

Packaging Waste Recovery – A European comparison



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Acknowledgement:

CIWM would like to acknowledge the valuable contribution made to this report by survey respondents, case study authorities and organisations, and members of the steering group.



Executive summary

This report examines the UK's market based approach to packaging waste recovery in the context of three other European Member States: Republic of Ireland, Germany and Denmark. Almost 20 years after initial implementation, the study considers how well the system operates alongside the wider aims of a more resource efficient, circular economy.

Compliance schemes

In the UK, Ireland and Germany producer compliance schemes are in place but the system in Ireland is not designed to be competitive. Denmark has no producer compliance as such but there is a compulsory deposit and return system for beverage containers; there is a similar deposit and return system in place in Germany that runs in parallel to the producer compliance scheme.

The compliance schemes in the UK, Ireland and Germany cover both commercial and household packaging waste. In Germany, commercial waste producer participation is limited to those that produce waste similar to households and the system excludes transit packaging.

Costs

It is challenging to compare the costs across systems due differences in approach and data availability. Compliance costs in the UK appear to be at the lower end as a result of competition being intrinsic to the approach. Similarly, in Germany, the costs have halved since moving from a monopoly to a competitive system.

The UK has focused on the lower cost recovery of commercial waste over household waste and this impacts on the revenue available for investment in household collection. In Ireland and Germany, systems have been designed for household collection and the revenue generated directly contributes to collection costs (a full cost model in Germany's case). This difference in approach also means local authorities have a greater role in the compliance schemes in Ireland and Germany.

Costs to producers (and hence revenue) in the UK are not fixed and depend on the price of the Packaging Recovery Notes. Costs in Ireland and Germany are more predictable for producers; in Ireland costs have remained unchanged since 2008.

Markets and infrastructure

Ireland has the greatest reliance and Germany the least, in terms of utilising export markets for packaging recovery. Ireland, Germany and Denmark have a higher dependence on energy recovery than the UK.

There is a lack of transparency about how the compliance scheme revenue has been spent in the UK and the impact

this has had on infrastructure development. In Ireland, while funding covers a high proportion of collection costs, the system appears to have had little impact on domestic recovery infrastructure. In Germany, the low reliance on export suggests that the system has impacted on domestic recovery infrastructure.

The deposit and return systems in Germany and Denmark support the infrastructure for closed loop recycling of the beverage container element of the packaging stream.

Reporting

There is current and accurate data on tonnage recovery in the UK, but there is a time lag in terms of equivalent data for Ireland and Germany.

Aside from recovery figures, information available is mixed and often only available to regulators and compliance schemes. In the UK and Ireland there is openness with respect to most producer costs but this information is confidential in Germany. While producers in Ireland and Germany cover the full costs of collection and recovery, the contribution made by UK producers is not clear.

Performance comparison

The Packaging Directive targets are being met in all the countries examined, demonstrating that the targets can be met through a variety of approaches. However, the complexity underlying packaging waste recovery, for instance in terms of coverage, funding mechanisms, role of local authorities and other national waste policy, makes it hard to draw direct comparisons or definitive conclusions regarding differences in performance across the countries examined.

The UK system achieves the minimum required targets and provides a compliance solution at a competitive cost to producers and without unfair burden on small producers. Conversely, there is no full cost recovery, a requirement of 'true' extended producer responsibility, and collection of household waste appears not to be supported to any significant degree. In addition, there is no driver to exceed targets, and the price fluctuations of the Packaging Recovery Notes impacts on market prices and the level of revenue uncertainty make it difficult to plan infrastructure. The reliance on export in the face of market uncertainty further undermines infrastructure development.

As with the UK system, there are strengths and weaknesses to each of the other systems considered; however, there are features of implementation that could be considered were the UK to conduct a review in terms of approach. In order to align with ambitions for a circular economy, consideration should be given to whether the regulations are fit for purpose for the future and achieve the requirements of extended producer responsibility, including transparency at all levels and full cost recovery.



Introduction

This report examines the UK's market based approach to packaging waste recovery in the context of other European Member States. Almost 20 years after initial implementation, the study considers how well the system operates alongside other policy instruments and the wider aims of a more resource efficient, circular economy.

The European Council Directive 94/62/EC on Packaging and Packaging Waste (the Packaging Directive), and subsequent revisions, was introduced to encourage the sustainable use of packaging and to meet defined targets for the recycling and recovery of packaging waste across the European Union (EU). Each member state was given freedom to define the mechanism for delivering the targets within the Packaging Directive. The Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (the Packaging Waste Regulations), and the Packaging Waste (Essential Requirements) Regulations 2003, transpose the Directive in the UK.

Extended producer responsibility

The concept of producer responsibility in Europe was first laid down in 1991 in the German Packaging Ordinance. Although not imposed by the Packaging Directive, producer responsibility was widely used in support of its implementation, both in the UK, and other European member states. Article 8 of the Waste Framework Directive 2008 set some general requirements regarding the implementation of extended producer responsibility (EPR).

The OECD defines EPR as a policy approach under which producers are given a significant responsibility – financial and/or physical – for the treatment or disposal of post-consumer products. Work was completed for the European Commission in 2014 on the development of guiding principles for EPR and Article 8 of the proposed revised Waste Framework Directive has been amended as a result (see Box 1). Some of the key themes of EPR are that systems should ensure: full cost recovery for collection, sorting and treatment; transparency at all levels of the system; and effective enforcement.

The ELV, WEEE and Batteries European Directives have used EPR as a policy approach. In the UK the collection infrastructure required for WEEE, ELVs and batteries have had to be funded by the compliance programmes on behalf of the producers of these products. In contrast, for packaging waste, a key part of the normal household and commercial waste streams, a significant financial investment is made by the public sector in the provision of the collection infrastructure for packaging waste materials.

As well as achieving recovery and recycling, the wider aims of EPR are to prevent wastes at the source and promote product design for the environment. The Packaging (Essential Requirements) Regulations are the means by which the UK aims to meet the packaging

reduction aims of the Packaging Directive. The regulations set out requirements for producers, sellers and distributors of packaging in relation to: volume; weight; ability to recover or reuse; the release of hazardous substances and presence of heavy metals.

Evolution of policy

The Packaging Waste Regulations (see Box 2) were introduced at a time where recycling levels in the UK and Europe were relatively poor and few other instruments existed to encourage recycling. Significant improvements in recycling rates have been achieved since this time, driven by EU and UK waste policy and legislation. In tandem, the policy landscape has evolved from linear waste management to resource efficiency and regard for realising the potential benefits of a circular economy.

The Packaging Directive has been subject to amendments since its introduction to stay aligned with policy, the most recent being in 2015 to require Member States to reduce use of lightweight plastic bags. The EU also launched its Circular Economy Package in 2015 and it aims to bring significant benefits: sustainable growth and job creation, reduced greenhouse gas emissions, direct savings linked with better waste management practices, and a better environment. Within the package a proposal has been adopted to increase the targets for packaging waste.

The current and proposed European and UK targets for recycling and packaging, and reduction of waste to landfill, are being introduced to drive the ambition to achieve a circular economy (the current targets are given in Table 1). The UK has packaging targets that apply only to obligated businesses; the targets are based on what is required in terms of national level recycling and recovery and take into account the tonnage of materials placed on the market.

The proximity principle remains core to our approach to waste management; to minimise the environmental impact, reduce transport costs and to ensure duty of care in the management of waste. Circular economy thinking also recognises the importance of channelling more waste materials back into the domestic economy. Currently, the market for recyclates in the UK means that export outside of the UK, and Europe, provides an important route for packaging waste recovery. It is argued that export of material for recovery undermines the potential financial viability of recycling and recovery facilities in the UK and the development of a domestic circular economy.

