[redacted]

203

From: [redacted]
Sent: 12 November 2020 14:10
To: wastecomments
Subject: IWMA Submission on DRS
Attachments: 201112_IWMA Cover Letter for DRS submisison to DECC.pdf; 201112_Final IWMA DRS Submission to DECC Nov 2020.pdf; Likely Impact of DRS on Irish Waste Management_Final Report_Jan2020.pdf

Hi,

Please find attached IWMA submission on DRS, with a cover letter and an attachment.

Regards,

[redacted]

SLR

[redacted]
Technical Director-Waste & Resource Management
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Irish Waste Management Association

Deposit Return Scheme Consultation,
Waste Policy and Resource Efficiency,
Department Communications, Climate Action & Environment,
Newtown Road,
Carricklawn,
Wexford,
Y35 AP50.

By email only to Wastecomments@DCCAE.gov.ie

12th November 2020

Re: Public Consultation on Deposit Return Scheme Consultation Document on Potential Models for Ireland

Dear Sir/Madam,

Further to your call for consultation on the above-referenced subject, I attach a submission made on behalf of the Irish Waste Management Association (IWMA).

Yours Sincerely,

Conor Walsh

Conor Walsh
IWMA Secretary

[redacted]
www.iwma.ie

Attachments:

1. IWMA Submission to the Department of Environment, Climate and Communications on the Potential Development of a Deposit Return Scheme in Ireland.

2. *'Likely Impact of a Deposit & Return Scheme on Waste Management in Ireland'*, SLR Consulting for the IWMA, January 2020.

IWMA

Irish Waste Management Association

SUBMISSION

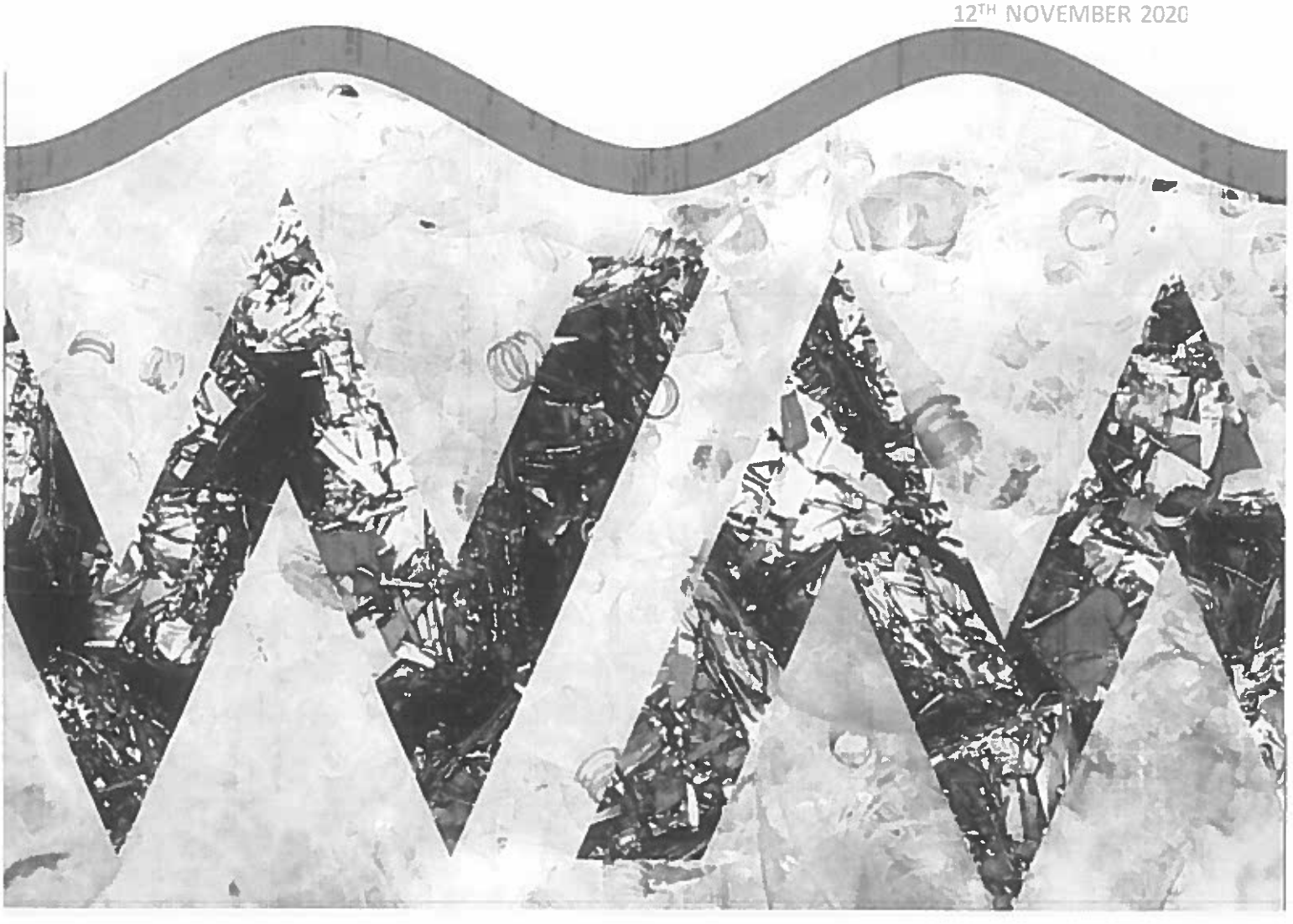
TO

DEPT. OF ENVIRONMENT, CLIMATE & COMMUNICATIONS

ON

THE POTENTIAL DEVELOPMENT OF A DEPOSIT RETURN SCHEME IN IRELAND

12TH NOVEMBER 2020



EXECUTIVE SUMMARY

The IWMA is the representative body of the waste management industry in Ireland.

In this submission, we advise against the proposal that Ireland should introduce a conventional DRS for PET bottles and aluminium cans, as proposed by Eunomia in their recently published report, commissioned by the Department of Communications, Climate Action and Environment.

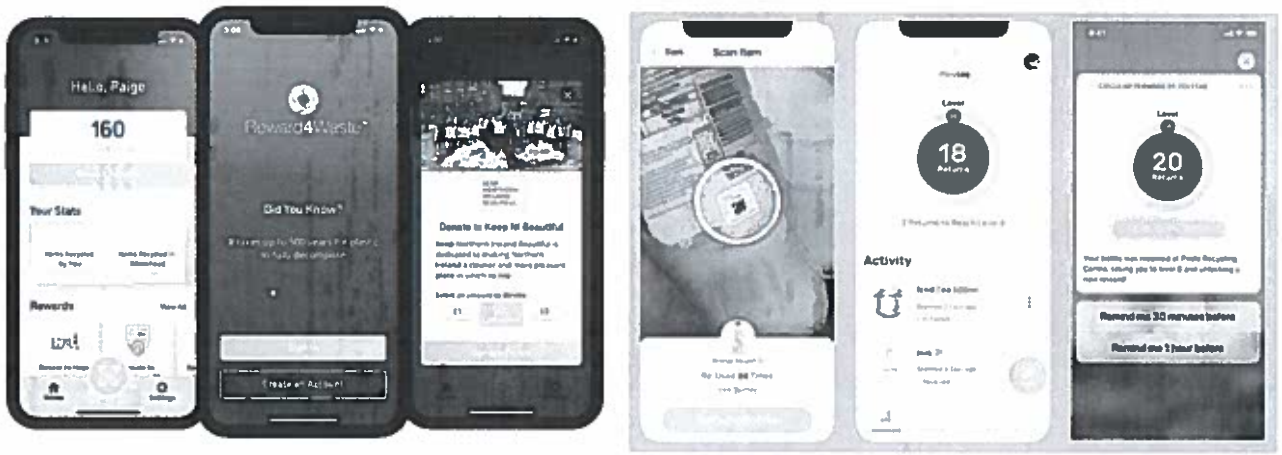
Instead, we favour the introduction of a Smart DRS (or digital DRS) that uses smartphone App technology combined with the existing collection network for recyclable materials, enhanced by some new delivery points for deposit materials.

We suggest that the Smart DRS should be extended to a wider range of materials, whether from the commencement of the system or as it develops over time.

In short, a Smart DRS works as follows:

- Recycling bins are given a unique code, such as a QR Code or an RFID Chip.
- Materials with deposits paid have a unique code, such as QR Code or similar.
- Consumer pays a deposit at the point of purchase.
- Consumer downloads the free App on to any smartphone or tablet.
- After consumption, the consumer scans the recycling bin with their smartphone followed by the packaging item within 30 seconds and redeems the deposit electronically via the App. The consumer is allowed 30 seconds between each item, but many items can be scanned one after another with the smartphone in a short time period.
- Deposits can be reclaimed using smartphones at home, at work, on the street (particularly using Smart Recycling Bins) and at a wide variety of strategic locations.
- Alternative options are provided for people that do not have smartphones or do not wish to use the App, including some Reverse Vending Machines at strategic locations such as civic amenity sites, shopping centres, train stations, airports, sports arenas, etc.

Examples of Smartphone Apps used for Smart DRS Systems



We provide further details of the Smart DRS in this submission. We find many faults with Eunomia's report, which incidentally did not even consider a Smart DRS. We argue that it would be a lost opportunity for Ireland to invest

so heavily in a system of the past (conventional DRS), when a system of the future is in our grasp (Smart or Digital DRS).

The world has moved on from manual and semi-automated ways to manage finances. Digital systems are the only way forward and are heavily backed by the EU and Ireland. It is EU and Irish Government Policy to promote digital business and consumer engagement, as this is more efficient and less resource intensive compared with traditional methods of conducting business and public engagement.

The European Commission is planning and promoting "***A Europe fit for the digital age***" and is looking for Member States to set standards in this regard, not to follow the outdated standards set by others. Ireland can be a world leader in this regard, as we were with the plastic bag levy and we are with the technology that we currently use in waste collection (RFID chips, weighing systems, customer engagement via electronic means, etc.).

The following Table summarises the key differences between the development of a conventional DRS and a Smart DRS in Ireland, as we see them.

Table 1
Comparison of Conventional DRS Versus Smart DRS for Ireland

Issue	Conventional DRS	Smart DRS
Cost	€70m to €100m per annum	€20m to €25m per annum
Surplus Revenue	None - €30m unredeemed deposits plus €10 to €15m material value leaves a shortfall of €25m to €60m.	€15m to €25m surplus if only PET Bottles and Aluminium Cans. Could be €50m to €100m if extended to other materials such as HDPE bottles, tetra-pak, glass, steel cans, etc.
Flexibility	None – reverse vending machines only accept round items. Also, space limitations in shops make it difficult to add more materials. It is also more difficult to change the deposit level.	Very flexible. Any item can be added quite simply by amending the label and using the technology. Variable deposits and revision of deposit levels are easily managed in this digital system.
Impact on Litter	Limited - reverse vending machines do not accept crush cans or bottles.	Excellent – any deposit item can be returned to a wide range of convenient locations and the deposit reclaimed regardless of whether or not it is crushed or squashed.
Impact on Existing Recycling System	Expected to cause a €7m per annum impact on the existing recycling system, which is a threat to its viability.	Expected to have a positive impact as people place more recyclable items in their recycling bins and the surplus revenue supports the introduction of more collection points for recyclables.
Integration with Northern Ireland	Difficult due to currency difference and the use of non-unique identifier on the labelling.	Easier, as the electronic system can easily manage the currency difference and the unique identifier will reveal the source of the item.
Consumer Engagement	Very difficult for consumers as they must store deposit items uncrushed in	Easy for consumers as they can reclaim the deposit in their home, at work, on the street, in

Issue	Conventional DRS	Smart DRS
	their homes and deliver them to shops periodically, where they queue to manually deliver the items to gain store credit.	shopping centres, at sports events, in train stations, at airports, at civic amenity sites, at bring banks, etc. Also, consumers get cash to their account, not credit. Also, the App will provide useful information to consumers. Less convenient for people that do not have smartphones, but adequate provision will be included.
Impact on Retailers	Difficult to manage returns and storage of materials.	Involved only on a voluntary basis with a scanner that make returns easier.
Quality of Materials	Higher quality.	Relies on a higher level of sorting to reach high quality, but food grade raw materials can be produced.
Security	Good at ensuring the items are returned before deposit is returned, but more open to fraud as items are not uniquely identified and there is a history of fraud with conventional DRS systems around the world.	Relies upon a degree of trust in the sense that people are expected to place the item in the recycling bin that they scan with their smartphone. However, less susceptible to fraud as the items are uniquely identified and a deposit cannot be returned twice on the same item.
Positive Environmental Impacts	Increase in recycling rates for PET bottles and aluminium cans combined with disincentive to purchase these items.	Increase in recycling rates for PET bottles, aluminium cans, cartons, tetra-pak, glass bottles, etc. combined with disincentive to purchase these items. Also offers potential to support re-use, e.g. higher returns for re-using glass bottles.
Negative Environmental Impacts	Significant carbon emissions associated with additional traffic and transport needed to deliver and collect the deposit items to and from shops and also with the development and operation of 5 new counting/sorting centres.	No negative environmental impacts envisaged as existing collection and processing system is used and enhanced with more convenient drop-off points.
Potential Health Impacts	Returned containers are likely to contain traces of product including sugary drinks and alcohol in open bottles and cans. This could attract flies and rodents to the storage area of shops, where the materials are securely stored alongside food products. There is a health risk associated with this arrangement.	Containers are mostly returned to non-retail locations, avoiding this risk altogether. When/if returned to retail, the items are scanned and can be placed in standard recycling bins without the need for secure storage, as the deposit cannot be reclaimed twice. The bins will be managed as waste in an appropriate manner, not as stock in the storage rooms.

