouse Gas Emission (GHG) Reductions

Greenhouse gas emissions reductions arise from this increase in recycling as a result of the DRS. As above, only the additional tonnages collected by the DRS system will be analysed and monetised as a benefit. This does not include material already being recycled via current collection systems before the introduction of a DRS.

As in section 5.3.1.2, per tonne emissions of closed-loop recycling were used to calculate the emissions for this increased recycling. These were then added to the avoided emissions from primary production and residual waste treatment e.g. landfill, incineration etc. This gave the following CO₂e emissions per tonne on a traded and non-traded basis following HMT green book supplementary guidance on greenhouse gas emission appraisal.³

Using Carbon values from 2023 to 2032, one obtains the following GHG emission savings profile, including traded and non-traded emissions:

Reduction in disamenity value of litter

. It was estimated in Option 2 that 40% of litter was material in scope of the DRS. Litter composition studies reveal that more On-the-Go drinks containers are present in litter than larger drinks containers, but due to a lack of definite empirical data, this likely effect could not be taken into account. The litter disamenity reduction benefits were derived from the Eftec empirical study and the effects were scaled down proportionately by the smaller scope of the On-the-Go option, i.e. to 31% of the all-in option.

8.2.3 Direct savings on costs of litter clean up

The same methodology used in 5.3.1.3 as was used to estimate the direct litter cleaning cost savings in Option 2 and the values were derived similarly to the foregoing,

A Table setting out the benefits of On-the-Go DRS follows.

³ <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

Table 23: Total Economic Benefits of On-the-Go DRS

£m												
Benefits	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Reduction of disamenity from litter			339.55	407.46	452.73	452.73	452.73	452.73	452.73	452.73	452.73	452.73
Net material revenue			8.23	9.88	10.98	11.66	12.26	12.63	13.07	13.58	14.10	14.60
Direct costs of litter clean-up savings			18.89	22.67	25.19	25.19	25.19	25.19	25.19	25.19	25.19	25.19
GHG emissions:												
savings from recycling			0.46	1.20	2.21	2.57	2.95	3.36	3.80	4.26	4.85	5.48
increase from additional transport			-0.97	-1.06	-1.27	-1.69	-2.52	-2.94	-3.46	-3.56	-3.97	-4.48
Total Benefit	0.00	0.00	366.16	440.15	489.84	490.46	490.62	490.97	491.33	492.20	492.90	493.52

NPV (2022-32) **£3,785.38**

Benefits – Costs	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
B - C	0.00	564.52	-164.5	90.04	182.43	183.05	183.20	183.56	183.92	379.74	79.64	549.01
NPVB-C	282.2											

BCR **1.081**

8.3 Differential impacts on Stakeholders

8.3.1 Producers of Drinks Containers

As discussed in section 7.4.1, there would be contribution from producers required to cover the costs of the DRS set out above. The methodology for this option is the same as for Option 2, with the DMO using the material revenue from the sale of collected material for recycling and then charging a fee to producers to cover the remaining costs, based on the packaging they place on the market. The total costs to the DMO are 302m per annum (466m in year 1). The material revenue gained is dependent on the amount of material captured by the DRS:

The difference between the total costs and total material revenue would be covered by the producer fee: This is equivalent to approximately 6p per unit in year 1 and 3p per unit from year 2 onwards in both

scenarios, based on current POM figures. This would result in all the costs of the operation of the DRS being met from these revenue sources.

Producers may go on to buy the material recycled via the DRS off the market for use in drinks container production. This cost has not been taken into account as buying material forms part of their costs with or without a DRS. It is also expected that a DRS will generate the availability of a better quality of recycled material.

8.3.2 The DMO

As discussed in section 7.4.6, it is proposed that the DMO is responsible for running the DRS, covering the economic costs of doing so with the total material revenue from the sale of materials to be recycled, the fee charged to producers and the use of unredeemed deposits. These aspects, including the detailed funding allocations, are the subject of further discussions.

8.3.3 Consumers

The same rationale as described for Option 2 applies for Option 3. It is expected that the higher price paid by consumers due to the deposit may have an effect on consumer demand, however once the first deposit is redeemed it is anticipated that consumption levels would revert back to a considerable degree. It is assumed that some consumers will choose not to return their drinks containers (for example, if they prefer to continue using existing household recycling) and would therefore lose the value of their deposit.

8.3.4 Local Authorities and Packaging Producer Responsibility Reform

As discussed in the all-in option, DRS is proposed as an alternative of the proposed packaging producer responsibility reform, under which it is proposed that the costs currently incurred by Local Authorities for dealing with packaging material waste will be covered by packaging producers.

With the introduction of a DRS, it is predicted that On-the-Go drinks containers will be diverted away from the current kerbside collection systems to the DRS. The main benefit of this to the current household collection system would be lower costs of collection, as less material is collected and dealt with via kerbside. These benefits are smaller than in Option 2, as a smaller tonnage of material is removed with an On-the-Go system.

The main disadvantage to the current household collection system would be the loss of revenue gained from the sale of material for recycling. These losses are smaller than in Option 2, due to the smaller tonnage of material, and the fact that a higher proportion of material is captured by the DRS from current residual/littering rather than kerbside recycling (due to the comparatively lower recycling rates of On-the-Go drinks containers). The same method was applied to establish this.