Changing financial landscape

One further consideration in the examination of packaging waste recovery in the UK is the changing fiscal landscape in which waste management has to be delivered by the public sector. Local authorities have been heavily impacted by austerity, with 69% of respondents to a recent CIWM survey¹ stating that their department's budget had been



Box 1 General requirements of EPR set down in Article 8 of Waste Framework Directive

- Define in a clear way the roles and responsibilities of producers, organisations implementing EPR on their behalf, private or public waste operators, local authorities and, where appropriate, recognised preparation for re-use operators.
- Define measurable waste management targets, in line with the waste hierarchy, aiming to attain at least the quantitative targets relevant for the scheme.
- Establish a reporting system to gather data on the products subject to EPR. Once these products become waste, the reporting system shall ensure that data is gathered on the collection and treatment of that waste.
- Ensure equal treatment and non-discrimination between producers with regards to small and medium enterprises.
- Take the necessary measures to ensure that the waste holders targeted by the EPR schemes established are informed about the available waste collection systems and the prevention of littering. Also take measures to create incentives for the waste holders to take part in the separate collection systems in place, notably through economic incentives or regulations.
- Take the necessary measures to ensure that organisations set up to implement EPR obligations on behalf of producers have:
 - A clearly defined geographical, product and material coverage.
 - The necessary operational and financial means to meet its EPR obligations.
 - Put in place an adequate self-control mechanism, supported by regular independent audits, to appraise the organisation's financial management and the quality of data collected and reported.
 - Makes publicly available the information about: its ownership and membership; the financial contributions paid by the producers; the selection procedure for waste management operators.
- Take the necessary measures to ensure that the financial contributions paid by the producer to comply with its EPR obligations:
 - Cover the entire cost of waste management for the products, including: costs of separate collection, sorting and treatment operations; costs of providing adequate information to waste holders; costs of data gathering and reporting.
 - Are modulated on the basis of the real end-of-life cost of individual products or groups of similar products, notably by taking into account their re-usability and recyclability
 - Are based on the optimised cost of the services provided where public waste management operators are responsible for implementing operational tasks on behalf of the EPR scheme.
- Establish an adequate monitoring and enforcement framework with the view to ensure that the producers are implementing their EPR obligations, the financial means are properly used, and all actors involved in the implementation of the scheme and report reliable data.
- Where multiple organisations implement EPR obligations on behalf of the producers, to establish an independent authority to oversee the implementation of EPR obligations.
- Establish a platform to ensure a regular dialogue between the stakeholders involved in the implementation of EPR, including private or public waste operators, local authorities and, where applicable, recognised preparation for re-use operators.'

Source: adapted from proposal for a Directive of the European Parliament and of the Council amending Directive 2008/98/EC on waste - <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015PC0595>



Box 2 Packaging waste regulations in UK

England,
Wales
and
Scotland

Producer Responsibility Obligations (Packaging Waste) Regulations SI 2007/871. Amendments:

- Regulations SI 2008/1941. Revises the requirements for accrediting an exporter of packaging waste, giving the environment agencies more discretion as to what constitutes sound evidence of reprocessing.
- Regulations SI 2010/2849. Establishes waste recovery and recycling targets for 2011 and 2012 and making other technical changes.
- Regulations 2012 SI 2012 No. 3082. Includes new waste packaging recovery and recycling targets for the years 2012 to 2017 and a new set of targets for waste glass packaging for recycling by re-melt for the years 2013-2017.
- Regulations 2013 (SI 2013/1857). Amended formula for the calculation of the amount of glass packaging waste that a producer must recycle by re-melt. The amended formula ensures that the glass re-melt target is applied to a producer's glass recycling obligation.
- Regulations 2014 SI 2890. Change the recycling and the recycling by re-melt targets for glass for the years 2014, 2015, 2016 and 2017.
- Regulations 2016 SR 241. Make producer responsibility more efficient by reducing the regulatory burden on businesses.

Packaging (Essential Requirements) Regulations 2015 (revokes the 2003 Regulations as amended)

Northern
Ireland

Producer Responsibility Obligations (Packaging Waste) Regulations (Northern Ireland) SR 2007/198. Amendments:

- Regulations (Northern Ireland) SR 2008/77. Increases recovery and recycling targets.
- Regulations (Northern Ireland) SR 2008/373. Revises the requirements for accrediting an exporter of packaging waste.
- Regulations (Northern Ireland) SR 2010/396. Establishes new waste recovery and recycling targets for 2011 and 2012, strengthening reporting provisions and making other technical changes.
- Regulations (Northern Ireland) SR 2012/437. Includes new waste packaging recovery and recycling targets for the years 2012 to 2017 and a new set of targets for waste glass packaging for recycling by re-melt for the years 2013-2017.
- Regulations (Northern Ireland) 2013 SR 262. Set new recovery and recycling targets for packaging waste for a five year period from 2013 to 2017 (inclusive).
- Regulations (Northern Ireland) 2014, SR 2014/ 276. Changes the targets for recycling and for recycling by re-melt for glass for the years 2014 to 2017 (inclusive).
- Regulations 2016 SR 241. Make producer responsibility more efficient by reducing the regulatory burden on businesses.
- Regulations (NI) 2016 SR 79. Reduce regulatory burdens by removing the requirement to provide operational plans and enabling producers to delegate the signing of reporting and monitoring requirements to the most appropriate person in the company.

Packaging (Essential Requirements) Regulations 2015 (revokes the 2003 Regulations as amended)

Source: Netregs, http://www.netregs.org.uk/library_of_topics/materials__equipment/packaging/packaging_legislation.aspx, accessed May 2016



Table 1 Waste targets in Europe and the UK

Target	Europe - revised	Europe	UK (obligated business targets)	Scotland	Wales	NI
Packaging waste - recycling (and reuse)	75% by 2030	55% by 2008	72.5 % by 2017*	As UK	As UK	As UK
Packaging waste - recovery	-	60% by 2008	79% by 2017*	As UK	As UK	As UK
Recycling – municipal waste	65% by 2030	50% by 2020	50% by 2020	70% by 2025 (all waste)	70% by 2025	60% by 2020 - proposed
Landfill – all waste	10% by 2030	-	-	5% by 2025	-	-

*The packaging targets apply only to businesses obligated under the Packaging Waste Regulations

affected by reductions in central Government funding in the five years up to 2015. The CIWM survey identified that local authorities are, from the analysis completed, only half way through the funding cuts and many have chosen to delay significant budget cuts. The Government and the public sector will need to innovate in order to meet recycling targets and this may include looking afresh at the existing fiscal and regulatory tools including the Packaging Waste Regulations.

While the Packaging Waste Regulations have successfully enabled the UK to meet, and exceed, the Packaging Directive waste targets there are potential lessons to be learned from other EU members who have chosen different paths in the implementation of the Directive. This paper will compare the implementation of the regulations with three other countries taking alternative approaches to packaging compliance: Germany, Denmark and Republic of Ireland (Ireland). This analysis will be used to consider whether the regulations should be now be reviewed to help realise the circular economy and to reduce the financial burden on local authorities for waste management and to embody the core principles of EPR.

Implementation approaches

Policy and legislative drivers on packaging waste

The systems in place to meet the requirements of the Packaging Directive sit alongside other waste management regulatory measures designed to minimise waste, increase recycling and reduce waste to landfill. In line with evolving European policy, changes are also taking place at a national level. Across the four European countries there are some key similarities and differences as summarised in Table 2.

The UK, Ireland and Germany have used producer compliance schemes to deliver the requirements of the Packaging Directive. In Germany, the compliance scheme does not cover all commercial waste; commercial waste outside of the compliance scheme is still covered by regulation but there is no statutory reporting. Packaging recovery is also supported in Germany and Denmark via deposit and return systems and all four countries have some form of tax on single use carrier bags.