Issue	Conventional DRS	Smart DRS
Development Timeframe	4 to 5 years. The need for 5 new counting/sorting centres will involve site selection, site procurement, EIA, planning permission, EPA licensing, design, construction and equipment installation. This will take at least 3 years.	2 years. Main items required to get started are: • Trials • Labelling of deposit items • Labelling of recycling bins • Provision of more recycling bins • Procurement of App technology The trials could be completed in the next 6 months and none of the other tasks should take more than 12 months to complete.
Risks	The system is proven elsewhere which is a positive. However, countries that have introduced a successful DRS have a much higher proportion of apartment-dwellers and they have a tradition of delivering recyclables to drop-off points. Ireland has a different way of recycling with greater emphasis on kerbside MDR bins. There is a high risk that the public will not engage fully with a conventional DRS and will resent the inconvenience involved, with knock effects on overall recycling. There is also a risk that removing the high value materials from the existing recycling system could lead to a collapse of that system. There is also a planning risk associated with the development of 5 new counting/sorting centres. The risk of fraud is higher.	This is a novel system with the risks associated with any new development. However, there are lower risks in a number of ways, as follows: • The investment level is much lower. • Public involvement is much more convenient, so there is a lower risk of public rejection of the scheme. • There is no risk of negative impacts on the current recycling system. • The flexibility of the system allows it to start small and progress over time to more materials. • The risk of fraud is lower.

The above Table shows that a Smart or Digital DRS is clearly the best way forward for Ireland. We must not fear digital technology as it is now so well established across the world and there really is no going back to the old ways.

Using the excuse that a conventional DRS is a 'proven system' is not good enough. The risks are higher, not lower and Ireland is a very progressive country and a world leader in the digital technology space. We must be progressive in that regard a Smart DRS is the best environmental and economic option for us and for those that come after us.

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1.0 OVERVIEW OF THE IWMA

The IWMA is comprised of 41 members that operate 50 waste companies, as shown below.

Our website, www.iwma.ie , provides details of our members. Note that some members have acquired other companies in recent years and therefore trade under several brand names.

Our members handle household, commercial, C&D, liquid and hazardous wastes and are involved in the following waste management activities:

- Waste Collection
- Waste Transfer
- Recycling Operations
- Composting
- Anaerobic Digestion
- Hazardous Waste Management
- Specialist Treatments (such as Sterilisation)
- Soil Treatment and Recovery
- Waste to Energy
- SRF Production
- Landfill Operations
- Export of Waste for Treatment Abroad

It is clear that the IWMA represents a broad spectrum of waste management activities, so we have no inherent bias towards or against any particular waste management options. Our main goals are to raise standards in the industry, to promote compliance with all legislation and to assist Ireland in meeting the targets set by the EU in a variety of Directives. All our submissions are available publicly on our website.

2.0 CURRENT RECYCLING OF PET BOTTLES AND ALUMINIUM CANS

2.1 Introduction

In this section, we show the infrastructure involved in the collection and recycling of PET Bottles and Aluminium Cans in Ireland. The IWMA has a strong view that this collection system and associated infrastructure should be used for any DRS introduced to Ireland. To by-pass that infrastructure would entail very high environmental and economic costs that we believe are unnecessary and wasteful. We also suggest that any such decision would have to be based on an independent, fair and detailed cost-benefit analysis alongside an appropriate environmental assessment. We do not accept that the Eunomia report contains either of these requirements.

2.2 Current Recycling Rates for PET Bottles and Aluminium Cans

REPAK, as the sole PRI Scheme for packaging waste in Ireland, is tasked with gathering and recording data on packaging waste generation and management in this Jurisdiction. REPAK provided the following data to the IWMA[1] in November 2019, based on their 2018 estimations:

Table 2-1
REPAK 2018 Data on PET Bottles and Aluminium Cans

	Placed on Market (t)	Quantity Recycled (t)	Current Recycling Rate
PET Bottles	25,490	15,472	60.7%
Aluminium cans	11,456	8,363	73.0%

2.3 Household Bins

The private sector waste industry in Ireland has delivered the following bins to households in Ireland, based on the most recent reliable data recorded by the NWCPO:

- 1,259,870 houses serviced with a residual waste bin
- 1,232,765 houses serviced with a mixed dry recycling bin (98%)
- 812,358 houses serviced with a brown (organic) bin (64%)
- 24,286 houses serviced with a bag service
- 138,357 apartments serviced with waste collection service

PET Bottles and Aluminium cans are collected in the Mixed Dry Recycling (MDR) Bins. From there, they are generally delivered to waste transfer stations for bulking up prior to onward transfer to Materials Recovery Facilities (MRFs).

Based on the EPA Waste Characterisation study on Household waste conducted by the RPS[2], we find the following data:

- Quantity of Household Waste relevant to the characterisation study = 1,046,819 tonnes
- Quantity of PET Packaging in Recycling Bins = 12,589 tonnes (this includes PET bottles, trays and other PET packaging)
- Quantity of Aluminium Cans in Recycling Bins = 3,264 tonnes

[1] Email correspondence from David Sharpe (REPAK) to Conor Walsh (SLR/IWMA) on 27th November 2019.

[2] Household Waste Characterisation Campaign, RPS for the EPA, November 2018.

SLR has gathered data from each of the Materials Recovery Facilities (MRFs) that are sorting household MDR generated in the Republic of Ireland. This includes data from two MRFs located in Northern Ireland that take some MDR from south of the border. Accounting for reported contamination levels and discounting 16% for PET Trays, we estimate that the Household MRFs recycle 11,879 t/a PET Bottles currently (2020).

SLR's data from a 2019 survey of these MRFs estimated that they are currently recycling approximately 4,444 tonnes of aluminium cans per annum.

The SLR data is relatively consistent with the waste characterisation study, allowing for 3 or 4 years growth and considering that household waste is high in 2020 due to the number of people working from home this year.

2.4 Commercial Waste Bins

Commercial premises have variable waste collection services as the range of materials varies across different businesses. We do not have data on the numbers of bins or the volume of aluminium cans and PET bottles, but based on the EPA Waste Characterisation study on Non-Household waste conducted by the Clean Technology Centre[3], we find the following data:

- Quantity of Commercial Waste relevant to the characterisation study = 715,227 tonnes
- Quantity of PET Packaging in Recycling Bins = 6,833 tonnes (this includes PET bottles, trays and other PET packaging)
- Quantity of Aluminium Cans in Recycling Bins = 928 tonnes

We have no data on the proportion of PET bottles in the PET packaging figure other than the REPAK estimate of 15,472 tonnes of total PET bottles recycled in 2018. This suggests about 3,000 to 4,000 tonnes of non-household PET bottles were recycled in 2018.

2.5 Civic Amenity Sites and Bottle Banks

The National Waste Report for 2012 estimated that 1,304 tonnes of aluminium cans were dropped off at bring banks that year. REPAK data for 2019 puts that figure at 1,534 tonnes.

PET bottles are generally not included at bring banks or CA sites, so we assume a negligible figure for that material at those drop-off points.

2.6 Estimated Quantities of PET Bottles and Aluminium Cans Currently Recycled

Our estimates detailed above suggest that the following quantities of the target materials are currently recycled:

- Aluminium Cans = c.3,200t/a household MDR + c.1,500t/a bring banks + c.900t/a commercial MDR + c.3,400t/a recovered from residual waste = c.9,000t/a
- PET Bottles = 15,000 to 16,000 tonnes per annum

REPAK's latest estimates suggest that the recycling rate for aluminium cans was at 89% in 2019[4]. The SLR estimates detailed above are consistent with that view, given that REPAK now estimates that the total market comprises c.10,000t/a aluminium cans.

This suggests that a DRS is not necessary for aluminium cans and further suggests that they would only be included in a DRS to help finance the scheme. We strongly question the merits of taking that valuable material out of kerbside recycling to help finance a parallel collection and treatment route, when it is already successfully recycled.

The data on PET bottles is less clear. REPAK previously calculated a recycling rate of 60.7% for this material. REPAK's latest estimation suggests that there are 29,900 tonnes placed on the market, which is higher than previously

[3] Non-Household Waste Characterisation Campaign, Clean Technology Centre for the EPA, 2018.

[4] Presentation by REPAK to IWMA on 19th October 2020

estimated. On that basis, the recycling rate is likely to be between 50% and 55%. We accept that strong measures will be required to increase that recycling rate to 77% by 2025 and 90% by 2029.

2.7 Waste Transfer Stations

The main MSW Waste Transfer Stations in Ireland are detailed in Table 2-2 below and shown on Map 1/1A in Appendix 02 at the end of this submission. There are approximately 80 such facilities of significance, with some other very small facilities or facilities focussed on Construction and Demolition Waste that handle small quantities of MSW.

Just over half of the identified facilities are comprised of large facilities regulated by EPA Licence, with the remainder comprising smaller facilities regulated by way of waste facility permits issued by the local authorities.