Any net costs as a result of DRS material no longer being collected at kerbside will become the responsibility of producers obligated under planned reforms to the packaging producer responsibility scheme and not Local Authorities,

Of the remaining 15% of DRS-scope material, one can envisage that some of this will still be recycled via kerbside¹ or indeed captured in residual waste or continue to be littered. As the Deposit Management Organisation will be responsible for all DRS material placed on the market these waste collection/treatment costs will no longer be placed on Local Authorities. We are consulting on options for a payment system to cover these costs to compensate Local Authorities appropriately. In addition, Local Authorities will gain from the introduction of a DRS due to the reduction in litter cleaning costs, amounting to 13m per year.

¹ For example, in instances where people are unable to visit a return point so choose to place the bottles in their recycling bins at home instead. This means that the overall recycling rates for DRS-scope materials are likely to be higher than the DRS capture rate.

9 Option 4: DRS with No Glass intake

While the All-in option covers all drinks containers, the no-glass option would specifically exclude glass containers. Responses to the first consultation demonstrated strong support for the inclusion of glass bottles (86%). At the same time, significant concerns were raised from industry on the inclusion of glass in a DRS. The main concerns raised were the significant increase in handling costs and equipment complexity due to the weight of glass; that given the weight of glass packaging, consumers may prefer not to take their glass packaging back to return points and that, by taking the majority of glass out of kerbside recycling, the recycling of the remaining glass collected at kerbside could be undermined. Therefore, a cost-benefit analysis of a no glass DRS was conducted as a possible policy option, which was carried out as a directly comparative exercise to the All-In option. In these relative assessments it is important to keep in mind that the All-In scheme was deemed to be characterised by a wide-ranging adoption of glass compaction by the businesses involved apart from those engaged in manual take back of containers.

9.1 Costs

Some pre-requisite fixed costs would be needed at the outset in any scenario and these will not be directly related to throughput. Hence the costs associated with setting up the scheme organisation, IT Installation and the central headquarters administration costs would not be significantly altered. This does not apply to most capital equipment and the figures for the RVMs need to be adjusted to reflect the narrower scope of the intake in the no glass option. With respect to other aspects, such as storage space and transport, it is important to bear in mind that the comparator for this option would be the All-in DRS that would normally treat glass by compacting it so that its volume would be reduced by a factor of around 4 or 5.²

It was judged on the basis of price quotations available that there would be a 15% reduction in the dimensions of the RVM (machine) required with a corresponding reduction in expenditure, involving a decrease in both capital and operating costs. Manual handling, i.e. labour, costs were reduced by the decline in the number of units being received, which in the base period amounted to 19%. In addition to the directly related expenses, there will be consequential effects on lowering rental and opportunity costs, which have been incorporated into the analysis. The reduction in the storage space required from not having glass, whose volume constitutes 32% of that for total DRS scope materials, was factored into the analysis, whilst taking account of the fact that for those with RVMs the compaction process can reduce volumes by a factor of 4 or 5. Further evidence on the relative effects of glass compaction will be sought in the forthcoming consultation.

² Information from RVM manufacturers

Table 24: Total Economic Costs of No Glass DRS

£m												
Costs	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Capital investment costs		825.87	154.85	103.23	-	-	-	-	-	825.87	154.85	530.91
Organisational Set up cost		146.00	-	-	-	-	-	-	-	-	-	-
IT Installation		-	7.20	-	-	-	-	-	-	-	-	-
Training & familiarisation (initial)		-	15.00	-	-	-	-	-	-	-	-	-
Central administration costs		-	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
Counting centre costs		-	22.18	22.18	22.18	22.18	22.18	22.18	22.18	22.18	22.18	22.18
Relabelling		-	36.17	-	-	-	-	-	-	-	-	-
Enforcement		-	1.55	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31
RVM Handling costs		-	39.05	46.86	52.07	52.07	52.07	52.07	52.07	52.07	52.07	52.07
RVM maintenance costs		-	64.73	77.68	86.31	86.31	86.31	86.31	86.31	86.31	86.31	86.31
Opportunity costs		-	15.31	18.37	20.41	20.41	20.41	20.41	20.41	20.41	20.41	20.41
Retail rental Costs		-	11.27	13.53	15.03	15.03	15.03	15.03	15.03	15.03	15.03	15.03
Manual take-back labour costs		-	29.40	29.40	29.40	29.40	29.40	29.40	29.40	29.40	29.40	29.40
Logistics		-	185.08	222.10	246.78	246.78	246.78	246.78	246.78	246.78	246.78	246.78
Total Cost	0.00	971.87	611.59	564.45	503.28	503.28	503.28	503.28	503.28	1329.15	658.13	-27.63

NPV (2022-32) 5,491.42

EAC (2022-32)

Gross 589.4

9.2 No Glass DRS Benefits

The benefits associated with the reduction in litter take account of the increase in litter relative to the All-In option arising from not capturing glass bottles under this scenario. It is difficult to establish whether the volume or the number of litter items has the greater influence in generating disamenity effects. Here a composite measure of these two factors was used to determine the lessening of the reduction in the disamenity from litter and similarly in reduction of the savings in litter clean-up costs to local authorities. The benefit accruing in the form of revenue from the sale of the recycled materials in the secondary markets will also be reduced. The basic methodology and modelling developed for estimating the respective benefits are similar in all the options.