Variable charging for household waste is established in Germany and Denmark and is coming into place in Ireland. Mandatory collection of recyclable dry materials will be in place across all four countries but is most established in Denmark. Similarly, a landfill ban of municipal solid waste (MSW) in some form is in place across all four countries but has been in place in Denmark for the longest. Landfill tax is in place with the exception of Germany.

Characteristics of packaging producer compliance schemes

Overview

The UK has a market based system that obligates eligible packaging producers to pay for packaging waste recovery through a tradable market based evidence system using commodities called Packaging Recovery Notes (PRNs); there are multiple compliance schemes available for producers and direct compliance is also an option. Less than 10% of producers opt for direct compliance, with compliance schemes taking on the legal requirement of meeting targets on behalf of their members. PRNs are purchased by producers or compliance schemes as evidence that they have fulfilled their obligations.

In Ireland, eligible producers pay for packaging waste recovery through a single packaging compliance scheme (Repak) or via self-compliance directly with the regulator.

Table 2 Summary of policy and legislative drivers on packaging waste

Policy/legislation	UK	Ireland	Germany	Denmark
Producer compliance scheme	Yes	Yes	Yes Does not include all commercial producers.	No
Deposit and return system	No	No	Yes	Yes
Single use bag tax	Yes Single use bags.	Yes Single use bags.	Yes - voluntary Plastic bags.	Yes Plastic bags.
Variable charging for householder waste collection	No	Yes From July 2016.	Yes Implementation approach varies in different municipalities.	Yes Implementation approach varies in different municipalities.
Mandatory collection of dry recycling	Yes Paper and cardboard, plastic, glass and metal.	Yes All households in Ireland provided with bin for recycling.	Yes From Jan 2015 Introducing mandatory recycling bin for metal, plastics.	Yes Paper and cardboard (settlements with more than 1000), recyclable glass packaging waste (settlements over 2000), recyclable metal and plastic packaging waste.
Landfill ban	Mixed Ban on separately collected waste in Scotland (ban on biodegradable municipal waste from 2021).	Yes Ban on untreated MSW and packaging waste.	Yes Ban on separately collected waste materials. Ban on untreated MSW.	Yes Ban on waste suitable for incineration.
Landfill tax	Yes	Yes	No	Yes

Fees are paid to the compliance scheme or the regulator based on the tonnage of packaging produced.

Germany has the most complex system of the four countries. It operates a market based full-cost model for sales packaging. Obligated companies participate in 'Dual systems' compliance schemes and report to them the tonnage of each packaging material they have produced (licenced packaging). Compliance schemes collect money from packaging producers and distribute the money to cover the costs of recycling waste packaging from the kerbside. The system is fully financed by the obligated packaging producers and a clearing house ("Gemeinsame Stelle dualer Systeme Deutschlands GmbH") coordinates activities of compliance schemes. The system runs in parallel with the compulsory deposit and return system for

drinks containers, DPG (Deutsche Pfandsystem GmbH).

Denmark has no compliance scheme for producers. A deposit and return system for drinks packaging is run by a private non-profit organisation called Dansk Retursystem (DRS). Producers pay an annual registration fee plus an operational fee that is variable depending on the type of packaging. In addition, there was a weight based tax on packaging and on non-refillable packaging for beer and soft drinks; this was abolished in 2014 to reduce the production costs and administrative burden to producers².

Participation is obligatory in all four countries for all eligible producers including importers. In the UK and Ireland thresholds are in place that excludes smaller producers. There is shared responsibility encompassing manufacturers,



Table 3 Overview of packaging regulation by country: compliance schemes, producers obligated and deposit and return

		UK	Ireland	Germany	Denmark
Compliance scheme		PRN	Repak	Dual systems	Not applicable
Market based		Yes	No	Yes	No
Number of compliance schemes		51	1	10	-
Producers obligated	Raw material manufacture	Yes	Yes	Yes	No
	Converter	Yes	Yes	Yes	No
	Packer/filler	Yes	Yes	Yes	No
	Seller	Yes	Yes	Yes	Yes
	Importer	Yes	Yes	Yes	Yes
Threshold		50 tonnes of packaging AND have a turnover of more than £2 million per annum	10 tonnes of packaging AND have a turnover of more than €1 million per annum	None	None
Deposit and return		Not applicable	Not applicable	DPG	DRS

distributors, packers/fillers and sellers in the UK, Ireland and Germany; in Germany packers/fillers and sellers have only been included since the 5th amendments to the regulations in 2007. The Danish deposit and return system covers only sellers and importers of drinks products included in the deposit and return system.

The variations in approach are summarised in Table 3 including details of the type of packaging producers obligated under the compliance schemes in place.

Packaging coverage

The Packaging Directive covers all packaging placed on the European market and all packaging waste, whether it is used or released at industrial, commercial, office, shop, service, household or any other level, regardless of the material used.

The compliance schemes in the UK, Ireland and Germany cover both commercial and household packaging waste. In Germany, commercial waste producer participation in compliance schemes is limited to private end users; these are establishments which generate packaging waste similar to that arising from households, such as catering establishments, cinemas, leisure facilities and motorway service stations. Recovery of commercial packaging outside of scope of the compliance scheme is organised by the producers directly.

The compliance schemes in the UK and Ireland cover all packaging types (see Table 4) but transit packaging is excluded in Germany. The Germany and Denmark deposit schemes only cover primary sales packaging. In UK and

Ireland long term storage and large transport containers are specifically excluded, these exclusions are not required in Germany and Denmark as commercial waste isn't covered.

Role of local authorities

Local authorities in the UK have no formal obligations under the Packaging Waste Regulations; however, they do have an important role to play in delivering the targets through provision of collection and recycling services to householders and supplying material to reprocessors and exporters. The PRN revenue, where available, can be reinvested to improve recycling infrastructure and the collection and sorting systems, and these include those run by local authorities.

In Ireland, local authorities are the regulators of producer compliance and can also be registered reprocessors. Local authorities were involved in the design and development of the regulations and the implementation of the systems³.

In Germany, where compliance schemes are directly responsible for householder recycling of packaging, compliance schemes must coordinate with municipalities (local authorities) on waste management systems before approval will be granted. Local authority collections therefore work alongside dual systems activity⁴.

Municipalities in Denmark are responsible for all the waste arising within their boundaries and hence the recycling of the majority of packaging waste (excluding packaging covered by the deposit and return system).



Table 4 Packaging waste included under compliance schemes and deposit and return systems

Packaging type	Definition	Examples	UK	Ireland	Germany	Denmark
Primary (sales)	Packaging that constitutes a sales unit to the final user or consumer at the point of purchase.	Plastic bottle, beverage carton	Yes	Yes	Yes	Yes
Secondary (grouped)	Packaging that constitutes a grouping of a certain number of sales units and which can be removed from a product without affecting the product's characteristics.	Plastic bag, cardboard box	Yes	Yes	Yes	No
Transit/transport/tertiary	Packaging that facilitates handling and transport of a primary or secondary packaging to prevent damage from physical handling and transport (but not including road, rail, ship, air containers).	Pallets	Yes	Yes	No	No
Other packaging excluded			Long term storage and large transport containers	Long term storage and large transport containers	Deposit and return: containers greater than 3 litres capacity. Exempt beverages include: milk, juices, wine, and spirits.	Containers greater than 20 litres or made fiberboard. Exempt beverages include: juice, cocoa, wine and spirits.

Financial mechanisms

UK producers are required to register with the local environment agency; the registration fee is lower if this is done via a compliance scheme and is lower for small and medium sized enterprises (SME). Compliance schemes charge annual membership fees that can vary according to the tonnage obligation.

An eligible producer in the UK must calculate their tonnage obligation; the obligation is calculated by working out their share of responsibility (see Table 5) (many producers perform more than one activity) and then multiplying this by the relevant recovery or recycling target and the tonnage of packaging related to each activity (see Figure 1).