Table 2-2
Main MSW Waste Transfer Stations in Ireland

Code	Name	Location	County	Province	Authorisation
P1014	Pac-on (Thorntons)	Balbriggan	Dublin	Leinster	EPA Licence
P1015	Glanway	Port of Waterford	Kilkenny	Leinster	EPA Licence
W003	Ballymount Baling Stn	Ballymount Road	Dublin 12	Leinster	EPA Licence
W032	Waterford CC Dungarvan	Ballynamuck Middle	Waterford	Munster	EPA Licence
W039	Panda	Ballymount Cross	Dublin 24	Leinster	EPA Licence
W044	Thorntons	Killeen Road	Dublin 10	Leinster	EPA Licence
W045	Keywaste	Greenhills Road	Dublin	Leinster	EPA Licence
W053	Greenstar	Fassaroe	Wicklow	Leinster	EPA Licence
W058	Greenstar	Deepwater Quay	Sligo	Connaught	EPA Licence
W082	Panda/Greenstar	Dock Road	Limerick	Munster	EPA Licence
W104	AES	Tullamore	Offaly	Leinster	EPA Licence
W106	Barna Waste	Carrowbrowne	Galway	Connaught	EPA Licence
W116	Greenstar	Six Cross Roads	Waterford	Munster	EPA Licence
W131	Midland (AES)	Clonmagaddan	Meath	Leinster	EPA Licence
W136	Greenstar	Sarsfieldcourt	Cork	Munster	EPA Licence
W140	Panda	Rathdrinagh	Meath	Leinster	EPA Licence
W144	Oxigen	Coes Road	Louth	Leinster	EPA Licence
W147	Ashgrove Recycling	Churchfield Ind Est	Cork	Munster	EPA Licence
W148	City Bin Co Ltd	Carrowmoneash	Galway	Connaught	EPA Licence
W152	Oxigen	Robinhood Ind Est	Dublin 22	Leinster	EPA Licence
W158	Ray Whelan	Waste Services	Laois	Leinster	EPA Licence
W163	Bergin (Barna)	Ballaghaderreen	Roscommon	Connaught	EPA Licence
W169	Mulleady	Cloonagh	Longford	Leinster	EPA Licence
W177	Greenstar	Carrignard	Waterford	Munster	EPA Licence
W183	Greenstar	Millennium Park	Dublin 11	Leinster	EPA Licence
W188	Greenstar	Greenogue	Dublin	Leinster	EPA Licence
W194	AES	Kyletalesha	Laois	Leinster	EPA Licence
W197	Mulleady	Mullingar Bus Pk	Westmeath	Leinster	EPA Licence
W205	Greyhound	Crag Avenue	Dublin 22	Leinster	EPA Licence

Code	Name	Location	County	Province	Authorisation
W206	Thorntons	Dunboyne Ind Est	Co Meath	Leinster	EPA Licence
W207	Cavan Waste (Oxigen)	Killygarry Ind Park	Cavan	Ulster	EPA Licence
W208	Oxigen	Merrywell Ind Est	Dublin 22	Leinster	EPA Licence
W214	Ted O'Donoghue	Knockpogue	Cork	Munster	EPA Licence
W216	Barna Waste	Ardcolum	Leitrim	Connaught	EPA Licence
W217	Killarney WD	Aughacurreen	Kerry	Munster	EPA Licence
W220	Greenstar	Ramstown	Wexford	Leinster	EPA Licence
W222	AES	Blakes Cross, Lusk	Dublin	Leinster	EPA Licence
W227	Access Skip Hire (Thorntons)	JFK Ind Est	Dublin 12	Leinster	EPA Licence
W229	Goff Recycling (AES)	Ballygillane Big	Wexford	Leinster	EPA Licence
W238	Dublin City MRF (Panda)	Merrywell Ind Est	Dublin 12	Leinster	EPA Licence
W240	AES	Nenagh	Tipperary	Munster	EPA Licence
W253	Clean Ireland	Ballynagun West	Clare	Munster	EPA Licence
W257	Country Clean	Churchfield Ind Est	Cork	Munster	EPA Licence
W258	Murray Waste	Ferns	Wexford	Leinster	EPA Licence
W261	Panda	Cappagh Road	Dublin 11	Leinster	EPA Licence
NL01	Wilton	Ballyjamesduff	Cavan	Ulster	LA Permit
NL02	Sidney McDaid	Letterkenny	Donegal	Ulster	LA Permit
NL03	D&M Environmental Services	Letterkenny	Donegal	Ulster	LA Permit
NL04	Shaun Molloy & Sons (Donegal Waste)	Glenties	Donegal	Ulster	LA Permit
NL05	Patrick Logan & Sons	Newtowncunningham	Donegal	Ulster	LA Permit
NL06	Sharkey Waste Recycling	Letterkenny	Donegal	Ulster	LA Permit
NL07	Wers Waste	Tuam	Galway	Connaught	LA Permit
NL08	Walsh Waste	Loughrea	Galway	Connaught	LA Permit
NL10	McGrath Industrial Waste	Castlebar (Moneenbradagh)	Mayo	Connaught	LA Permit
NL11	Bourke Waste Removals	Westport	Mayo	Connaught	LA Permit
NL12	Ballinrobe Waste	Ballinrobe	Mayo	Connaught	LA Permit
NL13	G&N Loftus Recycling	Ballina	Mayo	Connaught	LA Permit
NL16	Green Energy (Skipfull Two Ltd)	Ballycoolin	Dublin	Leinster	LA Permit
NL18	Allied Recycling	Naas	Kildare	Leinster	LA Permit
NL19	Exomex (McElvaneys)	Dundalk	Louth	Leinster	LA Permit
NL20	Ecological Waste	Dundalk	Louth	Leinster	LA Permit
NL21	Allied Recycling	Oldcastle	Westmeath	Leinster	LA Permit
NL22	Clean Ireland	Shannon	Clare	Munster	LA Permit
NL23	Clare Waste	Tuamgraney	Clare	Munster	LA Permit
NL24	Midleton Skip Hire	Midleton	Cork	Munster	LA Permit
NL25	Higgins	Tralee	Kerry	Munster	LA Permit
NL26	Dillon	Tralee	Kerry	Munster	LA Permit
NL27	Martin Doheny	Castle Inch	Kilkenny	Leinster	LA Permit
NL28	Greenstar	Hebron Ind Est	Kilkenny	Leinster	LA Permit

Code	Name	Location	County	Province	Authorisation
NL29	Derry White Skiphire	Charleville	Limerick	Munster	LA Permit
NL30	Sheahan Waste Recycling	Galvone Ind Est	Limerick	Munster	LA Permit
NL31	Quality Recycling (Wiser)	Carrick on Suir	Tipperary	Munster	LA Permit
NL32	Ryan Brothers	Thurles	Tipperary	Munster	LA Permit
NL33	Clonmel Waste	Clonmel	Tipperary	Munster	LA Permit
NL34	Davey Transport Ltd	Moville	Donegal	Ulster	LA Permit
NL35	CND Recycling	Tramore Road	Cork	Munster	LA Permit
NL36	Bantry Skip Hire	Bantry	Cork	Munster	LA Permit
NL37	Cork Recycling Company	Togher	Cork	Munster	LA Permit
NL38	Munster Waste Management	Mallow	Cork	Munster	LA Permit
NL39	Barna Waste	Athlone	Westmeath	Leinster	LA Permit
NL40	Blue Dolphin Environmental	Smithborough	Monaghan	Ulster	LA Permit

2.8 Materials Recovery Facilities

Mixed Dry Recyclables (MDR) collected at kerbside are delivered to Materials Recovery Facilities (MRFs) for processing, usually after bulking at Waste Transfer Stations. There are nine such facilities serving the household MDR market in Ireland as detailed in Table 2-3 below and shown on Map 2 at the end of this submission. Note that one of these facilities, ReGen, is located in Northern Ireland, but serves the Republic of Ireland as well as Northern Ireland. ReGen is an IWMA Member company.

Table 2-3
Main Household MDR Materials Recovery Facilities in Ireland

Code	Name	Location	County	Province	Authorisation
NL26	Dillon	Tralee	Kerry	Munster	LA Permit
NL31	Quality Recycling (Wiser)	Carrick on Suir	Tipperary	Munster	LA Permit
NL41	Thorntons	Parkwest	Dublin 10	Leinster	LA Permit
NL43	ReGen	Newry	Down	Ulster	NI Licence
W104	AES	Tullamore	Offaly	Leinster	EPA Licence
W106	Barna Waste	Carrowbrowne	Galway	Connaught	EPA Licence
W169	Mulleady	Cloonagh	Longford	Leinster	EPA Licence
W238	Dublin City MRF (Panda)	Merrywell Ind Est	Dublin 12	Leinster	EPA Licence
W291	Forge Hill Recycling	Forge Hill	Cork	Munster	EPA Licence

3.0 CONVENTIONAL /TRADITIONAL DRS

3.1 SLR Report

The IWMA commissioned SLR Consulting to prepare a report on the likely impact of a conventional DRS on waste management in Ireland. We attach that report to this submission for your consideration. The following extracts from the Executive Summary of that report summarise SLR's findings in this regard.

"Potential Impact on Kerbside Recycling

SLR consulted with each of the MRF Operators in Ireland to see what impact the removal of plastic bottles and aluminium cans would have on the Material Recovery Facilities in Ireland. The MRF Operators estimated that this would have a €20 to €40 per tonne impact on gate fees at their facilities. Some of the MRF Operators also commented that there would be other impacts to be considered, such as:

- *Without good quality materials, such as plastic bottles and aluminium cans, it is difficult to move lower quality materials such as plastic pots/tubs/trays and plastic films. Reduced recycling of these materials would impact negatively on Ireland's recycling performance.*
- *The processing lines at the MRFs would have to be re-configured to manage the changes to the input materials.*
- *A DRS is likely to impact on all REPAK subsidies, as the producers of aluminium cans and plastic bottles would not provide subsidy for MRF operations, so the existing subsidy could be reduced for all materials.*

Based on the tonnages and values of these materials as reported by the MRF Operators, SLR independently analysed the potential impact on the MRFs from a successful DRS. The results are shown in Tables 2 and 3 below.

Table 3-1
Expected Revenue Losses at MRFs if DRS Materials Removed

Material	Volume Handled (t/a)	Average Value of Material Including REPAK subsidy (€)	Loss of Revenue (€)
Aluminium Cans	*4,444*	*915*	*€ 4,066,260*
PET Bottles	*11,227*	*247*	*€ 2,773,069*
Estimated Cost due to Loss of Beverage Containers			*€ 6,839,329*
HDPE Bottles	*7,283*	*415*	*€ 3,022,445*
Estimated Cost due to Loss of Beverage Containers and HDPE Bottles			*€ 9,861,774*

Table 3-2
Expected Increase in MRF Gate Fees for Household MDR if DRS Materials Removed

Material	Revenue Loss (€)	Household MDR Handled in 2016 (t/a)	Household MDR Handled after DRS materials removed (t/a)	Loss of Revenue per Unit / Potential Gate Fee Increase (€)
Loss of Beverage Containers	*€ 6,839,329*	*253,328*	*237,657*	*€ 28.78*
Loss of Beverage Containers and HDPE Bottles	*€ 9,861,774*	*253,328*	*230,374*	*€ 42.81*

The increase in gate fees at the MRFs could have very serious consequences on kerbside recycling in Ireland as the incentive to collect recyclables at kerbside would be reduced to a point where it would favour rogue operators that collect household waste with no source segregation.

Likely Increases in Recycling Rates

It is widely accepted that a DRS would have a positive impact on litter and that has been the focus of many DRS systems across the world. In particular, a DRS with a high value deposit of c.25 cent is expected to attract litter pickers.

However, the impact on recycling rates is not so clear. In countries that do not have a kerbside collection system for recyclables and have a low recycling rate, the impact of a DRS on recycling rates will be greater than in countries with well advanced systems for collecting recyclables.

SLR examined the quantities of beverage containers already recycled in Ireland and assessed the impact on MSW recycling and packaging waste recycling of an increase to 90% recycling of those materials. The results were as follows:

PET Bottles:

- *Total on the market = 25,490 t/a.*
- *Uplift from 60.7% to 90% = 29.3% = 7,469 t/a extra recycled.*
- *7,469 t/a out of a total MSW generation of 2.8 million t/a = **0.27%***

Aluminium Cans:

- *Total on the market = c.11,456 t/a.*[5]
- *Uplift from 73% to 90% = 17% = 1,948 t/a extra recycled.*
- *1,948 t/a out of a total MSW generation of 2.8 million t/a = **0.07%***

*Total Uplift in MSW Recycling rate = **0.34%***

The data suggests that a successful DRS would only increase overall MSW recycling rates by 0.34% which would do little to assist with the WFD requirement to increase MSW Recycling rates from the current 41% rate to 65% by 2035, with intermediate targets for 2025 and 2030.

The extra tonnage of PET bottles would increase the plastic packaging recycling rate from 34% to 36.5%, still well short of the 50% target by 2025 and the 55% target by 2030.

It appears that Ireland has already exceeded the 2025 and 2030 targets for aluminium packaging recycling, so the uplift in that category would be welcome, but is not of greatest concern at this time.

The effect of a successful DRS on the overall packaging recycling targets would be about 0.7% increase in the recycling rate from 65.6% to 66.3%.

A DRS would undoubtedly increase recycling rates for PET bottles and aluminium cans and would assist Ireland in meeting the SUP Directive targets for 2025 and 2029 but would clearly have very little impact on the other recycling targets that are currently not on track.