Table 25: Total Economic Benefits of No Glass DRS

No Glass Benefits												
£ m	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Reduction of disamenity from litter			786.42	943.70	1048.56	1048.56	1048.56	1048.56	1048.56	1048.56	1048.56	1048.56
Net material revenue			9.45	44.41	62.23	64.72	66.83	69.08	71.35	73.64	75.98	78.39
Direct costs of litter clean-up savings			46.51	55.82	62.02	62.02	62.02	62.02	62.02	62.02	62.02	62.02
GHG emissions:												
savings from recycling			1.80	4.24	7.89	9.17	10.54	12.02	13.59	15.27	17.45	19.78
increase from additional transport			-2.85	-3.12	-3.73	-4.95	-7.39	-8.64	-10.16	-10.45	-11.66	-13.16
Total Benefit	0.00	0.00	841.32	1045.05	1176.96	1179.51	1180.56	1183.03	1185.36	1189.03	1192.34	1195.58

NPV_(B-C) (2022-32) **3,582.34**

10 Summary Comparative calculations

10.1 Summary of NPV, Business NPV, EANDCB for each option

The costs of running the DRS count as direct costs to business, as they will be covered by the Producer Fee. The material revenue gained by the DMO through the onward sale of material counts as an indirect benefit to business, by reducing the producer fee they pay. One would expect the producer fee to vary according to secondary material markets, with strong markets and high prices reducing the fee to be paid by producers. This is to be paid by drinks container producers, based on the material they place on the market. Producers will also be affected by the costs they pay via the packaging producer responsibility reform. The impact that the introduction of a DRS scheme will have on these costs is covered in Option 2 of this related impact assessment.

Table 26 Summary of NPV, BCR, EAC, £m

	Option 2 – ‘All-In’	Option 3 – ‘On the Go’	Option 4 – ‘No Glass’
NPV	5,884.5*	282	3,582.3
Total cost PV	6,346	3,503	5,491
EANDCB Net	@ 85% RR; 266	182.7	269.78
BCR	1.927*	1.081	1.65

* Calculated on the basis of accrual costs

10.2 Small and Micro Business assessment

The Better Regulation Framework sets out that small and micro businesses should be exempted by default from the requirements of new regulatory measures. However, in the context of a DRS, convenience of return points is crucial to consumers' participation and therefore the success of the scheme in meeting the policy aims. An estimated 34.3%¹ of retailers selling in scope containers are small and micro businesses, so a blanket exemption would severely reduce the effectiveness of a DRS. We will be seeking further evidence and more robust data through the consultation on the number and market share of small and micro businesses affected by a DRS.

Small and micro size retail outlets, like retailers in general, will be reimbursed from the DMO for all the costs that they incur. These would involve reimbursing small and micro size retail outlets for any losses incurred in hosting a return point via a handling fee. As discussed in section 7.1.3, the fee paid to retailers to reimburse them for these costs will be based on a series of criteria which will be set out in legislation, taking into account all the likely costs to a retailer of operating a return point.

The costs retailers might incur through hosting a return point include a space cost of placing an RVM on the shop floor, and of storing bottles (after unloading from machines² or otherwise) as well as training and familiarisation costs. This was calculated on the basis of estimated rental values for the various locations in the shops.³ The opportunity costs were estimated by applying the potential profits in the relevant retail category lost to the average floor space required.

Our policy approach is to leave the calculation of the retailer handling fee to the DMO to determine. As seen in international DRS, the DMO will likely calculate standard costs (per container) to be reimbursed to retailers, depending on container material and type of return point being operated. There will also be compensation for other costs incurred in hosting the return point (space, storage, utilities costs such as electricity etc) which could be more tailored to an individual retailer's circumstances. We intend to use the consultation to test these criteria with stakeholders and obtain a breakdown of the number of small and micro businesses affected to ensure we are proposing the right types of cost are covered by the fee. Based on responses, we will then look to incorporate this detail more closely into our modelling and to update our criteria, if necessary, for the final impact assessment, whilst recognising that our intention is to leave the specifics of the handling fee calculation down to the DMO to decide.

Retailers will agree what form of return point (RVM or manual return point) they wish to host with the DMO. The DMO will be keen to optimise its placements of RVMs at the most economical locations to get the best return rates possible. Therefore small and micro business that are unlikely to face the number of returns per day to make an RVM economically viable can instead collect containers manually. This will be a less intensive process and would be a cheaper solution for small businesses. Therefore, the collection of containers would be a net cost neutral endeavour for small and micro business, with the handling fee

¹Derived from BRC data source.

²It is predicted that bottles will be transported relatively soon after emptying an RVM, for example by making use of back-filling supermarket delivery vans.

³Calculated by using retail data provided in British Retail Consortium Deposit Return Schemes in the UK: Implications for retailers

paid to cover any costs they do incur. We do not believe that there would be a disproportionate impact on small and micro businesses. The flexibility in the form of the return point and the reimbursement of costs mean that any burden would be proportional to the size of the retailer.

Furthermore, there is the possibility of these retailers actually seeing increased footfall as once consumers return containers they are likely to purchase new drinks. Evidence from Norway initially showed shopkeepers were hesitant to accept RVM machines placed in stores or take back drinks but once the handling fee reimbursements came in they were very happy to place even full sized RVMs in their stores. This was because customers would spend some of the deposits that they had redeemed in the shop so that the business would gain a small profit from increased sales.