UK Producers are required to purchase PRNs (or Packaging Export Recovery Notes (PERN)) as evidence

that recycling or recovery has been carried out equivalent to their obligation. Each PRN applies for one tonne of material. The costs of PRNs are highly variable as illustrated in Figure 2 and the volatility of PRN prices has been a criticism of the system; however, competition in the UK system has kept prices down for producers⁵.

In Ireland, producers who become a 'self-complier' must register with every local authority in which they operate, e.g. if nationwide retailer, and there is an annual fee per tonne of packaging waste. The alternative to self-compliance is the Repak compliance scheme. Repak is a privately owned, non-profit company that is currently the only compliance scheme in Ireland. Repak defines different member types.

'Regular members' pay fees based on packaging tonnage



Table 5 Shared responsibility

Activity	Example	Share of responsibility
Raw material manufacture	Sheet metal manufacturer	6%
Converter	Can manufacturer	9%
Packer/filler	Food manufacturer	37%
Seller	Retailer selling goods to the public	48%
Importer	Bringing in packaging or packaged goods from outside the UK	Rolled up obligation

Source: Advisory Committee on Packaging (2016) PRN System Guide. ACP

statistics supplied for the previous year. In common with the UK, Repak operates a shared responsibility fee that includes five stages (materials manufacturer, converter (makes or imports (empty) packaging), distributor, brand holder/importer, and retailer). Producers may be active on several or all stages of the chain and are required to pay fees for each stage. Variable fees apply to individual material types and for each stage in the shared responsibility chain (see Table 6). The final cost to the producer is therefore made up of all the activities they are involved in for all of the packaging that they handle.

'Scheduled members' are producers who retail directly to consumers but who are not brand holders or importers of the products sold on-site e.g. independent retailers, pubs and hotel; scheduled members pay a fixed fee based on

Figure 1 UK producer calculation of obligation



Source: Advisory Committee on Packaging (2016) PRN System Guide. ACP

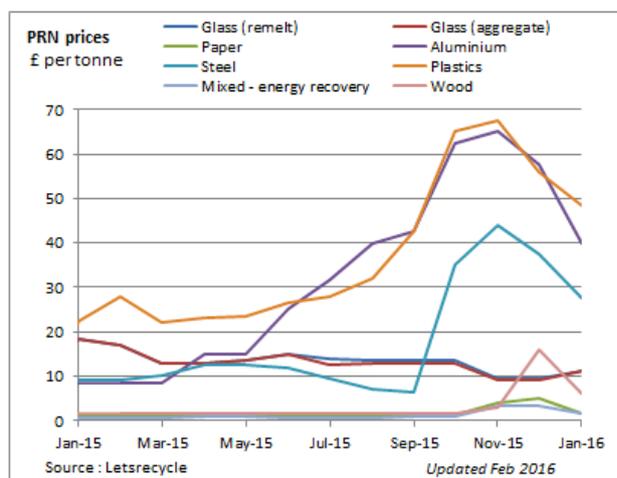
Table 6 Repak regular membership fees

	Paper	Glass	Aluminium	Steel	Plastic	Plastic bottles	Wood	Paper composite
Materials Manufacturer	€2.05	€2.05	€2.05	€2.05	€2.05	€2.05	€2.05	€2.05
Converter	€2.05	€2.05	€2.05	€2.05	€2.05	€2.05	€2.05	€2.05
Distributor	€2.05	€2.05	€2.05	€2.05	€2.05	€2.05	€2.05	€2.05
Retailer	€4.10	€4.10	€4.10	€4.10	€4.10	€4.10	€4.10	€4.10
Brand holder/ Importer	€22.73	€9.18	€83.62	€78.51	€89.16	€89.16	€10.60	€75.78
Total	€32.98	€19.43	€93.87	€88.76	€99.41	€99.41	€20.85	€86.03

Source: Repak, <https://www.repak.ie/regular-membership-fees/>, accessed April 2016

turnover⁶. Member fees have been fixed at 2008 levels and it is intended that they will remain at this level until 2018.

Figure 2 PRN Prices January 2015 – January 2016



Source: <http://www.wrap.org.uk/content/prn-prices>, accessed April 2016

Table 7 Annual costs – compliance schemes

	UK	Ireland	Germany - compliance scheme
Administrative fees	<p>Regulator annual fee: £345-£564/SME £564-£776/producer This fee can be covered by membership fee with a compliance scheme.</p> <p>Estimated total £5m</p> <p>Compliance scheme annual fee:</p> <p>These vary e.g. Valpak £375-£2,500</p> <p><i>Source: environment agencies and Valpak website, accessed April 16</i></p>	<p>No regulator fee.</p> <p>Compliance scheme administration costs rolled up with material obligation. Repak minimum fee £773</p> <p>Repak administration costs before exceptional items were £3.45m (€4.389m for 2014 (2013: €4.144m)).</p> <p><i>Source: Repak, 2015</i></p>	<p>Annual administrative costs for clearing house estimated to be around €1.1 million.</p> <p><i>Source: study communication, 2015</i></p>
Compliance scheme - material fee	<p>Various – dependent on price PRN</p>	<p>Repak: £1.62 - £78.31 / tonne Local authority: €15 per tonne of packaging waste supplied. There is a minimum fee of €500 and a maximum fee of €15,000.</p> <p><i>Source: Repak website, local authority websites, accessed April 16.</i></p>	<p>Minimum free €140.00 per year.</p> <p><i>Source: Cojocariu, 2013</i></p>
Income and costs	<p>PRN revenue c.£1/capita</p> <p>PRN revenue: £62.1m - 2012 £111.5m- 2013 £63.8m - 2014 £64.2m -2015</p> <p><i>Source: NPWD, 2016</i></p>	<p>Compliance scheme income c.£4/capita</p> <p>Compliance scheme income from producers: £19.0m - 2014 (€24.3m)</p> <p>Other information:</p> <ul style="list-style-type: none"> Self-compliance income: c.£0.6m– 2012 (€0.8m (estimated based on tonnage packaging placed on market = 54,525 tonnes. x €15/tonne = €817,875)) <p>Cost per tonne: £28.3/tonne – 2012 (€35.6) £36.5/tonne - 2010 (€45.6) Self-compliers £15.1-£106.8 (€19.4/tonne - €137/tonne)</p> <p><i>Source: Repak, 2015; RPS et al, 2014</i></p>	<p>Dual systems turnover c.£9/capita</p> <p>Dual systems turnover: £750m (€900m-€1 billion)</p> <p><i>Source: Eunomia, 2011; PAC Next, 2014; Gandenberger, C et al, 2014</i></p>

Source: sources given in table; currency conversion €0.78 = £1 (www.xe.com (Apr 16)); population figures from Eurostat



Germany has 10 compliance schemes but Der Grüne Punkt – Duales System Deutschland GmbH (DSD) has 40% of the market share⁷. Until 2005 DSD was the only compliance scheme and was non-profit. In 2002 the Federal Competition Office in Germany announced that the DSD monopoly would end and be replaced by a competitive system. Licence fees are paid by producers to compliance schemes per tonne of packaging. Due to the competitive nature of the German system, up to date cost information is not available; however, since moving from a monopoly to a competitive system it is reported that there has been a cost reduction of over 50%. The cost savings have been attributed to competition and improved recycling and sorting technology^{8,9}.

The DPG organises the deposit and return system in Germany and is financed by membership fees paid by producers and collectors. All organisations involved have to sign a contract with the DPG to be authorised to take part in the management of the deposit and return system.

DRS has the exclusive right to operate the deposit and return system in Denmark, the operating efficiency is reviewed every few years to assess whether the company will be granted a new licence. Producers must register with the DRS and are liable for a registration fee and operating fees which are dependent on the packaging type and amount of packaging. Producers (producers, importers, and distributors) must register with DRS if they wish to sell beverage products that are included in the scope of the deposit and return system. The product must also be registered with the scheme before it can be sold on the Danish market. The operating fee must be paid for each item of packaging; the fee is generally payable every 4 weeks for each individual item of packaging sold and is based on the reports of actual sales. DRS had a turnover of 1.5 billion Danish Kroner or £158 million in 2014¹⁰. Some environmentally conscious retail chains and producers have also introduced deposits on packaging that is not

included in the DRS, for example on wine and water bottles.