Costs of a DRS in Ireland

We also estimated the likely costs associated with developing and operating a comprehensive and successful DRS in Ireland. These are rough estimates that are detailed in the main body of the report and are comparable with other estimates that we reviewed in DRS related reports. Rather than consider capital and operational

[5] REPAK's annual report states that 8,363 tonnes of aluminium cans were recycled in Ireland in 2018. Later data from REPAK given to the IWMA and to Eunomia states that 73% of aluminium cans are recycled, so we calculate that 11,456 t/a are placed on the market. REPAK has also stated that 9,427 t/a of aluminium cans are placed on the market by REPAK members in RoI, so the additional tonnage is likely to be imported (e.g. Northern Ireland shopping) or placed on the market by non-members of REPAK.

costs, we spread the capital costs over 10 years to view all the costs as 'annual costs'. We summarise these costs as follows.

Table 3-3
Overview of Potential Annual Costs of DRS in Ireland

Item	Description	Estimated Cost per annum millions
1	Installation of RVMs & Storage Room (spread over 10 years)	€ 25.0
2	Development of 3 Regional Depots (spread over 10 years)	€ 3.8
3	Set-Up costs (spread over 10 years)	€ 2.1
4	Ongoing labour and space costs at stores	€ 6.3
5	Logistics Costs	€ 22.4
6	Counting Centre Costs	€ 3.2
7	Central Administration Costs	€ 2.7
8	Labelling & Security Markings	€ 7.7
	Total Estimated Annual Costs (Gross)	€ 73.2
	Added Value of Additional Beverage Containers Captured	€2.6
	Total Estimated Annual Costs (Net)	€ 70.6

In light of these estimated costs and considering the additional tonnages of beverage containers likely to be captured and recycled by a DRS, we estimate that the cost of recycling the additional tonnage works out at ***€7,497*** *per tonne. To put this figure in perspective, we calculated the cost of kerbside recycling at just under €500 per tonne and the cost of CA Site recycling at about €240 per tonne.*

In order to meet future targets, Ireland needs to recycle a large amount of additional materials and we expect that 'recycling at any cost' is not a financially sustainable policy for Ireland. Using a modest 2% growth rate, we have calculated that Ireland needs to recycle an additional 1 million tonnes per annum by 2030 and 1.75 million additional tonnes per annum by 2040. It is clear from the data that recycling costs of €7,497 for every additional tonne is not viable for the Irish State as it would cost more than €168 billion over the next 20 years to meet the targets."

4.0 IWMA POSITION ON DRS

4.1 IWMA View of Traditional DRS

The IWMA is strongly opposed to the traditional or conventional DRS proposed by Eunomia in their report as it does not use the existing waste collection and treatment infrastructure and would be a threat to kerbside recycling. In our opinion, such a system would be inconvenient for the public, difficult for retailers, very costly, inflexible and ineffective or only partially effective in achieving the stated goals.

We provide some comments on the Eunomia report later in this submission. We believe that it was wrong to appoint Eunomia for this task as they lobbied for DRS in Ireland in 2017 and their report, in our opinion, is unsurprisingly biased towards the position that they took at that time.

We therefore do not accept Eunomia's report as an independent analysis on this subject and we reserve the right to challenge it in the event that it is used to justify a decision to introduce a conventional/traditional DRS into Ireland.

4.2 IWMA Support of Smart DRS (or Digital DRS)

4.2.1 Introduction

The IWMA is interested in exploring hybrid DRS options that use the existing infrastructure and we believe that such options would be better environmentally and economically for Ireland, as well as advancing digital business in line with Government and EU policy. There is also the potential to progress a number of policies favoured in the recently published Waste Action Plan, as detailed later in this submission.

We therefore support the delivery of a Smart DRS, along the following lines:

- Bins are given a unique code, such as a QR Code or an RFID Chip.
- Materials with deposits paid have a unique code, such as QR Code or similar.
- Consumer pays a deposit at the point of purchase.
- Consumer downloads the free App on to any smartphone or tablet.
- After consumption – the consumer scans the recycling bin with their smartphone followed by the packaging item within 30 seconds and redeems the deposit electronically via the App. The consumer is allowed 30 seconds between each item, but many items can be scanned one after another with the smartphone in a short time period.

This would allow existing household and commercial recycling bins and collection systems to be used in the DRS and would be supplemented by existing and new drop-off points, such as CA sites, bottle/can banks, street recycling bins, shopping centre bins, train station bins, airport bins, etc.

4.2.2 A Better Option for the Public

Whilst the idea of a DRS may be a popular concept with the public, we fear that a conventional DRS will prove too cumbersome for many people in Ireland and participation rates may start high, but will undoubtedly decline over time. Other countries that have successfully introduced conventional DRS schemes are populated by people that have a tradition of bringing recyclables to central points, as they all have a high level of apartment-dwellers

compared to Ireland. The following Table shows that difference in living arrangements in successful DRS countries[6] versus Ireland.

Table 4-1
Percentage of Population Living in Flats/Apartments (Eurostat 2016 data)

Country	Percentage
Estonia	62.0
Lithuania	58.2
Germany	57.1
Iceland	48.5
Sweden	45.1
European Union (EU28)	41.8
Finland	34.2
Norway	19.7
Netherlands	18.8
Ireland	7.3

Irish people predominantly live in houses and place the bulk of their recyclables in the mixed dry recycling bins in their gardens. For some people, even this simple task is a challenge. It would be naïve to expect that the population of Ireland will embrace a more difficult system that would involve the separate storage of uncrushed aluminium cans and PET bottles in their home, followed by delivery of those items to reverse vending machines at retailers to gain store credit. There would undoubtedly be a novelty factor at first for many people, but when this wears off, it is hard to see that the public will persist with this difficult task over time.

Alternatively, a Smart DRS would allow the public to reclaim their deposit immediately after consuming the product if they are at home, in work, on the street, in a shopping centre, airport, train station, at a football match, etc.

After the deposit has been reclaimed in a Smart DRS, there is no need for secure storage of the materials to prevent fraud. The deposit cannot be claimed a second time, due to the protection offered by the unique identifier and the electronic tracking. A conventional DRS offers the possibility of deposits being claimed multiple times fraudulently, so the materials must be stored in a secure setting and accounted for manually or semi-automatically. This rules out many locations.

4.2.3 *Catering for those without Smartphones*

A limited number of Reverse Vending Machines could be provided to facilitate people that do not have a smartphone or do not wish to register on the App. However, that could be a few hundred RVMs rather than the thousands needed in a conventional DRS.

We also suggest that retailers should be given the option to take-back materials on a voluntary basis to cater for customers that are not comfortable with technology, particularly older customers. This would be a simple process whereby the shop would be provided with an electronic scanner, financed by the scheme rather than the retailer. Returned items would be scanned and cash or credit offered to the customer.

At that point the materials would be deposited in a recycling bin or even a compacting bin. The materials would have intrinsic value, but the deposit value is removed as soon as the material is scanned, so the materials can be compacted or put out with the regular recyclable collections, perhaps more frequently, without necessarily

[6] Included in Eunomia Report on Figure 4.2.

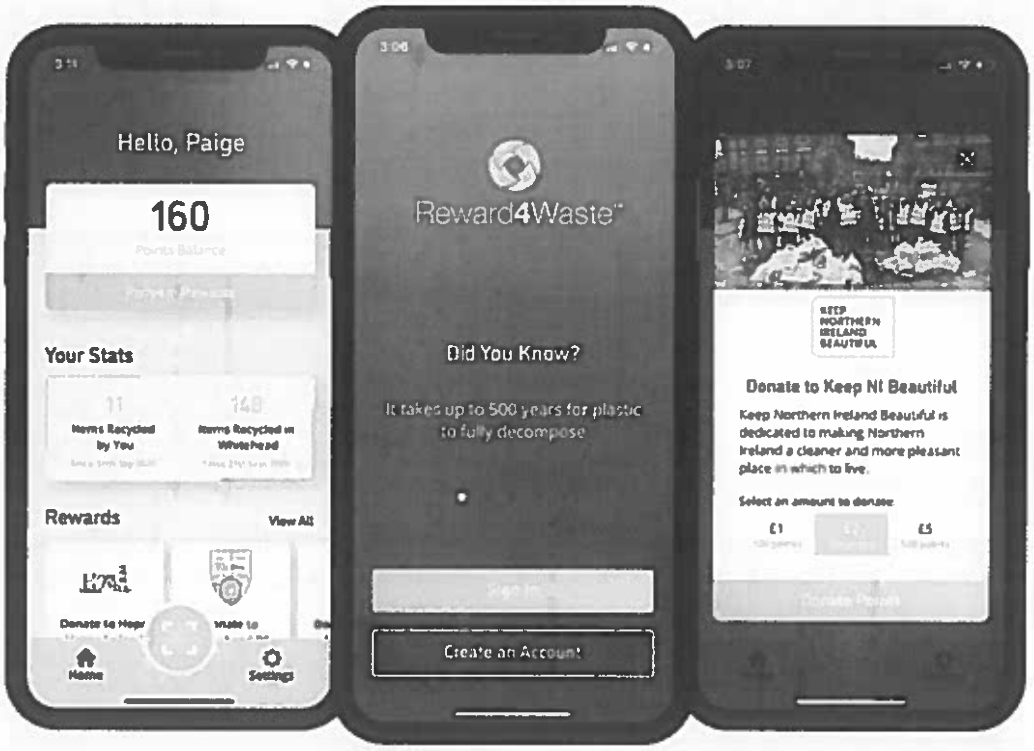
arranging special collections. This would be a very cost effective way to facilitate manual returns, where required or desired.

We expect that the requirement for manual take-back would decrease over time and may ultimately be phased out as the population becomes more and more focussed on digital transactions.

4.2.4 Smart DRS Trials

A trial of a Smart DRS, called Reward4Waste, is currently ongoing in Whitehead near Carrickfergus in County Antrim, Northern Ireland. The company behind the technology used in the trial is Cryptocycle, who has developed an App for a Smart DRS, as shown in the image below.

Photo 1 – Cryptocycle App used for Rewrd4Waste Trial in Whitehead



Mid & East Antrim Borough Council and Bryson Recycling are partners in the trial, which is also supported by Britvic, SPAR, PepsiCo and Encirc. Details of the trial can be found here: https://reward4waste.com/.

The Whitehead trial is based on rewards rather than deposits that are returned, so it may not be as effective as a deposit return system in terms of public response. Cryptocycle has proposed a DRS trial to the Welsh Government and it recommends charging and refunding deposits in that trial as that is expected to be more effective than the rewards system in Whitehead.

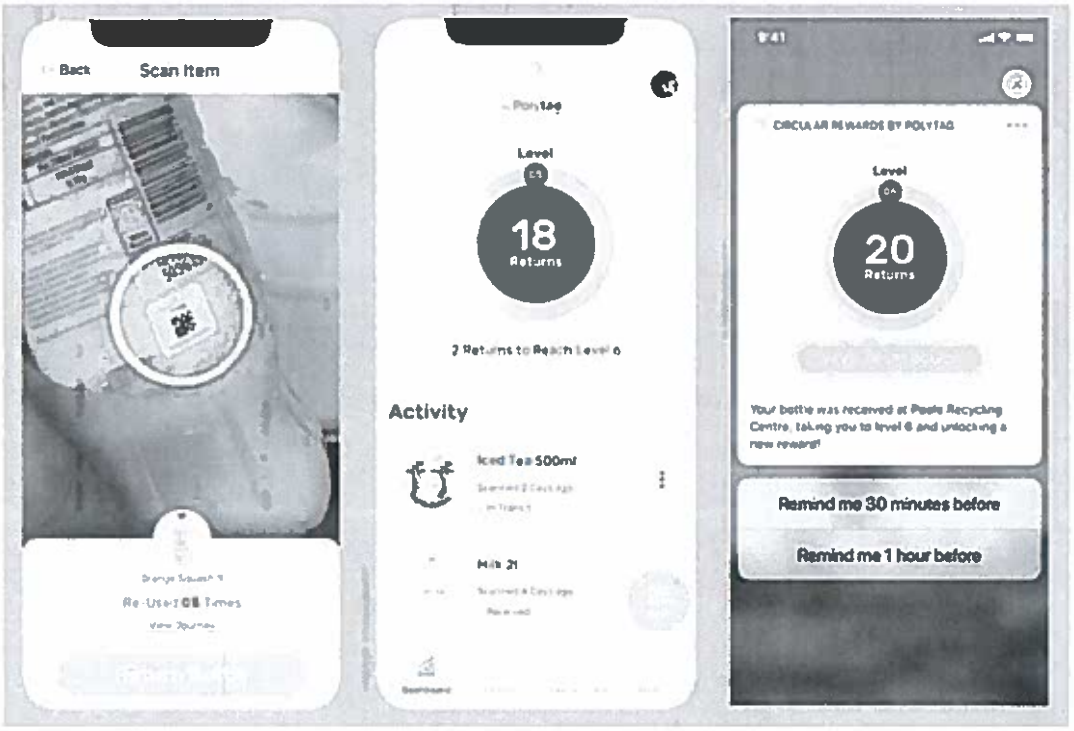
Cryptocycle is not the only technology provider in this field. The IWMA has also engaged with EconPro, a technology company that also provides a Smart DRS solution called PolyTag.