As explained above, there will be exemptions that in practice will be most likely availed of by small and micro retail businesses where it is not in their interests to host a return point. These limited exemptions consist of (i) proximity to other retail outlets which are already hosting a return point, and (ii) if the retailer would be in breach of health and safety requirements by operating a return point on their premises, such as in small confined premises. Retailers wishing to apply for an exemption would do so to the DMO, who would consider the application whilst also ensuring there remains an ample supply of return points for consumers to use, given the clear research findings suggesting that accessibility and availability of return points would be key to the success of the scheme and minimising consumer burdens. Making provisions for these exemptions in the regulations would help to reduce potential burdens on SaMBA retailers though, who prefer not to host a return point.

With regards to small and micro-size producers, we are seeking views in our consultation on any mitigations which should be put in place to minimise the burden on these businesses. Whilst we propose that all producers placing in scope drinks containers on the market should be obligated under the DRS and are therefore not able to opt out of the scheme, we want to protect the smallest drinks producers from the cost burden associated with the introduction of a DRS. We are therefore considering whether the registration fees which a small producer pays to the DMO could be reduced or waived for these businesses. In any case, we have a clear expectation that producer fees will be transparently calculated and shared publicly.

10.3 Sensitivity Analysis scenarios

There are a number of risks and sensitives associated with this analysis, including areas where the data are uncertain and would benefit from further evidence. See Annex C for further details of sensitivity analyses conducted.

10.4 Key Evidence Gaps and Assumptions

For transparency, the key areas that would benefit from further evidence have been listed below, and a number of questions have been asked in the accompanying consultation document and the UK Government for England, Welsh Government and the Department of Environment, Agriculture and Food in Northern Ireland are commissioning further research in order to establish a better evidence base in this area.

- The scale and patterns of disamenity effects arising from the dispersion of litter
- The linearity of reductions in litter disamenity in accordance with reductions in litter
- The proportion of litter that comprises specifically 'on-the-go' type drinks containers (i.e. single format and less than 750ml)

- The UK total spend on litter clear-up by Local Authorities
- Evidence of retail transport costs, and the scale of efficiencies obtainable through backhauling
- The relationship between the number of counting centres required and the amount of material processed (i.e. how this would change in proportion to an 'on-the-go' system)
- The way in which a producer fee would be likely to be distributed across producers of different sizes
- Consumer behaviour responses to a DRS.

11 Monitoring and Evaluation

In the 2018 Resources and Waste Strategy for England, Government committed to publishing a monitoring⁴ and an evaluation⁵ plan which was subsequently published in 2020.

The Evaluation Plan sets out clearly and transparently the provisions for evaluating the impact of projects within the context of the Resources and Waste Strategy. This includes the establishment of an Evaluation Programme Board that will report to the Resources and Waste Strategy Programme Board. The Evaluation Plan explains how we will monitor and report on progress and how we will identify to what extent policy initiatives are working. Key indicators for monitoring will include the overall recycling rate and packaging recycling rates (including for plastic) for England. Chapter 6 of this document presents a specific assessment of planned evaluation for a Deposit Return Scheme, including evidence collection. Please see chapter 6 of the Resources and Waste Strategy Evaluation plan for further details.

The evaluation plan does not cover every policy proposal (there are 100+) in the Resources and Waste Strategy, but has a focus on five key strands – one of which is the Deposit Return Scheme for drinks containers.

For each strand, evaluation will include development of systems maps to identify the various contextual influences and interactions which may affect the way the policy works. An initial theory of change model for each area has been included in the published plan, and these will be further developed as a basis for evaluation.

The 'Monitoring Progress' document sets out the key measures and indicators identified for monitoring progress of resources and waste projects and will report annually on these as well as reporting any developments of new indicators and measures.

⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907029/resources-and-waste-strategy-monitoring-progress.pdf

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907161/resources-and-waste-strategy-evaluation-plan.pdf

12 Annexes

Annex A – UK Drinks Market ⁶

Year	Type	Expenditure -bn
2012	Alcoholic drinks (on and off licence)	44.46
2013	Alcoholic drinks (on and off licence)	46.67
2014	Alcoholic drinks (on and off licence)	48.02
2015	Alcoholic drinks (on and off licence)	49.39
2016	Alcoholic drinks (on and off licence)	51.3
2017	Alcoholic drinks (on and off licence)	54.92

Year	Type	Expenditure -bn
2012	Food and non-alcoholic drink	91.44
2013	Food and non-alcoholic drink	96.46
2014	Food and non-alcoholic drink	97.57
2015	Food and non-alcoholic drink	97.46
2016	Food and non-alcoholic drink	98.81
2017	Food and non-alcoholic drink	103.84

Annex B – Drinks Demand Price Elasticities and References⁷

Author	Time period	Beer	Wine	Spirits

⁶ Own AGR calculations using Defra statistics on UK consumer expenditure on food, drink and catering

⁷ HMRC, Estimations of price elasticities of demand for alcohol in the United Kingdom, 2014