The different ways selected to finance collection, sorting and recovery system combined with the lack of transparent information makes it very difficult to compare the relative financial burden on producers, and government, in the different member states. Table 7 illustrates that the costs to producers are lower in the UK than in Ireland or Germany. There is greater certainty about the level of financial obligation for producers in Ireland and Denmark, compared to the UK and Germany, as fees are fixed. In Germany there has been a cost decrease from approximately €2 billion per year from 1995-2000 to approximately €1 billion per year since 2008¹¹.

Compliance and enforcement

Performance against targets

Table 8 gives the Packaging Directive and country specific targets set for packaging recovery. The Packaging Directive was revised in 2004, increasing the overall targets and setting material specific targets. Countries can exceed the maximum recycling targets as long as they avoid market distortions or hampering other member states' efforts to comply. The German Packaging Ordinance initially had adverse consequences on other member states due to insufficient national capacity to process the amount of packaging requiring recycling. Large amounts of materials, mainly paper, were transported to other EU countries and the Far East¹².

All countries have set recovery targets higher than those in the European legislation. Only Ireland has set a higher recycling rate and this is via the targets imposed on Repak by the Irish government rather than those in the legislation.

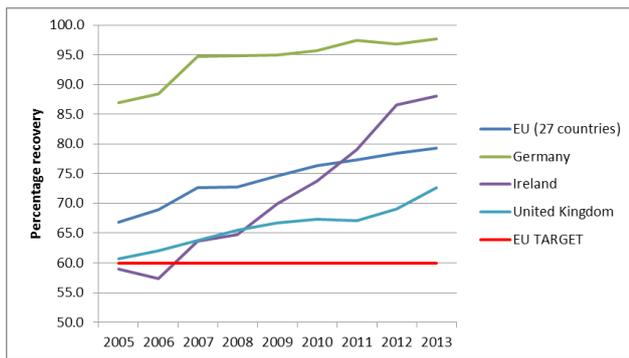
The targets in the UK are not directly comparable with those set in the other countries as they are targets

Table 8 Packaging waste targets

Target	European Directive 94/62/EC	European Directive 2004/12/EC	UK (2016 business targets)	Ireland (legislation)	Ireland (Repak)	Germany	Denmark
Recycling target - min	25%	55%	-	55%	70%	55%	55%
Recycling target - max	45%	80%	71.8%	-	-	-	80%
Recovery target - min	50%	60%	78%	60%	75%	65%	90%
Recovery target - max	65%	-	-	-	-	-	-
Year to achieve targets	2001	2008	2008	2011	2008	2008	2008



Figure 3 Packaging recovery rates 2005–2013



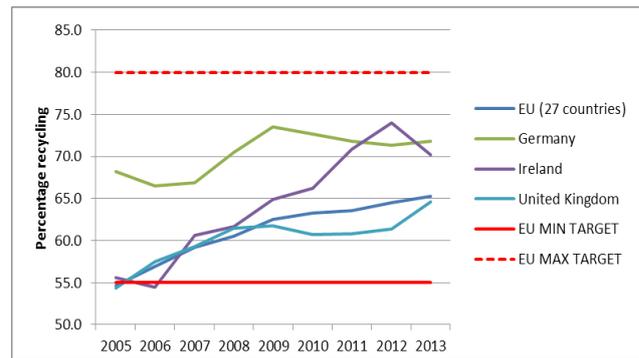
Source: Eurostat

imposed on obligated producers; the targets are set higher to account for producers below the threshold for obligation. The UK targets are kept under review by Defra; there have been several changes to the business targets in recent years, most recently in February 2016 for plastics and glass.

As can be seen in Figure 3 and Figure 4, both the recovery and minimum recycling targets were being met before the 2008 deadline and rates have continued to increase.

The Danish figures were omitted as data for some years appears to be anomalous. As packaging waste is not covered by producer responsibility Danish figures for packaging waste have historically been included within MSW figures. A new data system for waste was introduced in 2010, one of the aims was to improve data quality on the recovery and recycling of packaging¹³; this may explain the apparent irregularities in the data. According to Eurostat figures in 2013 Danish recovery of packaging was 86%, and recycling 65%.

Figure 4 Packaging recycling rates 2005–2013



Source: Eurostat

Ireland was not required to meet the targets until 2011 due to target derogation from the EU, but achieved the target in advance. Recycling and recovery rates are highest in Germany and Ireland but none of the countries have yet met or exceeded the 80% maximum recycling target.

The 2004 Directive introduced more challenging material specific targets as shown in Table 9. The country level material specific targets are on a par with those set in 2004 or 10-20% higher, the exception being the target set in Ireland for wood which is considerably higher. As previously mentioned, the UK targets are higher as they only apply to obligated producers. As an example, the business recycling target for wood for 2016 of 22% was set to achieve a national recycling rate of 19.2%¹⁴.

Material recycling rates from 2013 are given in Table 10 with a comparison between targets and recycling rates is given in Figure 5. The comparison for the UK is not equivalent to the other countries due to the difference between business targets and national achievement. That being said, the UK has exceeded even the business target for paper and cardboard. Ireland, Denmark and

Table 9 Material specific packaging recycling and recovery targets

Material	UK					
	EU	(2016 business targets)	Ireland (legislation)	Ireland (Repak)	Germany	Denmark
Paper and cardboard	60%	69.5%	60%	80%	70%	60%
Glass	60%	77%	60%	75%	75%	80%
Metals	50%	-	50%	65%	-	50%
Steel	-	75%	-	-	60%	-
Aluminium	-	52%	-	-	70%	-
Plastic	23%	49%	23%	50%	36%	23%
Wood	15%	22%	15%	90%	15%	15%



Table 10 Packaging recycling rates by material 2013

Material	EU	UK	Ireland	Germany	Denmark
Paper and cardboard	84.7	89.4	79.1	88.2	85.4
Glass	72.6	68.3	80	88.7	77.7
Metals	74.2	57.4	79.1	93.2	57
Steel	-	60.9	-	93.7	-
Aluminium	-	43.4	-	89.3	-
Plastic	37.3	31.6	40.1	49.4	36
Wood	36	42.3	81.6	25.5	46.6