The Polytag smart DRS uses the same QR code combined with block-chain technology for tracing of packages as Cryptocycle, but is also developing a printing process to 'tag', at the point of manufacturing specific packages. The sole purpose of tagging the package is to allow recovery of the specific package, from a specific manufacturer, at a later date in a materials recovery facility. This system would work in conjunction with the QR code / phone app at

the consumer facing end of a smart DRS, but would allow the MRF operator to identify a particular package and recover it when the requirement or financial incentive is available to do so.

The tracing function will be facilitated through the use of a Polytag mobile phone app which enables consumers to scan the Polytag QR codes themselves. We provide an image of the App below.

Photo 2 – PolyTag App used for tracing packaging items



EconPro is planning to carry out a Smart DRS Pilot Project in Conwy in Wales in partnership with the Welsh Government and WRAP. The trial will cover 550 houses and involves supplying houses with water bottles labelled with unique codes and tracking the return of those bottles.

There are undoubtedly other companies that can bid for the operation of a Smart DRS in Ireland.

4.2.5 *Proposed Pilot Projects for Smart DRS in the Republic of Ireland*

The IWMA is interested in supporting one or more pilot projects in the Republic of Ireland, both financially and logistically. Ideally, we suggest that such a pilot project should be realistic enough to roll-out nationally, if found to be successful. It should involve the charging of deposits and return of those deposits once the material is scanned by the correct bin.

We suggest something along the following lines:

- Select a village that has one or two convenience stores that are willing to participate.
- The project can commit to compensating any lost business during the course of the trial, if the convenience store or its parent company does not wish to financially sponsor the trial.
- All beverage containers sold in the village could have deposits attached regardless of the packaging material (plastic bottle, metal can, glass bottle, carton, tetra-pak, etc.) or a simpler trial might just include PET Bottles and aluminium cans at this stage with expansion considered in later trials.

- A unique code should be applied to each beverage container sold in the village. This will have to be done manually with stickers or sticker-guns (but would be printed on the label by the producer if rolled out nationally). The project will finance that element of the pilot.
- All customers of the shops should be encouraged to download the App, but a take-back option offered to those that do not use smartphones or refuse to engage with the App.
- The shops should be supplied with a scanner to manage take-back and can place the take-back items in recycling bins supplied by their waste contractor.
- The local bottle bank in the village could be fitted with unique QR Codes that can be scanned as people return empty bottles, if glass is included in the trial.
- All household and commercial recycling bins in the village should be fitted with unique QR codes by way of appropriate stickers. These can be applied by the customer or the waste collector – preferably by the customer.
- Any street recycling bins in the village should also be fitted with a unique QR codes.
- The trial should be run for 3 months, but the returned materials counted for a longer period to allow for slow returns.
- Repeat the trial in 2 or 3 villages in different parts of the country with different waste contractors and different technology companies.

We expect that these pilot projects will iron out any teething issues and highlight any strengths and weaknesses with the Smart DRS system.

4.2.6 Advantages of Smart DRS

The advantages of a Smart DRS include the following:

- Can use the existing 1.2 million kerbside recycling bins as well as commercial backdoor recycling bins and develop some new 'on the go' recycling bins.
- Can use existing MRFs without need for additional counting centres. It also protects the MRFs and associated kerbside recycling system.
- Can use existing logistical and transport infrastructure without the need to replicate this.
- The range of materials can be extended to any or all packaging. For example, returning glass bottles and jars to bottle banks. Perhaps not in the initial trial, but as the scheme expand over time, if desired.
- Flexibility to vary deposits depending on environmental performance. This means the deposit can be ramped up over time to eliminate composite packaging, or those that are especially difficult to recycle.
- Simple to increase or decrease deposits at any time. This will prevent producers switching to non-deposit packaging materials such as tetra-pak.
- Potential to integrate with Northern Ireland.
- A number of Reverse Vending Machines could be provided for people that do not use smartphones or do not wish to register on the App.
- The unique identifier will prevent fraud as deposits can only be claimed once and the system will automatically recognise any attempt to claim a deposit on any item more than once. A user can be locked out of the system if they attempt to claim a deposit twice.

- It supports the EU and Irish Government Policy to promote digital business and consumer engagement, as this is more efficient and less resource intensive compared with traditional methods of conducting business and public engagement.

- Returned containers are likely to contain traces of product including sugary drinks and alcohol in open bottles and cans. In a conventional DRS, this could attract flies and rodents to the storage area of shops, where the materials are securely stored alongside food products. There is a health risk associated with this arrangement. This is not the case in a Smart DRS as the materials would be placed in recycling bins after they are scanned and would be managed appropriately as recycled waste, not as valuable stock.

4.2.7 Digital Nature of Smart DRS

On the final bullet point above, the European Commission is planning and promoting "***A Europe fit for the digital age***" and includes the following introductory paragraphs on its website[7]:

> *"Digital technology is changing people's lives. The EU's digital strategy aims to make this transformation work for people and businesses, while helping to achieve its target of a climate-neutral Europe by 2050.*
>
> *The Commission is determined to make this Europe's "Digital Decade". Europe must now strengthen its digital sovereignty and set standards, rather than following those of others – with a clear focus on data, technology, and infrastructure."*

It is clear to us, that a Smart DRS presents a great opportunity for Ireland to ***set standards*** by way of a fully digital DRS ***rather than following those of others*** that have developed manual or semi-manual DRS systems.

Ireland is probably the only country in the world where every household bin has been fitted with an RFID chip and the weight of every bin-lift recorded and reported to the customer. We are already ahead of the rest of the world in using technology in waste management and we therefore welcome the opportunity to set even higher standards for the rest of the world to follow. The implementation of a conventional DRS would be a backward step in that context.

4.2.8 Flexibility of a Smart DRS

A Smart DRS can be used on all packaging materials, even if the materials are non-recyclable and returned to residual waste bins. Waste companies can issue identifier codes on stickers to all customers to be placed on all 3 bins. The stickers should be consistent with national messaging and even a national colour coding scheme, as foreseen in the recently published Waste Action Plan.

A deposit of 10 to 20 cent could be placed on all recyclable packaging materials and this can be reclaimed via the App as people place these materials in recycling bins. This could easily extend to materials such as steel cans, cardboard packaging (e.g. cereal boxes), cartons, milk bottles, glass jars/bottles, plastic pots/tubs/trays, etc. We do not envisage such a comprehensive roll-out of deposits from the start, but items can be introduced over time, as desired.

A sticker gun could be used to attach the unique codes in situations where labels are not country specific to Ireland, for example wine bottles. In this way, retailers would encourage country-specific labels on imported products, which would greatly assist recycling efforts in Ireland. The requirement to bring glass to bottle banks to reclaim deposits would greatly reduce contamination of the recycling bins and greatly reduce the weight of residual waste. The unredeemed deposits can be partly used to extend the network of bottle banks and civic amenity sites, as a Smart DRS would cost a fraction of a conventional DRS.

[7] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age_en

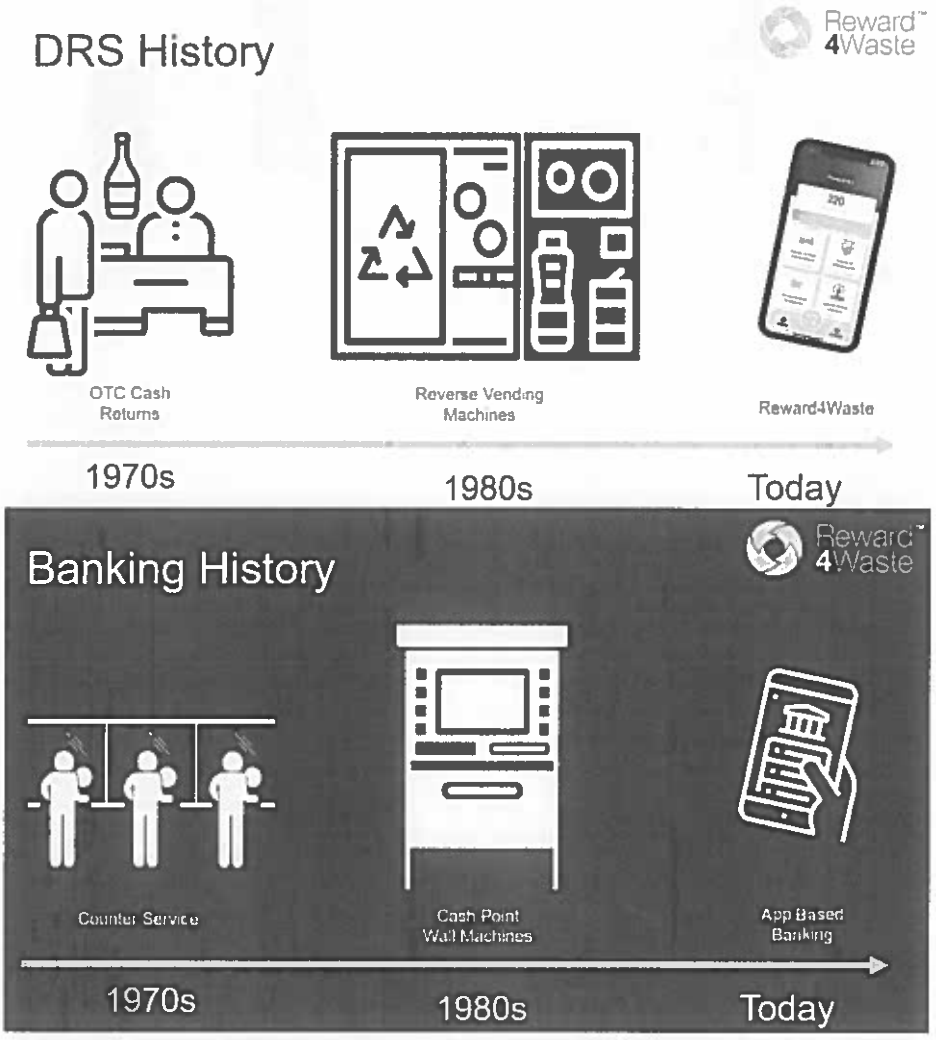
A higher deposit can be put on non-recyclable packaging items, say 25c to 35c per item, if desired. This would encourage producers to use recyclable materials when packaging their goods. The deposit on the non-recyclable items would be reclaimed when consumers scan the general/residual waste bin and place the items in the correct bin. Scanning the wrong bin would generate a message directing the consumer to the correct bin.

4.2.9 Progression from Manual to Digital Transactions

The following images, provided by Cryptocycle, show the progression in banking from 'over the counter' to 'semi-automated' with the introduction of cash machines, followed by 'digital banking' where Apps and other electronic means are used in normal everyday banking.

A similar progression is inevitable with DRS schemes, so it would be a lost opportunity for Ireland to invest so heavily in a system of the past (conventional DRS), when a system of the future is in our grasp (Smart DRS).