Stone (1945)	1920-1938	-0.73		-0.72
Prest (1949)	1870-1938	-0.66		-0.57
Stone (1951)	1920-1948	-0.69	-1.17	-0.57
HMT (1980)	1980	-0.2	-1.10	-1.6
Walsh (1982)	1955-1975	-0.13	-0.28	-0.47
Duffy (1983)	1963-1978		-1.00	-0.77
McGuinness (1983)	1956-1979	-0.3	-0.17	-0.38
Clements and Selvanathan (1987)	1955-1975	-0.19	-0.23	-0.24
Duffy (1987)	1963-1983	-0.29	-0.77	-0.51
Godfrey (1988)	1956-1980		-0.67	-0.72
Godfrey (1988)	1956-1980		-0.95	-1.49
Selvanathan (1988)	1955-1985	-0.13	-0.37	-0.32
Wong (1988)	1920-1938	-0.25	-0.99	-0.51
Crooks (1989)	1970-1988	-1.05	-2.42	-0.91
Jones (1989)	1964-1983	-0.4	-0.94	-0.79
Jones (1989)	1964-1983	-0.27	-0.77	-0.95
Selvanathan (1989)	1955-1975	-0.25	-0.22	-0.2
Baker and Mckay (1990)	1970-1986	-0.88	-1.37	-0.94
Baker et al (1990)	1970-1986	-0.99	-0.92	-1.12
Cuthbertson and Ormerod (1991)	1965-1989	-0.3	-0.49	-0.3
Duffy (1991)	1963-1983	-0.09	-0.75	-0.86
Selvanathan (1991)	1955-1985	-0.13	-0.40	-0.31
Crawford and Tanner (1995)	1974-1994	-0.67	-1.40	-1.2

Blake and Nied (1997)	1952-1992	-0.95	-1.32	-0.93
Clements et al (1997)	1955-1985	-0.44	-0.57	-0.72
Salisu and Balasubramanyam (1997)	1963-1998	-0.1	-1.16	-0.66
Chambers (1999)	1963-1993	-0.6	-1.20	-0.4
Crawford et al (1999)	1978-1996	-0.75	-1.70	-0.86
Duffy (2002)	1963-1999	-0.39	-0.14	-0.67
Moosa and Baxter (2002)	1964-1995	-3.2	-2.30	
Duffy (2003)	1963-1996	-0.41	-0.79	-1.36
Huang (2003)	1970-2002	-0.48 -1.03		-1.31
Selvanathan and Selvanathan (2005)	1955-2002	-0.27	-0.35	-0.56
Collis et al (2010)	2001-2006	-0.77 -1.11	-0.46 -0.54	-1.16 -0.9
Meng et al (2014)	2001-2009	-0.79 -0.98	-0.87 -0.38	-0.89 -0.08

Annex C – Technical market details

Market background

In 2017:

- UK consumer expenditure on alcoholic drinks (on and off licence) was 54.92bn.

- Food and non-alcoholic drinks expenditure was 103.84bn. The data is not more granular than this to discern the portion of this expenditure that is attributed to the non-alcoholic drinks market.⁸
The alcoholic drinks market has enjoyed a 4% average annual growth rate over the five-year period to 2017. Meanwhile the food and non-alcoholic drinks market has enjoyed a 3% average annual growth rate.

The below table shows the share of beverages sold in the UK in 2017. The UK records soft drinks as their largest beverage manufactured, followed closely by beer and whisky.

Table 14 Share of Beverage in the UK, %

Label	Share of beverages in the UK (percentage)
Soft drinks	28
Beer	27
Whisky	25
Cider	7
Gin and Geneva	3
Mineral waters	3
Other beverages	5

Source: Office for National Statistics

The UK also records the largest sales of soft drinks in the EU – 3.8bn in 2017. UK households spent approximately 9.10 per week on alcoholic drinks and 2.30 per week on soft drinks for FYE 2019.⁹

⁸ DEFRA Food Statistics pocketbook, UK consumer expenditure on food, drink and catering, 2017 data

⁹ ONS, Living Costs and Food Survey

Annex D – Price elasticities of demand

Alcoholic beverages

It is clearly suggested from existing literature that the demand curve for alcoholic beverages slopes downwards and that demand for alcohol is relatively inelastic. Literature shows that the lower the elasticity, the higher the charge must be to have a significant incentive effect.¹⁰ Due to the relatively low elasticity of alcohol (shown below), a significant charge could be considered for the Deposit Return Scheme.

Two international meta-studies found the following.¹¹

Wagenaar et al, 2009:

A 1% increase in price leads to a:

- 0.46% decrease in beer consumption
- 0.69% decrease in wine consumption
- 0.80% decrease in spirits consumption

For all drinkers, a 1% increase in price was found to reduce the demand for alcohol by 0.51% (mean). Heavy drinkers were found to be less responsive to price, with a 1% increase in price reducing drinking in the group by 0.28%.

Gallet, 2007:

- A 1% increase in price causes a: 0.50% decrease in overall alcohol consumption, comprising
- 0.36% decrease in beer consumption
- 0.70% decrease in wine consumption
- 0.68% decrease in spirits consumption

The table below shows the range of estimates of PED from UK alcohol studies

Table 15 Price Elasticities for different alcohol types

Alcohol Type	Literature median	Literature mean	Literature range
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¹⁰ Owens et al, Green Taxes: A budget memorandum, page 8

¹¹ IAS, How does the price of alcohol affect consumption? ([here](#))

Beer	-0.44	-0.6	-0.09 : -0.32
Wine	-0.78	-0.86	-0.14 : -2.42
Spirits	-0.72	-0.75	-0.08 : -1.60
Average	-0.65	-0.74	

See **Annex B** for the full list of studies.

inflation by 2 percentage points.