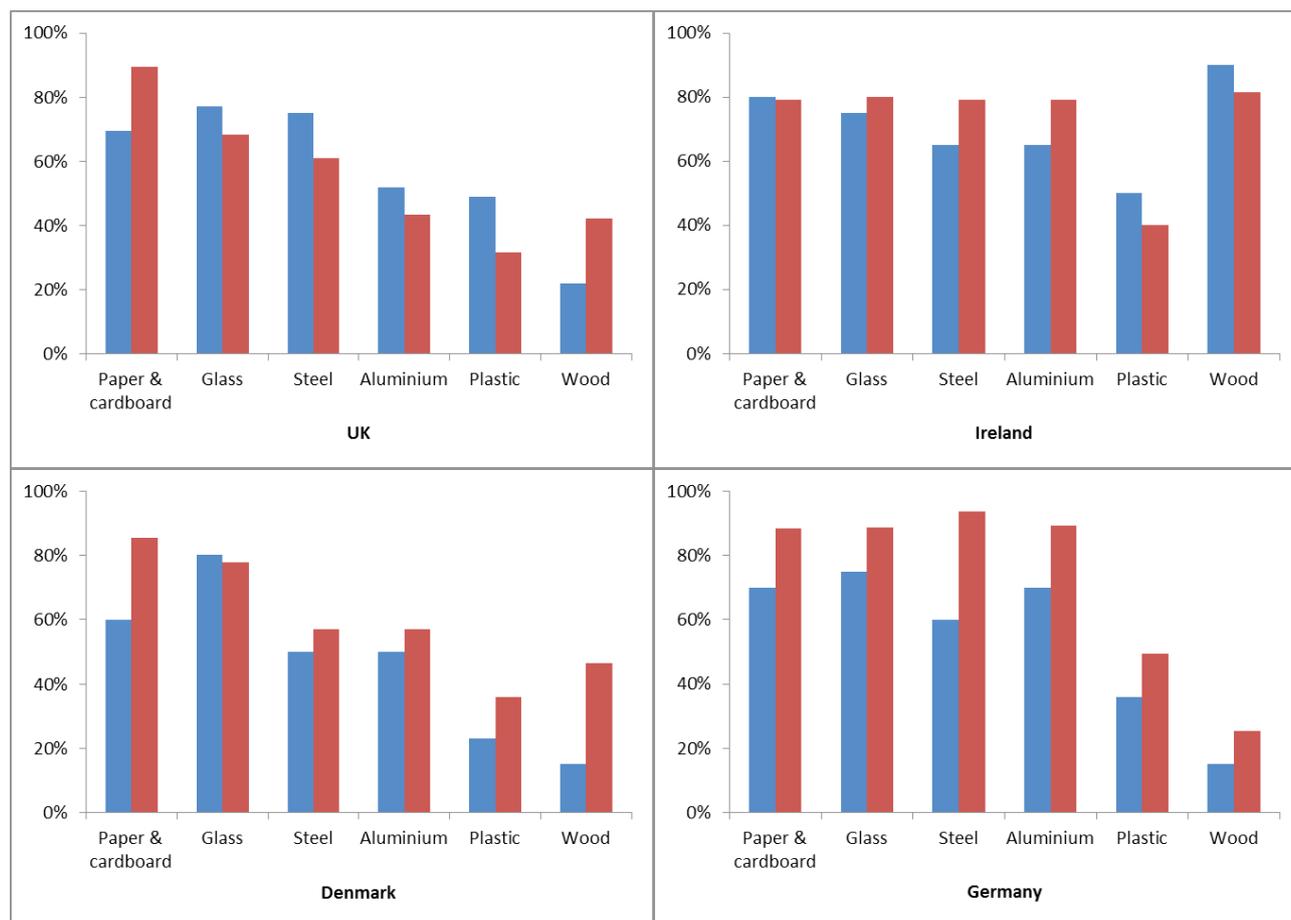
Source: Eurostat

Germany have met their material specific targets. Ireland has met the targets set in the legislation but not the more challenging targets set by the Irish government for Repak for paper and cardboard, plastics and wood.

The UK system does not specifically target waste from different sources. As a result UK collection is

focused on the lowest cost waste streams and these are predominantly from commercial sources¹⁵. In Germany and Ireland the systems are designed so there is collection from households as well as commercial sources. In Ireland the Repak strategy has been to target the heavier packaging waste as this is the most cost-effective source¹⁶. The focus in Germany has been

Figure 5 Targets vs. recycling rates 2013



Key: blue = % target; red = % recovery rate

Source: Eurostat (NB no separate figures for aluminium and steel recycling available for Ireland and Denmark – figure used in metal recycling rate)

lightweight packaging and paper and plastic; glass being collected by the deposit and return system and at bring banks.

Enforcement

Enforcement is carried out by national or regional governments with reviews of data reported and audits used to review compliance. All regulators have power to take enforcement action including financial penalties (see Table 11). In Denmark the tasks and functions of the deposit and return system are regulated by the Danish Environmental Protection Agency.

In the UK the cost of administration is ring fenced and is covered directly through registration fees (see Table 7); this includes registration fees paid by both packaging producers and schemes, alongside accreditation charges from reprocessors or exporters.

Non-compliant producers and 'freeriding' producers put

compliant producers at a competitive disadvantage and skew the accuracy of recovery reporting. Free-riding in Germany, estimated to be 23% in 2011¹⁷, is the subject of debate in Germany and the regulations were amended in 2014 to close a legal loophole that had meant sales packaging volumes not being declared. The weight of the lightweight material collected at the household level has been almost double the weight of the licensed lightweight packaging. The difference has been attributed to undeclared sales packaging, non-licensed packaging material as well as contamination¹⁸.

There was no evidence found to suggest one system is better at ensuring compliance than the other; however, the UK system appears to be the most transparent in terms of the publically available information and having specific requirements on the regulators to monitor free-riding.

There are increased concerns about the level of waste crime in the UK and it is more challenging to ensure duty of care is being upheld when waste is exported.

Table 11 Enforcement and compliance systems

	UK	Ireland	Germany
Regulators	Environment Agencies (EA, SEPA, Natural Resources Wales, Northern Ireland Environment Agency)	Local authorities.	Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. 16 provincial governments – waste disposal authorities Clearing house enforces scheme data accuracy.
Accrediting compliance schemes	Compliance schemes must register with a regulator. Regulators monitor compliance with Regulations of compliance schemes.	Any person or body corporate may apply for approval to the Minister of the Environment to operate as an "approved body". Repak is the only compliance scheme and is granted approval until 2018.	Dual systems must obtain a licence in each of the 16 provincial governments. To obtain a licence in each province the dual system must have a signed agreement with each local authority in the province.
Actions possible	Suspension of accreditation. Enforcement undertakings; monetary penalties; prosecution.	Enter and inspect premises. Serve a notice and require the production/ or proof of compliance. Prosecution and recovery of costs; monetary penalties; jail sentence.	Monetary penalties.
Accrediting reprocessors and exporters	Applications via National Packaging Waste Database (NPWD) Public register on NPWD. Inspections/audits.	Repak registered recovery operators enter into standard contracts. External audits to review subsidy claims.	Municipalities operate commercial tenders with waste management companies with input from compliance schemes.



Table 12 Reporting arrangements

	UK	Ireland	Germany
Reporting – data available	NPWD (https://npwd.environment-agency.gov.uk/Public/PackagingHome.aspx) Data shows waste accepted for UK and overseas reprocessing and total PRNs/PERNS issued.	National Waste Report by EPA includes section on packaging waste but runs 2-3 years behind. Repak Annual reports - 1-2 years behind.	DOC Register (http://www.ihk-ve-register.de) holds data on DOCs and dual systems which is all submitted online. Database only available to waste disposal authorities as regulators. Federal Statistics Office of Germany (https://www.destatis.de/EN/Homepage.html) provides figures on sales packaging collected and recovered.
Reporting – frequency	Monthly reporting by reprocessors. Quarterly public reporting by regulators.	Quarterly reporting by producers. Online data submission. Annual reporting by Repak.	Quarterly reporting by compliance schemes (producers can also declare monthly or annually by agreement – frequency depends on packaging volume and compliance scheme preferences). Annual Declaration of Completeness (DOCs) required if 1 of 3 thresholds is exceeded: more than 80 tonnes/annum glass; more than 50 tonnes/annum paper/cardboard/carton packaging; or more than 30 tonnes/annum aluminum, steel, plastics and composites.
Reporting – audits	Yes – producer data audited by regulators	Yes - Repak subject to annual audit and Repak audits members.	Yes – compliance schemes subject to independent audit quarterly.

The environment agencies are responsible for regulating export of waste in accordance with the European Waste Shipment and the UK Transfrontier Shipment of Waste Regulations. The Environment Agency ran an awareness campaign in 2014 on the need for exporters to ensure that the destination can lawfully accept the waste. Repak reviews audit information provided by registered recovery operators where facilities are being used outside of the European Union; this is to ensure they are broadly equivalent to European Union environmental standards.

Reporting mechanisms

Producers and compliance schemes are generally subject to quarterly reporting and data is held by the regulators, as well as the compliance schemes (see Table 12).