Figure 4-1
Progression of Banking as an Example for Progression of DRS



4.2.10 Education and Awareness from a Smart DRS

A smart system such as this, would really help to educate the consumer and would have a very positive impact on recycling rates, contamination levels and litter prevention. Deposits can be increased and decreased to assist with the implementation of Government environmental policy. The waste characterisation work carried out by RPS and

the Clean Technology Centre on behalf of the EPA shows that there are significant gains to be made if consumers make a better effort to sort their waste.

Based on the EPA data sourced from those waste characterisation studies, we estimate that kerbside household recycling could increase from 28% to 56% and commercial backdoor recycling could increase from 22% to 80% if consumers placed materials in the correct bins, as depicted in the images below.[8]

Figure 4-2
EPA Analysis of Actual Use versus Correct Use for Household Bins

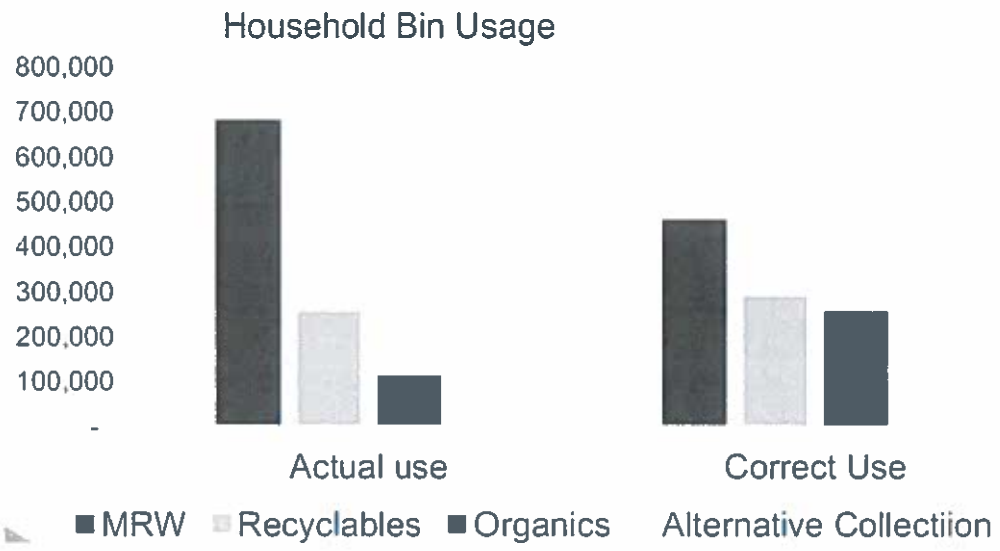
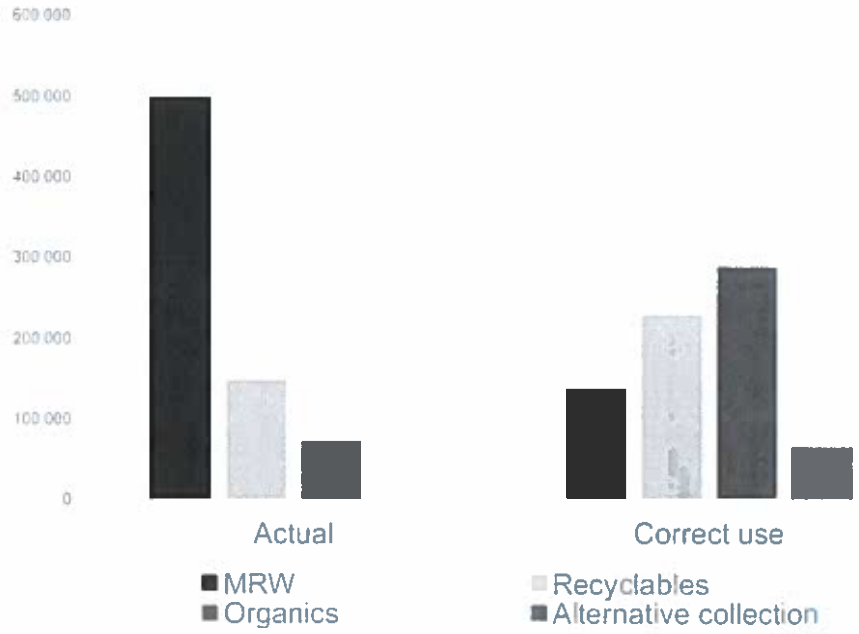


Figure 4-3
EPA Analysis of Actual Use versus Correct Use for Non-Household Bins



[8] Presentation by Helen Searson, EPA, to the Irish Waste Conference in November 2018.

The DRS could act as a learning tool for every consumer in Ireland. They will clearly learn directly from the App if they use it to reclaim their deposits.

Clearly such a system can contribute to solving a number of waste management issues and is much more comprehensive than a conventional semi-automated/manual DRS. It may be prudent to introduce measures progressively, rather than immediately in a 'big bang' move. The system could be developed to address a limited range of materials initially, such as beverage containers (all materials) and then be expanded as the public gets comfortable with it and the usage levels of the App are high enough to justify expansion.

4.2.11 Costs of a Smart DRS

SLR Consulting's Report on the '*Likely Impact of a Deposit & Return Scheme on Waste Management in Ireland*' published in January 2020 and attached to this submission, estimated that a Conventional DRS in Ireland would cost about €73million per annum to operate. The capital costs were annualised in that calculation, to give a cost per annum for development and operation of the scheme. Eunomia's report uses different figures but comes to a similar conclusion for the annual costs of the scheme.

In the Table below, we compare the costs of a Smart DRS with a conventional DRS, using the same methodology that was used by SLR Consulting.

Table 4-2
Likely Annual Costs of Conventional versus Smart DRS in Ireland

Item	Description	Conventional DRS Est. Cost per annum millions	Smart DRS Est. Cost per annum millions
1	Installation of RVMs & Storage Room (spread over 10 years)	€ 25.0	€ 5.0
2	Development of 3 Regional Depots (spread over 10 years)	€ 3.8	€ 0
3	Set-Up costs (spread over 10 years)	€ 2.1	€ 2.1
4	Ongoing labour and space costs at stores	€ 6.3	€ 1.3
5	Logistics Costs	€ 22.4	€ 4.5
6	Counting Centre Costs	€ 3.2	€ 0
7	Central Administration Costs	€ 2.7	€ 2.7
8	Labelling & Security Markings	€ 7.7	€ 10
	Total Estimated Annual Costs	€ 73.2	€ 25.6

We take the view that a fully comprehensive Smart DRS would require less than 20% of the new centralised drop-off points compared with a conventional DRS, so the costs associated with the installation, space, labour and logistics are all set at 20% of the previously calculated costs.

There would be no need for counting centres and centralised depots with a Smart DRS as the system counts every item as it is claimed and the centralised collection points can be serviced by the existing waste collection service, particularly if a range of recyclable materials are accepted.

We allow similar costs for set-up, administration and a higher cost for labelling as household, commercial and street bins would require labelling with unique codes. This exercise shows a saving of close to €50 million per annum for a Smart DRS.

A Smart DRS can also generate much more revenue as it can be applied to a much wider range of packaging materials. Eunomia estimated that a DRS on PET Bottles and Aluminium cans would generate €31.74million per annum in unredeemed deposits, based on 10% unredeemed PET bottles and aluminium cans.

If the scheme was extended to milk bottles, glass jars/bottles, cartons, shampoo bottles, bleach bottles, cereal boxes, yoghurt tubs, steel can, food trays, non-recyclable packaging such as crisp packets, etc, it is clear that 10% unredeemed deposits would comprise hundreds of millions of euro per annum. Even if it was just extended to all beverage containers, regardless of materials, it would generate significantly higher revenues. That money should be ring-fenced to pay for the operation of the DRS as well as supporting the following areas:

- development of reception points for recyclable materials including bottle banks, civic amenity sites and street recycling.
- Litter clean-ups.
- Education and awareness initiatives for waste prevention and waste management.
- Recovery operator subsidies to support recycling efforts.
- Financial support/grants for indigenous reprocessing of recyclables.
- Research into materials being exported overseas.
- Research and identification/development of opportunities for reuse/recyclable alternative (packaging) materials.
- Reuse initiatives, including grant-aid and subsidies for repair and restoration services as well as promotion of reuse hubs.
- Etc.

4.2.12 Contribution to Waste Action Plan and EU Targets

A conventional DRS in Ireland would do little to assist Ireland with meeting national and EU targets and objectives apart from the targets set in the Single Use Plastics Directive. This is detailed in the attached SLR report.

On the other hand, a Smart DRS has much greater potential to assist in achieving the following:

- Packaging waste recycling targets – a Smart DRS can extend to a wider range of recyclable packaging materials and will result in higher recycling rates for all these materials, not just PET and aluminium.
- Municipal waste recycling targets – similarly, a Smart DRS will result in higher recycling rates for MSW, not just for PET and aluminium.
- Education and awareness would be advanced by a Smart DRS as the App would continuously inform people of the right and wrong bins at home, at work and 'on the go'.
- The Waste Action Plan states:
    - *"We will incorporate municipal waste recycling targets as conditions of waste collection permits (i.e. collectors will be required to achieve a 55% recycling rate of municipal waste by 2025, 60% by 2030 and 65% by 2035). The effect of this will be to incentivise the waste industry, in the context of the current market structure, to drive enhanced segregation including for apartment complexes."*

  A Smart DRS will help to achieve these higher recycling rates, particularly if it impacts positively on the materials placed on the market in Ireland. The removal of glass bottles and jars from the residual waste bins would be particularly helpful in this regard due to their weight. The data provided by a Smart DRS

would also be helpful in identifying good and bad results in terms of recycling rates achieved in different areas and different materials.

- The Waste Action Plan states:
  - *"We will work to improve waste segregation in the commercial sector, including an awareness campaign and enforcement actions requiring segregated waste bins and incentivised charging to ensure waste minimisation and proper segregation."*

A Smart DRS would also help with this policy as people will recycle a wide range of materials in their workplace to reclaim deposits and will be more conscious of the contents of each bin.

- The Waste Action Plan states:
  - *"We will standardise the colour coding of bins across the State on a phased basis (general waste bin to be designated as a 'recovery' bin: colour black; mixed dry recycling bin: colour green; organic waste bin to be designated as 'organic waste recycling bin': colour brown)."*

Whilst the IWMA is opposed to this policy, a Smart DRS could offer a compromise solution whereby every household and commercial bin in the country is fitted with a sticker that has a unique QR code as well as the desired terminology and colour. This would also extend to street recycling bins and those at shopping centres, stations, airports, etc.

- The Waste Action Plan states:
  - *"We will work to deliver sustained and visible public behavioural change campaigns under uniform branding, targeting individuals, business and the public sector to encourage waste prevention and recycling."*

A Smart DRS will act as an educational tool and will also generate much more surplus revenue as it costs less and generates more revenues from a wider range of deposit materials. A portion of that revenue can be spent in the areas identified in this policy.

- The Waste Action Plan states:
  - *"We will revisit the existing national standardised list of items acceptable in the mixed dry recycling bin with a view to expanding the list to capture more recyclable materials."*

With a unique identifier on a wide range of packaging materials, the consumer can use the Smart DRS App to verify the correct bin for each item, thereby facilitating a good response to any changes to the recycling list. The additional revenues from a Smart DRS can also facilitate the subsidisation of more indigenous recycling in Ireland, particularly of plastics that are currently not economically recyclable. The REPAK subsidies can be higher if a portion of the revenues from a Smart DRS are used in this way. By contrast, a conventional DRS would not generate surplus revenues that could be used in that way.

- The Waste Action Plan states:
  - *"We will examine means to ensure segregated waste receptacles are provided by commercial premises for customers."*

Mixed dry recycling (MDR) bins at commercial premises should be available for use in returning deposit items from a Smart DRS. This is much simpler than take-back in a conventional DRS as customers just need to scan the bin with their smartphone and place the item in the MDR bin. There is no need for the commercial outlet to refund the deposit. The commercial premises could also use smart bins that only open when a suitable item is scanned using the unique QR code system. This would protect against contamination of the commercial MDR bins with non-recyclable materials.