Since 2008, alcohol price levels have become much higher than they were before, due to duties on alcoholic products increasing above RPI-measured

The below table shows HMRCs¹² elasticity of demand estimates for different alcohol types,

¹² HMRC, Estimations of price elasticities of demand for alcohol in the United Kingdom, (2014). These were estimated using an isoelastic specification of the Heckman correction model.

Figure 1

Price	Quantity	Beer		Spirits		RTDs		Cider		Wine	
		On	Off	On	Off	On	Off	On	Off	On	Off
Beer	On	-0.34***	0.03	0.26***	0.08	0.08	0.11	0.05	0.11	0.10*	-0.04
	Off	-0.08	-0.74***	-0.10	-0.11**	0.02	-0.01	-0.02	0.07	-0.02	-0.08*
Spirits	On	-0.10***	-0.01	-1.25***	0.01	0.04	0.00	0.00	0.03	0.01	0.05*
	Off	0.00	0.04	-0.16**	-0.45***	-0.22	-0.09	-0.06	0.13	-0.01	-0.02
RTDs	On	0.00	0.09	0.17*	0.05	-0.24*	-0.03	-0.02	0.00	-0.04	0.00
	Off	0.00	-0.03	-0.03	-0.02	-0.03	-0.52***	0.03	-0.04	0.04	-0.03
Cider	On	-0.06	0.05	0.04	0.10	-0.04	0.24	-0.49***	-0.13	0.02	-0.06
	Off	-0.06	-0.01	0.02	0.05	0.30*	0.13	-0.25**	-0.74***	-0.04	-0.09**
Wine	On	0.02	0.02	0.12***	0.00	-0.07	0.01	0.07	-0.04	-0.24***	0.02
	Off	0.01	0.00	-0.02	-0.07*	0.14*	0.10	0.15*	0.05	0.03	-0.08***

* p<0.05, ** p<0.01, *** p<0.001

Price	Quantity	Beer		Spirits		RTDs		Cider		Wine	
		On	Off	On	Off	On	Off	On	Off	On	Off
Beer	On	-0.34***	0.03	0.26***	0.08	0.08	0.11	0.05	0.11	0.10*	-0.04
	Off	-0.08	-0.74***	-0.10	-0.11**	0.02	-0.01	-0.02	0.07	-0.02	-0.08*
Spirits	On	-0.10***	-0.01	-1.25***	0.01	0.04	0.00	0.00	0.03	0.01	0.05*
	Off	0.00	0.04	-0.16**	-0.45***	-0.22	-0.09	-0.06	0.13	-0.01	-0.02
RTDs	On	0.00	0.09	0.17*	0.05	-0.24*	-0.03	-0.02	0.00	-0.04	0.00
	Off	0.00	-0.03	-0.03	-0.02	-0.03	-0.52***	0.03	-0.04	0.04	-0.03
Cider	On	-0.06	0.05	0.04	0.10	-0.04	0.24	-0.49***	-0.13	0.02	-0.06
	Off	-0.06	-0.01	0.02	0.05	0.30*	0.13	-0.25**	-0.74***	-0.04	-0.09**
Wine	On	0.02	0.02	0.12***	0.00	-0.07	0.01	0.07	-0.04	-0.24***	0.02
	Off	0.01	0.00	-0.02	-0.07*	0.14*	0.10	0.15*	0.05	0.03	-0.08***

* p<0.05, ** p<0.01, *** p<0.001

On trade refers to alcohol sold to be consumed on the premises.

Off trade refers to alcohol sold to be consumed off the premises (most relevant for the DRS)

HMRC's report describes RTDs as alcoholic drinks to be consumed with a mixer and sold in pre-packaged form (for example, premixed gin and tonic).

The table suggests that all types of alcohol are price inelastic except for on trade spirits (-1.25). The next most elastic estimates are for off trade beer and off trade cider (-0.74). On the other hand, off trade wine (-0.08), on trade wine and on trade RTDs (-0.24) are the least elastic estimates.

Annex E – Non-alcoholic beverages

A literature review of 160 US studies between 1938-2007 found mean price elasticity estimates for soft drinks and juice to be relatively less inelastic, with PEDs of 0.79 and 0.76 respectively.¹³

For on trade soft drinks, a study evaluating the changes in sales of non-alcoholic beverages in Jamie's Italian restaurants in the UK, found that following the introduction of a 10p per beverage levy on sugar sweetened beverages (SSBs) sales per customer declined in the short and medium term. Compared with the pre-levy period, the number of SSBs sold per customer declined by 11% at 12 weeks and 9.3% at 6 months.¹⁴ However in this study other activities were done [such as redesigning a drinks menu] which may have also contributed to the decline in sales.