As with all waste data there are issues that impact on the accuracy, and comparability, of the data:

- **Transparency:** the UK reporting mechanism provides

the greatest transparency and most up to date data. In Germany and Ireland only regulators have access to quarterly data and there is a time lag before figures are reported.

- **Non-compliance/free riders:** as mentioned above there is potential for fraud across all the compliance schemes and this can lead to inaccuracies in reporting.
- **Double counting:** in Ireland packaging claimed to be recovered by self-compliers may include packaging which is also claimed by a waste operator; Repak conducts audits to mitigate the risk of double-counting, but it is thought that the lack of visibility on the arrangements between self-compliers and waste operator may limit the effectiveness of this audit¹⁹.
- **Overestimating/underestimating;** for example:
 - As highlighted above, the collection infrastructure provided for household packaging in Germany is

used for recyclable items which are not packaging as defined by the regulations e.g. plastic cups, spoons.

- According to the ACP²⁰ the system in the UK may not capture all the evidence from material that has been recycled. It is thought that some PRNs might not be issued because the value of some material PRNs are not high enough to cover the administrative cost.
- Thresholds in the UK and Ireland mean not all reprocessors and exporters need to become accredited which can lead to underreporting.
- As highlighted above, a legal loophole in the German regulations meant that sales packaging wasn't being declared.
- **Inconsistent reporting:** at a European level a recent CIWM report²¹ highlighted the inconsistencies in the way that recycling is measured across Europe making member state comparison difficult.

£3.5 billion in 2013/14²³, these figures demonstrate that investment is insignificant compared to overall costs. The amount of funding that flows from the PRN system directly to local authorities is not known but according to the ACP is a rarity²⁴; there is no mechanism by which local authorities can bid for PRN funding, so it remains at the discretion of producers as to whether they allocate the funds. It is argued that local authorities do receive a benefit via PRN revenue being used to support the price they pay reprocessors. The lack of transparency around the distribution of revenue from PRN system is one of the criticisms highlighted by stakeholders of the system.

The proportion of revenue Repak spent on recycling and recovery in Ireland in 2014 was £15.74m; this equates to £19.38 per tonne. The Repak Payment Scheme is the system of subsidies payment to approved Recovery Operators to fund the recovery and recycling of packaging waste that is sourced from industry and households (via bring bank and kerbside collection networks). Local authorities can be approved Recovery Operators. The recovery is funded using separate subsidy rates and the level of subsidy is based on the material type and source, and whether the material was recovered or recycled.

In 2014, average subsidies paid to recovery operators in Ireland were £49.86 (€64.22) per tonne for household recycling, £9.64 (€12.42) per tonne for commercial recycling and £1.95 (€2.51) per tonne for recovery (waste to energy) across all packaging material types²⁵. Household waste collection is being subsidised in preference to commercial recycling; the subsidy covers approximately 17% of the cost of managing commercial waste and 36% of the cost of managing household waste²⁶. In 2014, 82% of Repak's income was spent on recycling and recovery; 77% of this expenditure was on household recycling but this only generated 30% of the 812,046 tonnes recovered.

Outcomes of Packaging Directive implementation

Investment in collection and reprocessing infrastructure

UK PRN revenue in 2014 was £63.8 million, equating to £8.70 per tonne, and the revenue specifically identified as being spent on infrastructure and capacity and funding collection was £36.9 million²². Given in England alone, the cost of local authority waste management was around

Table 13 Investment in infrastructure

	UK 2014	Ireland 2014
Revenue spent on recycling and recovery	£63.8m*	£15.74 million (€20.279 million)
Tonnage recovered	7,330,685	812,046
Funding per tonne	£8.70	£19.38
Funding per capita	£0.94	£3.42
Accredited reprocessors	360	101
Of which local authorities	0	9
Third party outlets (including facilities in Europe and further afield)	Not known	c.700

*£63.8m is the total PRN revenue and not all of this will have necessarily been channeled to direct recycling and recovery.

Source: NPWD, 2015; Repak, 2015; Eurostat, 2015 (population figures)



In 2012, total household waste recovery was 773,037 tonnes, while the packaging waste recovered was 243,000 tonnes, 31% of the total.

Table 13 shows comparative information for the UK and Ireland for 2014.

In Germany the compliance schemes organise the kerbside collection of waste packaging directly from households. The clearing house coordinates activities of compliance schemes; all compliance schemes are equal partners. Costs for collection are allocated to compliance schemes on the basis of market share. There is consultation with municipalities over method and frequency of collection and payment to local authorities for container sites, cleanup and communication. The household packaging waste collection consists of a yellow bin/sack for lightweight packaging (plastics, metal, drinks cartons), which is fully paid for by dual systems, and a designated bin for mixed paper and card, of which 25% is paid for by dual systems²⁷. Municipalities operate commercial tenders with waste management companies to collect the material, including the lightweight packaging fraction, with input from compliance schemes; the mechanism is believed to have resulted in increased investment in infrastructure.

Beverage containers within the deposit and return system are returned manually or via reverse vending machines at shops and supermarkets; some reverse vending machines are fitted with compactors. The containers are transported to counting centres where they are registered, counted and sorted. The material is owned by the retailers to whom the containers are returned and material is sold back to container manufacturers.

In Denmark, in the absence of compliance schemes, most packaging waste is collected for recycling via

municipal collection schemes, typically bring-banks or kerbside collection. Local authorities are responsible for all waste produced within their geographical boundaries and a landfill and incineration tax is used to fund waste management and incentivise recycling.

DRS pay all shops and supermarkets a fee to cover the costs of handling beverage containers covered by the deposit and return system. Beverage containers are returned to shops and supermarkets either through reverse vending machines or manually at around 15,000 locations²⁸; the containers are then transported to counting centres run by DRS where they are registered, counted and sorted. DRS has contracts with European plants to recycle the material collected into food grade packaging. Plants are evaluated on their ability to ensure high quality recycling and are required to provide quality reports and receive site visits. Deposits related to beverage containers that are not returned are kept by DRS and spent on improving the reverse vending machines and social and environmental programmes²⁹.

Box 3 discusses the contribution that export and energy recovery makes to the achievement of targets.

While none of the systems provide total transparency about the level of investment, money from packaging regulation (compliance schemes and deposit and return) goes to fund both collection and recycling and recovery infrastructure in all four countries. Table 14 gives the estimated split in financial responsibility for collection and sorting.

In Ireland and Germany there is a direct link between the compliance schemes and funding for household packaging collection; in Germany this is a full cost model. The low reliance on export suggests that Germany has a more extensive network of reprocessing infrastructure than the other 3 countries examined;

Box 3 Reliance on energy recovery and export

Ireland, Denmark and Germany all have a much higher reliance on energy recovery than the UK, between 20-24%, versus 11% for the UK

Export of materials collected contributes to recovery targets. In the UK export of materials is managed through PERNs. As can be seen below, Ireland has the greatest reliance on export and Germany the lowest (based on figures reported to the EU). Funding is not earmarked for domestic recovery in Ireland; there is currently no glass manufacturing facility, metal smelter or paper mill in Ireland limiting their ability to recover packaging domestically.

Proportion of packaging recovery achieved via export 2013	Denmark	Germany	Ireland	United Kingdom
Packaging recovery (tonnes)	814,957	16,737,244	766,847	7,549,031
Export – recycling (tonnes)	307,265	2,040,858	516,232	3,201,269
Export - energy recovery	Not available	0	65,900	Not available
Total export	307,265	2,040,858	582,132	3,201,269
Proportion of recovery via export	38%	12%	76%	42%

Source: calculated from Eurostat figures for 2014

Table 14 Split of the financial burden of collection and sorting of household packaging 2011

Country	% collection / sorting cost borne by compliance scheme	% collection / sorting cost borne by local authority/municipality
UK*	7	93
Ireland	68-92	8-32
Germany	100	0
Denmark	2	98

Source: *Eunomia, 2011*; *UK figure is a 2005 estimate

however, Germany does also recover a greater proportion of packaging via domestic energy recovery.