- The Waste Action Plan states:
  - *"We will introduce further measures to incentivise the prevention and segregation of waste, including for example, reviewing the incentivised charging regime and introducing penalties for those who fail to segregate waste."*

A comprehensive Smart DRS that extends to many packaging materials will be self-policing in this regard. Those that fail to segregate their waste properly will lose their deposits and that can apply to both recyclable and non-recyclable packaging.

- The Waste Action Plan states:
  - *"We will work with relevant stakeholders to improve waste segregation in apartment complexes."*

It is currently difficult to increase recycling rates at apartments as the use of communal bins often results in a low level of personal responsibility and poor practice by some apartment dwellers can lead to poor practice by most or all residents in the apartment block. However, a comprehensive Smart DRS that extends to many packaging materials will be self-policing in this regard. Those that fail to segregate their waste properly will lose their deposits and that can apply to both recyclable and non-recyclable packaging. This should lead to good practice which should be contagious in this setting.

- The Waste Action Plan states:
  - *"We will work with stakeholders to ensure the waste sector is responsive to emerging trends and best practice in waste collection and treatment options."*

The development of a Smart DRS is an emerging trend and will undoubtedly become best practice in waste collection. This is a great opportunity to fulfil this policy immediately. A conventional DRS would surely have to transition to a Smart DRS in the future and we respectfully suggest that such a transition would be difficult for all involved, so it makes a lot more sense to embrace a Smart DRS now and build on it in the future.

- The Waste Action Plan states:
  - *"We will work to encourage the rollout and mainstream adoption of mywaste package labelling."*

The use of unique codes in a Smart DRS would be equivalent to mywaste packaging labelling as it would inform the consumer of the recyclability of the material when they use the smartphone App to check it. In this context, the more materials covered by the scheme, the better.

- The Waste Action Plan states:
  - *"In order to continue our progression and attain the EU packaging, recovery and recycling targets, we will introduce national targets for packaging compliance schemes within their approvals. These will include stretch targets to advance timeframes and position Ireland as a frontrunner within the EU."*

A Smart DRS that incorporates a wide range of packaging materials would be expected to increase recycling rates for those materials to 90% or more. Ireland would be a world leader in that context. Also, the surplus revenues from a Smart DRS could subsidise indigenous recycling of a wider range of packaging materials including soft plastics.

- The Waste Action Plan states:
  - *"We will set specific packaging format/product targets e.g. beverage and food cartons."*

Specific packaging format/product targets can be backed by deposit and return in a Smart DRS, which has the flexibility to do this easily.

- The Waste Action Plan states:
  - *"In line with the Programme for Government commitment, we will end self-compliance as an option under EPR. This will facilitate the mandatory introduction of EPR for all packaging producers before the 2024 EU deadline and will mean all producers will be liable for the ecomodulation of fees, (i.e. recyclable packaging will have lower fees and non-recyclable, composite packaging and over-packaging will be heavily penalised)."*

The setting of variable deposit levels in a Smart DRS can achieve the stated goal of encouraging recyclable packaging materials and discouraging composite packaging that cannot be recycled.

- The Waste Action Plan states:
  - *"We will ensure that Ireland achieves the packaging objectives within the Circular Economy Action Plan and the Plastic Strategy by ensuring that all packaging on the Irish market is reusable or recyclable in an economically viable way by 2030."*

This can also be achieved by the setting of variable deposit levels in a Smart DRS that phases out non-recyclable materials over the desired time period.

- The Waste Action Plan states:
  - *"We will work to reduce contamination levels in recycling bins."*

A Smart DRS would be very helpful in this regard, in terms of education and awareness, as discussed earlier in this submission.

- The Waste Action Plan states:
  - *"As part of the education and awareness programme outlined later in this document when we look at Citizen Engagement we will:*
    - *promote plastic and packaging as an urgent public issue (how to prevent it e.g. by choosing packaging free products) and how to handle the packaging waste that arises; and*
    - *raise consumer awareness on the benefits of use of reusable containers and work with retailers to encourage the provision of refill options."*

The placing of deposits on a wide range of materials in a Smart DRS would make reuse options appear more financially attractive. In addition, surplus revenues from a DRS could be used to support reuse in a number of ways. For example, the consumer could be offered a higher return on their deposit if they bring their glass bottles to reuse facilities. Also, surplus revenues from a Smart DRS could subsidise or grant-aid reuse initiatives and promote jobs in the areas of repair and restoration.

- The Waste Action Plan states:
  - *"We will utilise communication messaging to demonstrate how Local Authority areas are performing in respect of national targets."*

The data produced by a Smart DRS would be very helpful in this regard, as it would pinpoint the return rate of deposit items by local area, town, county, etc, which would help to target poor performing areas with enhanced communications campaigns.

- The Waste Action Plan states:
  - *"We will examine how segregated waste and recycling bins using uniform labelling could be provided on street, and at public events and festivals."*

A Smart DRS would fund the provision of street recycling bins and bins at public events and festivals that can accept deposit materials. However, where possible, public events and festivals that supply beverages should use reusable beverage containers with a large deposit (e.g. €1) that is redeemable at the event. These containers should ideally be washed and reused during the event.

We note that many local authorities are embracing "smart" street bins such as Big Belly and Mr. Fill compaction bins. These bins are fitted with SIM cards and can relay information back to a central base. They are very compatible with a Smart DRS and using the surplus funds from a Smart DRS to roll-out more smart street bins would be a very appropriate use of that revenue.

Photo 3 – Example of Smart Solar Compaction Bins

- The Waste Action Plan states:
  - *"We will continue to work with the Regional Waste Management Planning Offices (RWMPO) in the continued promotion of the mywaste.ie recycling labels to develop a unified approach to labels and standards for citizens to easily understand what packaging goes where."*

The use of unique codes in a Smart DRS would be equivalent to mywaste packaging labelling as it would inform the consumer of the recyclability of the material when they use the smartphone App to check it. Matching the bin with the relevant materials would be a lot easier for the public when they use the App on their smartphones. In this context, the more materials covered by the scheme, the better.

- The Waste Action Plan states:
  - *"We will utilise national and EU funding streams for research into plastic and packaging including:*
    - *research into materials being exported overseas; and*
    - *research and identification/development of opportunities for reuse/recyclable alternative (packaging) materials."*

A portion of the surplus revenues from a Smart DRS could be used to fund this research.

- The Waste Action Plan states:
  - *"We will introduce a deposit and return scheme for plastic bottles and aluminium cans. In delivering this, we will work closely with the food and drink industries, retailers, waste collectors and treatment facilities, and our colleagues in Northern Ireland."*

The IWMA is opposed to a conventional DRS and supports a Smart DRS, so we intend to be very progressive in working with Government to implement a Smart DRS. A conventional DRS would exclude the existing waste collection and treatment system, so we fail to see how waste collectors could work with Government using a model that compromises the existing recycling system. We would find ourselves in conflict with the implementation of such a system.

It is our understanding that most retailers are opposed to operating the conventional take-back arrangements associated with a traditional DRS, so we expect that they should also favour a Smart DRS.

We are unaware of the position of the food and drink industries on this matter, but we can see many advantages to a Smart DRS from their point of view, including greater potential to recycle more of the material that they place on the market, which is ultimately their responsibility. A Smart DRS is a cost-effective way for them to achieve that goal.

Integration with Northern Ireland would be quite simple using a Smart DRS, compared with a traditional / conventional DRS. The source of the materials would be identified by the unique codes and the deposit value and currency difference easily assigned to the account of the consumer reclaiming the deposit on either side of the border. Cross border issues that can be a serious challenge to a traditional DRS would not be an issue with a Smart DRS.

- The Waste Action Plan states:
  - *"This will be delivered via the following steps:*

    1. Public consultation on design options (Q3 2020)

    2. Public consultation on preferred model and draft regulations (Q1 2021)

    3. Commencement of underpinning legislation (Q3 2021)

    4. Introduction of scheme (Q3 2022)."

The proposed timeframe is certainly ambitious regardless of which scheme is chosen. We expect that a Smart DRS could be implemented faster than a conventional DRS as all the key infrastructure is already in place. A conventional DRS, as proposed by Eunomia, involves:

- The installation of 2,591 reverse vending machines with associated storage arrangements,
- The installation of take-back and storage facilities at 13,809 other premises,
- The development of five counting and sorting centres that would have to undergo site selection, land acquisition, design, planning permission, waste licensing, construction, installation of equipment and commissioning.
- The set-up of a logistics operation to collect the deposit materials.
- Education and awareness of all staff working in the take-back premises.
- Education and awareness for the consumer.
- Etc.

In reality, the counting/sorting centres alone will take more than 2 years to develop, so the proposed timeline cannot possibly be met with a conventional DRS.

On the other hand, a Smart DRS can be developed without need for any major new infrastructure. It will take time to conduct pilot projects before full roll-out, but we feel that this will be time well spent and should avoid major mistakes that could occur during full roll-out, if not tested at pilot scale. It will also take time to design the printing of labels and to communicate with the public, but that can be done in parallel and would be required also in a conventional DRS. The roll-out of unique labels to all existing bins can be carried out efficiently in a matter of months rather than years.

- The Waste Action Plan states:
  - *"A working mix of incentivisation and enforcement may be required to increase good behaviour, and the benefits of changed behaviour must be emphasised. All messaging must be evidence based to be effective."*

A Smart DRS will be very costly to those that do not manage their waste correctly and will be rewarding for those that exhibit good behaviour. It offers a very good example of the polluter pays principle if it is extended to a wide range of materials.

- The Waste Action Plan states:
  - *"Current standards of labelling, in providing information to consumers, need to be improved and products should carry a message on how they should be dealt with at end of life. The input of product manufacturers nationally and at EU level will be required if this is to be effective."*

The IWMA strongly agrees with the sentiment expressed here. A Smart DRS will provide this information in an electronic manner via the unique QR Code, so the wider the range of deposit materials, the better in this context.

It is clear from the above analysis that a Smart DRS has the potential to further many of the policies identified in the Waste Action Plan. Policies that would otherwise be difficult or costly to implement.

5.0 EUNOMIA REPORT

5.1 Need for Independent Cost-Benefit Analysis

The IWMA has concerns over the appointment of Eunomia to conduct a cost-benefit analysis of a DRS in Ireland. We respectfully suggest that an independent consultant should have been appointed to complete that task. Eunomia lobbied the Oireachtas Joint Committee on Communications, Climate Action and Environment in favour of a DRS in the debates on the Waste Reduction Bill 2017. The Report[9] that was issued by that Committee provided details of those that lobbied for and against a DRS, as follows:

Proposal B: Deposit Return Scheme (DRS)	
Arguments	
Supportive	AGAINST
Eunomia VOICE	Convenience Stores and Newsagents Association (CSNA) Department of Communications, Climate Action and Environment Food Drink Ireland IBEC PMCA Consulting Repak Retail Ireland

Eunomia clearly lacks independence on this subject and it is therefore not surprising that the report issued by Eunomia favours a conventional / traditional DRS and gives very little consideration to the impact of such a scheme on the existing kerbside recycling system in Ireland.

Whilst the conclusions of the Eunomia report were unsurprising, we are greatly concerned about the inaccuracies and the bias exhibited in the report. We provide some examples in the following sections. There are other errors in the report that we have noted, but this is not a full critique, we just focus on the substantial issues of concern.

5.2 Current Recycling Rates

REPAK, as the sole PRI Scheme for packaging waste in Ireland, is tasked with gathering and recording data on packaging waste generation and management in this Jurisdiction. REPAK provided the following data to the IWMA[10] in 2019, based on their 2018 estimations:

Table 5-1
REPAK 2018 Data on PET Bottles and Aluminium Cans

	Placed on Market (t)	Quantity Recycled (t)	Current Recycling Rate
PET Bottles	25,490	15,472	60.7%
Aluminium cans	11,456	8,363	73.0%

The Eunomia Report contradicts this data and presents the following estimations for PET bottle and aluminium can recycling:

[9] Houses of the Oireachtas, Joint Committee on Communications, Climate Action and Environment - Report of the Joint Committee on the Detailed Scrutiny of the Waste Reduction Bill 2017 [PMB] - 32CCAE006 – 28th May 2018. Table 6: Summary and categorisation of main stakeholder arguments

[10] Email correspondence from David Sharpe (REPAK) to Conor Walsh (SLR/IWMA) on 27th November 2019.