A report¹⁵ by the IFS notes that the size of own and cross price elasticities of demand¹⁶ is likely to vary across people. In the scope of the report on the Governments proposed soft drinks industry levy, the IFS warn however, due to varying substitution patterns across people, a sugar tax on soft drinks could lead to a higher consumption of sugary confectionary, thus limiting the effectiveness of the policy. A study by Pryce et al on alcohol quantity and quality price elasticities¹⁷ found that when the price of alcohol increases, consumers are more likely to substitute with cheaper drinks. Therefore, in the case of a drinks DRS, if an appreciable charge were passed onto consumers, there would be a counteracting response in switching to excluded products, such as drinks in cardboard cartons, milkshakes, etc. This effect would be mitigated by the introduction of the Extended Producer Responsibility scheme on other types of packaging.

¹⁶ **Cross price elasticity** (XED) measures the responsiveness of **demand** for good X following a change in the **price** of a related good Y .

Annex F – Projected Future Prices for High Quality Materials

The inherent uncertainty of predicting future prices in the intermediate to long-term needs to be emphasised. ¹⁸

Given that this exercise is simulation and forecasting, a considerable element of judgement based on industry knowledge/expertise is appropriate. Recognising that there will be substantial uncertainties, it would be inappropriate to apply such modelling purely mechanically. As well as the limitations arising from the inherent uncertainties, it is also fully recognised that this method is more restricted than formulating a full structural econometric model. Therefore, some adjustments to the outputs are likely to be necessary in the light of experienced knowledge and external projected industry outlooks. Such fine-tuning was conducted especially around the interface of the historical and predictive periods. A similar approach influenced the application of the functional forms of the estimation equations. The desired objective is to encapsulate the main underlying characteristic dynamic patterns whilst extracting purely transitory 'white noise' or short-term vibratory effects. In doing this attention was paid to the extent of the fluctuation patterns displayed but at the same time regard was also had to indications of underlying steadiness manifested in markets. It is important to point out that these predictive estimates are not meant to be precision forecasts but rather indicative projections.

These projections can be found in the table below:

/tonne	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Aluminium: High Quality	862.9	872.8	879.8	889.3	898.6	906.1	908.4	911.4	915.9	921.7	928.9	937.5
Steel: High Quality	123.0	133.2	136.4	143.2	151.5	158.2	162.6	164.7	164.8	163.2	159.9	155.1
Mixed Polymers: High Quality	182.5	199.6	212.5	221.5	224.2	221.4	216.4	212.4	206.5	198.7	189.1	178.0
Glass: High Quality	16.9	17.8	18.3	18.6	18.9	19.1	17.3	15.9	15.4	15.2	14.6	14.1

¹⁸ For the interested reader, the forward analysis of prospective prices undertaken for this study firstly differentiated pricing characteristics for basic grade materials and those for higher quality materials we expect the DRS to deliver. The analysis then conducted forecasting projection and simulation modelling utilising multiple order polynomial functions on disaggregated time series of pricing data to isolate and quantify the prospective premia that the higher quality DRS recovered recyclates would likely attain in future supply and demand conditions. The methodological underpinning for this modelling is based on dynamic univariate Granger causality. Its outturn is essentially driven by the dynamic patterns that are characterised in the data time series, in this case the materials prices. Regarding the coefficient values; these are determined by the univariate regression itself. The order of the polynomials is reflective of the oscillatory patterns of the data over time and there is a direct relationship between the frequencies and the exponential orders or levels. The order can be determined on the basis of the goodness of fit to the dynamic patterns and to coefficient of determination measurements, such as the R².

Annex G – Sensitivity analysis

The first scenario looks at the “what if” effects of increasing the level of the deposit from 20p to 25p in the third year. The scenario recognises two main effects stemming directly from such an intervention:

- the demand for DRS containers and hence the number of these being transacted declining by 2% in year 1, by 1.5% in year 2 and by 1% thereafter (constant over years 3 to 10)
- the rate of return of containers increasing to 86% in 1st year of introduction, 89% in 2nd year and 92% in subsequent years.

The first reflects a response corresponding to a short to medium term demand price elasticity effect. It is in line with the response elicited in the social research study which found that some consumers, particularly among the cohort in the younger age group, would reduce their purchases of drinks¹⁹. However, there is also a deferred opposite or countervailing effect in that subsequently this charge can be recovered. Raising the charge in the form of the deposit would increase the incentive for such recovery. A search of the economics research literature²⁰ did not find any study looking specifically at split dual effects and hence empirical evidence was not available to determine quantified estimates of these responses. Thus, some assumptions on the sizes of reactions had to be made for this simulation. These consisted of the following:

All-in option: an increase in the deposit level from 20p to 25p per container in Year 3. This involves:

- The demand for DRS scope containers and hence the number of these being transacted declining by 2% in year 1, by 1.5% in year 2 and by 1% thereafter (constant over years 3 to 10).
- The rate of return of containers increasing to 86% in 1st year of introduction, 89% in 2nd year and 92% in subsequent years.