Investment in education and awareness

UK reprocessors and exporters are required, as a condition of their accreditation, to report use of PRN funds each year. One of the categories of expenditure is 'The development of a communications strategy for consumers of packaging made from recyclable materials'. Expenditure in this category has steadily increased since it was introduced as a category in 2010. As part of Repak's approval from the Irish government they are committed to a series of campaigns targeted at business and households to

increase recycling. The scope of the campaigns is similar to those taking place in the UK (see Box 4) but differ in that all funding is directly from producers. In Germany, a fee is paid to local authorities to pay for education and awareness around how householders should separate waste streams.

Comparative figures on spend are presented in Table 15; while the scope of expenditure is likely to be different, these figures indicate that packaging compliance is supporting greater investment in consumer behaviour change in Ireland and Germany than in the UK. No equivalent figures were identified for the deposit and return schemes in Denmark and Germany.

Table 15 Income from producer compliance spent on communication, education and awareness

	UK	Ireland	Germany
Total spend	£0.84m	£0.41m (€0.532m)	Not identified.
£/capita	£0.01	£0.09	£0.87
Source	NWPD, 2015	Repak, 2015	PAC NEXT, 2014

Box 4 Repak education and awareness campaigns in Ireland

Repak generated over €1.5m worth of PR across primary campaigns in 2014.

Repak Recycling Week

Repak Recycling Week has been Repak's primary awareness campaign for the past 15 years. It is an established campaign in media calendars in October of every year.

The focus of the campaign in 2014 was 'Ireland is now second in Europe'

The 2015 campaign had the hash tag #makeplasticfantastic and focused on increasing plastic recycling and reducing contamination.



Repak Easter Appeal and Christmas appeal

The annual Repak Green Christmas campaign focused on keeping recycling at the forefront of people's minds during this heavy packaging consumption period.

Repak also had an Appeal to promote the recycling of the extra packaging found at Easter.



Source: *Repak, 2015*; *Repak Facebook page, accessed April 2016*

Summary and conclusions

The Packaging Directive targets are being met, and can be met, through a variety of approaches. The variation in approaches, in terms of packaging waste coverage, funding mechanisms, role of local authorities and other national waste policy, makes it hard to draw direct comparisons.

Ireland, Germany and Denmark are achieving higher recycling and recovery rates than the UK but due to the variety of approaches, and additional variations in waste management regulations, it is hard to identify clearly the reasons for this.

Producers

In the UK and Ireland producers have a choice of compliance options, either individually or via compliance schemes. The administrative burden tends to keep levels of self compliance low. Thresholds in place in the UK and Ireland reduce the burden on small producers.

It is extremely hard to compare the costs across different countries but the costs to producers in the UK do appear to be at the lower end. Competition tends to drive costs down as demonstrated in both the UK and Germany. In Germany, the costs of compliance have halved since the change from a monopoly to a competitive system for the dual systems; however, there still appears to be a challenge in terms of keeping scheme costs down and adequately offset by the value of materials³⁰. Part of the reason costs are lower in the UK is that it is not a full cost model and, as such, doesn't properly meet the requirements of EPR. While the UK system keeps costs down, the variability in PRN price does add uncertainty for producers in terms of financial burden.

Local authorities

The costs of household collection are more expensive than commercial collection and as a result the focus in the UK has been on the lower cost recovery of commercial waste. Local authorities do not have any direct role in the UK system and there is little support for household collection of packaging waste. In Ireland and Germany, systems have been designed for household collection; revenue from producers directly contributes to collection costs. It appears that, in Germany, targets are being bolstered to a certain extent by unlicensed packaging, an unintended consequence of providing household kerbside collections.

Infrastructure investment and the circular economy

The costs and revenue are more predictable in Ireland and Germany; PRN fluctuations in the UK add a level of revenue uncertainty and make it difficult to plan infrastructure. There is generally a lack of transparency about how the funding from compliance schemes has been spent in the UK and the impact this has had on infrastructure development. In Ireland, there is a high reliance on export and while funding is contributing to

collection costs it appears to have had little impact on recovery infrastructure. The low reliance on export in Germany suggests that the system has had some impact on recovery infrastructure. In addition, the deposit and return systems in Germany and Denmark support the infrastructure for closed loop recycling of the beverage containers element of the packaging stream.

Continued, low cost, export of material adds to uncertainty in terms of national infrastructure development and does not support the development of a circular economy. Material export is used in all countries but there is greater reliance on this route in the UK and Ireland.

Regulation

One of the EPR principles is that there should be transparency on performances and costs and that adequate means for enforcement are in place. The NPWD provides regular, transparent and accurate data on tonnage recovery (and PRN revenue) in the UK, although the variation in PRN price and the uncertainty this creates for producers means that UK data could usefully be made available on a more frequent basis. The UK still compares favourably with German and Ireland, however, where there is a longer time lag for equivalent data. Overall, while there is transparency in terms of reporting performance on recycling and recovery to Europe, the availability of data is variable and, in some cases, restricted to regulators and compliance schemes.

Fraud and free riding is likely to be present within all of the compliance schemes which places additional burden on compliant producers and impacts on the accuracy of reporting. That is not to say that all countries are not taking steps to ensure compliance, the UK for instance having specific requirements to monitor free riding.

The UK system achieves the minimum required targets and provides a compliance solution at a competitive cost to producers and without unfair burden on small producers. Conversely, there is no full cost recovery, a requirement of true extended producer responsibility, and collection of household waste is not supported. In addition, there is no driver to exceed targets, the price fluctuations of the PRNs impacts on market prices and the level of revenue uncertainty makes it difficult to plan infrastructure. The reliance on export in the face of market uncertainty, and inadequate infrastructure, further undermines infrastructure development and the development of a domestic circular economy.

In conclusion, there are strengths and weaknesses to each of the other systems considered; however, there are features of implementation that could be considered were the UK to conduct a review in terms of approach. In order to align with ambitions for a circular economy consideration should be given to whether the regulations are fit for purpose for the future, achieving the requirements of extended producer responsibility, including transparency at all levels and full cost recovery.



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Glossary

CIWM: the Chartered Institution of Wastes Management

Compliance scheme: producer membership scheme, approved by government, which ensures member producers comply with regulations

DPG: Deutsche Pfandsystem GmbH, the name of the deposit and return system in Germany

DRS: Dansk Retursystem, the name of the deposit and return system in Denmark

DSD: Der Grüne Punkt – Duales System Deutschland GmbH, packaging compliance scheme in Germany

ELV: end of life vehicle

EPR: extended producer responsibility

MSW: municipal solid waste

Municipalities: equivalent of local authorities in Denmark and Germany

NPWD: the National Packaging Waste Database is a web-based database supported by the UK environment agencies, the Department for Environment, Food and Rural Affairs, the Department for Business, Innovation and Skills, the Advisory Committee on Packaging, companies obligated by the packaging and battery regulations, reprocessors, exporters and compliance schemes

OECD: Organisation for Economic Co-operation and Development

Packaging Directive: the European Council Directive 94/62/EC on Packaging and Packaging Waste and subsequent revisions

Packaging Waste Regulations: the Producer Responsibility Obligations (Packaging Waste) Regulations 2007

PERN: Packaging Export Recovery Note

PRN: Packaging Recovery Note

Repak: packaging compliance scheme in Republic of Ireland

SME: small and medium sized enterprise

WEEE: waste electrical and electronic equipment





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The Chartered Institution of Wastes Management (CIWM), is the professional body which represents waste and resource professionals working in the sustainable waste and resource management sectors worldwide. CIWM sets the professional standards for individuals working in the industry and has various grades of membership determined by education, qualification and experience.

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