This yielded the following results:

¹⁹ Consumer research on DRS (ibid)

²⁰ Particularly the Journal of Economic Literature

Scenario with Deposit level raised to 25p per container

Costs	£m	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Capital investment costs			971.608	182.177	121.451	-	-	-	-	971.608	182.177	121.451	-607.255
Cost of Capital - annualised			192.064	192.064	192.064	192.064	192.064	192.064	192.064	192.064	192.064	192.064	192.064
Organisational Set up costs			146.000		-	-	-	-	-	-	-	-	-
IT Installation				7.200	-	-	-	-	-	-	-	-	-
Training & familiarisation (initial)				15.000									
Central admin costs				29.800	29.800	29.800	29.800	29.800	29.800	29.800	29.800	29.800	29.800
Enforcement				1.550	1.313	1.313	1.313	1.313	1.313	1.313	1.313	1.313	1.313
Counting centre costs				20.625	24.750	26.233	30.938	30.938	30.938	30.938	30.938	30.938	30.938
Relabelling				38.666	-	-	-	-	-	-	-	-	-
RVM maintenance costs				76.152	91.383	101.537	101.537	101.537	101.537	101.537	101.537	101.537	101.537
RVM Handling (Labour) costs				52.103	62.524	66.270	78.155	78.155	78.155	78.155	78.155	78.155	78.155
Retailers opportunity costs				18.889	22.667	25.186	25.186	25.186	25.186	25.186	25.186	25.186	25.186
Retail rental Costs				14.754	17.705	19.672	19.672	19.672	19.672	19.672	19.672	19.672	19.672
Manual take-back labour costs				27.119	32.543	34.493	40.678	40.678	40.678	40.678	40.678	40.678	40.678
Logistics (post-return)				192.785	231.343	257.047	257.047	257.047	257.047	257.047	257.047	257.047	257.047

Total Cost	0	1,309.672	676.821	635.478	561.550	584.325	584.325	584.325	1,555.933	766.502	705.776	-22.93
	0	338.064	686.708	706.091	753.614	776.389	776.389	776.389	776.389	776.389	776.389	776.389

NPV_C (2021-32)	£6,391 m
	£6,182 m
EAC (2021-32)	£639.03 m
	618.09 m

- (i) For the On-the-Go option, given the manner in which these drinks are purchased and consumed often whilst people are in transit together with the smaller number of RVMs installed under this scenario, it could be argued that there would be less likelihood that high return rates would be achieved. A sensitivity analysis scenario with this parameter was run with a recycling rate of 77%. This was chosen simply as representing approximately halfway between the current recycling rate for drinks containers and the expectation of reaching an 85% recycling rate in the main On-the-Go option.

Total Economic Costs of DRS On-the-Go RR at 77% m

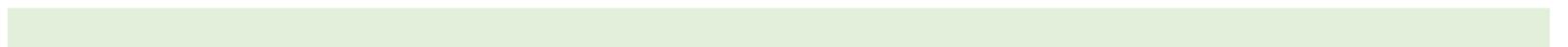
Costs	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Capital investment costs		£564.52	£105.85	£70.57	£0.00	£0.00	£0.00	£0.00	£0.00	£564.52	£105.85	£-362.91
Organisational Set up costs			£146.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
IT Installation			£7.20	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
Central administration costs			£15.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
Train'g & familiarisation			£29.80	£29.80	£29.80	£29.80	£29.80	£29.80	£29.80	£29.80	£29.80	£29.80
Counting centre costs			15.88	£18.94	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
Relabelling			18.62	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00	£0.00
RVM Handling costs			£26.22	£31.46	£34.95	£34.95	£34.95	£34.95	£34.95	£34.95	£34.95	£34.95
RVM maintenance costs			£45.49	£54.59	£60.66	£60.66	£60.66	£60.66	£60.66	£60.66	£60.66	£60.66
Opportunity costs			£9.44	£11.33	£12.58	£12.58	£12.58	£12.58	£12.58	£12.58	£12.58	£12.58
Retail rental Costs			£8.12	£9.74	£10.83	£10.83	£10.83	£10.83	£10.83	£10.83	£10.83	£10.83
Manual take-back labour costs			£8.78	£10.54	£11.71	£11.71	£11.71	£11.71	£11.71	£11.71	£11.71	£11.71
Logistics			90.64	108.77	120.86	120.86	120.86	120.86	120.86	120.86	120.86	120.86
Total Cost	£0.00	£564.52	£401.90	£236.97	£160.53	£160.53	£160.53	£160.53	£160.53	£725.06	£266.38	£-202.37

NPV_C (2021-32) **2,290.16**

EAC_B (2021-32) **228.98**

£m												
Benefits	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Reduction of disamenity from litter	0.00	0.00	307.59	369.11	410.12	410.12	410.12	410.12	410.12	410.12	410.12	410.12
Net material revenue	0.00	0.00	7.46	8.95	9.94	10.56	11.10	11.44	11.84	12.30	12.78	13.23
Direct costs of litter clean-up savings	0.00	0.00	17.12	20.54	22.82	22.82	22.82	22.82	22.82	22.82	22.82	22.82
GHG emissions:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
savings from recycling	0.00	0.00	0.42	1.08	2.00	2.33	2.68	3.05	3.44	3.86	4.39	4.96
increase from additional transport		0.00	-0.88	-0.96	-1.15	-1.53	-2.28	-2.67	-3.13	-3.22	-3.60	-4.06
Total Benefit	0.00	0.00	£ 331.70	398.72	443.74	444.30	444.44	444.76	445.09	445.88	446.51	447.07

NPV (2021-32) **£3,313.15**



Benefits - Costs												
B - C	0.00	-564.52	-70.20	161.75	283.20	283.77	283.91	284.23	284.55	-279.18	180.13	649.45
NPV_{B-C}	1,058.80											
BCR	1.447											