Table 2-2: Current Final Destinations of Beverage Containers Placed on the Market Annually

	PET Beverage Bottles	Aluminium Beverage Cans
Units Placed on the Market	959,000,000	790,000,000
Placed on the Market (tonnes)	28,751	12,774
Recycling Rate (%) sent to re-processors	54.9%	55.0%
Recycling Rate (%) adjusted for losses at re-processors	43.9%	69.4%

In reaching the figure of 43.9% for PET Bottles, Eunomia[11] stated the following:

"Recycling rates for PET were based on tonnages provided by Repak showing the proportions funded by Repak, recycled and recovered. The total tonnage funded as recycling was 16,569 tonnes out of a total 28,751 tonnes funded by Repak, which results in a rate of 55%. A loss rate in re-processing of 20%, as per data provided by other stakeholders, was then applied to result in a final recycling rate of 44%."

We believe that the 20% reduction in PET bottle recycling was not merited and no evidence is provided by Eunomia to support such a significant change to the REPAK/EPA figures. We believe that the actual figure for PET bottle recycling is between 50% and 55% as detailed earlier in this report, so 43.9% is a significant under-estimate in our view and has serious implications on some of the conclusions of the Eunomia Report.

Also mentioned earlier in this report is the latest REPAK estimate of aluminium can recycling, which is 89%, which is much higher than the 69.4% used by Eunomia and that also has serious implications on some of the conclusions of the Eunomia Report.

5.3 Analysis of Recycling Rates in Other Countries

We note that the Eunomia Report downgrades the recycling rates in Ireland and Belgium, but does not downgrade recycling rates in countries that operate a DRS. Eunomia has previously reported[12] that many EU countries have exaggerated their municipal waste recycling rates. The following table shows the data reported to Eurostat for 2017 versus Eunomia's estimate of the actual MSW recycling rates in those countries.

Table 5-2
Adjustments Required to Recycling Rates According to Eunomia

Germany	67.6%	54%
Belgium	53.7%	50%
Switzerland	52.5%	50%
Austria	57.7%	48%
Slovenia	57.8%	48%
Netherlands	54.2%	47%

[11] Appendix A.4.3.1 of the report

[12] https://www.eunomia.co.uk/reports-tools/recycling-who-really-leads-the-world/

According to Eunomia's previous work, the greatest exaggeration is in Germany and the IWMA agrees with that view, as we have reviewed a report commissioned by the German Waste Management Association[13] that provides details of the erroneous calculation of MSW recycling rates in that country. In fact, that report suggests an even lower recycling rate for Germany in the range of 47% to 52%.

However, Eunomia puts a lot of faith in the very high recycling rate reported for deposit materials in Germany (98.4% in Section 4.4) and does not question that data in any way. This is in stark contrast to Eunomia's treatment of data reported by Belgium to Eurostat. The Eunomia Report confirms that Belgium, without a DRS, ranks highest in Europe for packaging waste recycling (Figure 3-1), second highest for metal packaging recycling (Figure 3-3) and third highest for beverage can recycling rates (Figure 3-4).

The Eunomia report goes on to further analyse and place doubt over the Belgian figures, but does not question the data produced by countries that operate a DRS. We believe that this shows bias against countries without DRS schemes in favour of those that operate such schemes.

5.4 Impact on Kerbside Recycling

We consider that Eunomia's analysis of the impact on kerbside recycling is flawed and the IWMA is prepared to challenge it, if necessary. Eunomia uses baseline information from a Peter Bacon report that was published in 2008 in response to a recycling crisis at the time when Chinese markets collapsed. This was not a good baseline and was not accurate on the costs that Eunomia gleaned from it.

SLR's in-depth analysis in the attached report shows that collection costs for dry recyclables are approximately €500 per tonne, not the €130 per tonne that Bacon estimated. The €8 figure for impact on collections in Table 5-6 therefore increases to a €30 impact. By the same token, the material revenue impact later in that same table should be €28, not €13.

Later in the same Table, the figure of €21 per tonne should be corrected to €63/tonne = €12.50 per house i.e. 4.5% increase.

The Eunomia analysis is convoluted and we do not endorse the methodology that was used, but we have identified some very significant errors in the figures used, so it does not stand up to scrutiny and should not be considered a fair analysis of the impact on kerbside collections.

Eunomia claims that the returned deposit materials will be worth €15.35million in intrinsic value (Table 5-3), based on a 90% return rate. The report goes on to state:

> *"The DRS modelling has used the same material prices as the modelling for the impact on kerbside collections, so has conservatively assumed that there is no premium for the higher quality material. If a system operator secured higher prices for the PET and aluminium, the net cost to producers would be lower."*

However, the analysis of the impact on kerbside recycling in Section 5.3.2 estimates that the loss due to removal of deposit materials from the existing system would only be €2.9 million. This analysis is highly inconsistent and does not stand up to scrutiny, so we consider it to be highly flawed.

The SLR report attached to this submission shows in detail how the loss to kerbside recycling would be €6.8 million per annum (see section 3-1 of this submission).

The impact on kerbside recycling from a conventional DRS is very simple to calculate. There would be no discernible impact on collections as waste collectors would still be required to visit every house on the route and the removal of PET bottles and cans would only represent a 6% reduction in weight based on SLR's data presented earlier in this

[13] Report by Thomas Obermeier and Sylvia Lehmann of TOMM+C for the German Waste Management Association https://www.tomm-c.de/fileadmin/pdf/2017/170828_Obermeier_Calculation_methods_for_recycling_rates.pdf

submission. That would not lead to a 6% saving as a lot of time is spent travelling to and from transfer stations. The real difference is the loss of value of the materials so Eunomia's figure of €2.9 million is a significant under-estimate.

We also take issue with Eunomia's ridiculous suggestion in Section 5.1.5.2, where it states:

> *"Finally, it is expected that a proportion of deposit-bearing containers will still be collected in MDR bins. In this case (and providing the containers are still intact), household waste collectors or MRF operators could redeem the deposits on these containers through the DRS system, even if they are not the operator directly involved in collecting the deposit-bearing containers through the official DRS collection points. This would mean that some or much of the lost material revenue and subsidy can be mitigated, as the deposit value per container is greater than the material value and Repak subsidy per tonne combined."*

So Eunomia expects that the aluminium cans and PET bottles placed in the MDR bins will not be crushed by the compactors in the collection trucks and a site operative can collect these uncrushed cans and bottles from the sorting lines and can bring them to a retail store to reclaim the 20 cent deposits. Eunomia suggests that this will mitigate the MRFs' losses, which we estimate at €6.8 million per annum. This is clearly not a credible suggestion.

We were surprised and disappointed that Eunomia did not suggest that bales of aluminium cans and plastic bottles could be rewarded with payments for the unredeemed deposits, as is the case in New South Wales in Australia. That would have been a much better suggestion.

We also find that Eunomia's comparison with other countries is not particularly relevant to the situation in Ireland. The kerbside collection system in Ireland is different from collection systems in the quoted countries in many ways. Germany collects mixed plastics in a yellow bag. Denmark's kerbside collection only extends to half the population. The quoted countries have lower rural populations and higher apartment dwelling compared to Ireland. All of these countries rely more heavily on communal drop off points, rather than individual kerbside household recycling collections. We therefore do not accept that the impact on kerbside recycling in those countries would be equivalent to the impact in Ireland.

We also note that Eunomia has not analysed the impact on kerbside recycling associated with the loss of the REPAK subsidy on PET Bottles and aluminium cans.

5.5 Contamination Levels

The Eunomia Report states in Section 4.3.3:

> *"Evidence from recyclers also suggests that beverage containers collected via a DRS will be less contaminated than those collected through the kerbside. Indeed, a representative of the Irish recycling industry commented that their "biggest problem is cross contamination which is very difficult to sort out."*

There can be no reliance on hearsay from un-named sources described by Eunomia as *"Recycling Industry Representatives"*. The IWMA is the main representative body for recyclers in Ireland and we do not concur with these sentiments.

The MDR bins collected by our members have variable levels of contamination and that is certainly an issue for the MRFs to deal with. However, they do deal with it and they produce high quality bales of aluminium cans and various grades of PET Bottles.

The grade of PET Bottles produced depends on the market price and demand. The machinery can be adjusted to produce a very high grade if that is what the market forces demand. Some MRFs already produce bales that are close to 100% PET Bottles, whereas others produce an 80:20 mix of PET Bottles (80%) and PET Trays (20%). In the

next stage of the recycling process PET Trays are flaked, washed, extruded and pelletised alongside PET Bottles to produce rPET (recycled PET), so this is not considered to be contamination.

We are reliably informed by the relevant expert in a major manufacturer of PET Trays[14] in Ireland that the rPET produced from PET bottles and trays collected in MDR bins can be used to make PET Food Trays. The sorting is more intensive for PET and aluminium cans collected in the MDR bins, but the final recycled raw material is of comparable quality and can be used as 'food grade' raw material.

We can also confirm that SLR consulting has prepared market reports for two companies that are considering the development of a PET reprocessing facility in Ireland and neither company has expressed an issue with the quality of rPET that can be achieved using PET collected in MDR bins.

So, Eunomia's comment in Section 4.4.6:

> *"The containers are consequently an important source of revenue and producers may be particularly interested in the PET, as the DRS can provide food-grade rPET that can be used to manufacture new bottles."*

must be viewed in the context that equivalent quality rPET can be produced from PET bottles and PET trays sourced from co-mingled collections of dry recyclables. We believe that our sources are reliable in this regard, but we cannot comment on Eunomia's sources, as they are unnamed.

5.6 Litter

We find that Eunomia's analysis of litter in Ireland is quite flawed. Firstly, the report states in Section 5.1.1 that:

> *"A littering rate of 1.62% was applied, based on the EPA's data for "unmanaged" waste."*

Litter is a subset of unmanaged waste, which also includes backyard burning, burning waste wood/paper in fireplaces, flushing waste down toilets, in-sink macerators, etc, so the figure used by Eunomia is clearly an over-estimate.

In Section 5.1.5, Eunomia states:

> *"It is, however, worth noting that local authorities in Ireland spent over €105 million on litter-related services in 2018. As an indication, however, a study by Eunomia for Keep Britain Tidy in the UK found that a DRS could lead to savings for litter and street cleaning services in the order of £0.22 (€0.24) to £0.45 (€0.50) per household per annum (smaller for more rural authorities)."*

The first part of this paragraph refers to litter and street sweepings, which includes the management of litter bins and is not a reflection of littered materials.

The second half of the paragraph suggests that a DRS would save about €500,000 per annum in litter and street cleaning services in Ireland. This shows that the €105 million figure is clearly not relevant.

This also puts another quoted figure in context. In Section 5.3.3 Eunomia states:

> *"the DRS could be associated with an annual reduction in litter disamenity of €95.8 million."*

This statement is clearly an outrageous exaggeration.

[14] Personal communication between Panda and Quinn Manufacturing.

In Appendix 01 of this submission, we provide a letter from Tobin Consulting Engineers detailing the number of plastic bottles and aluminium cans that were encountered in all the litter surveys in Ireland in 2019. Tobin Consulting Engineers compiled that data for the local authorities.

There were 1552 surveys covering the worst litter blackspots in Ireland that year. A 50m stretch of road was covered in each case. On average, each survey found one plastic bottle and one aluminium can. We recognise that litter is bad and plastic bottles and aluminium cans contribute to litter, but we cannot accept Eunomia's analysis that suggests removing one can and one plastic bottle from each litter blackspot is somehow worth €95million to society. This is clearly a ludicrous claim that we strongly challenge.

5.7 Space Requirements at Retailers

In Table 6-18 of the Eunomia Report, the estimated storage cost to retailers is based on an assumption that they only need 1m² for storage of returned cans and bottles (more for RVMs). This is surely an underestimate as the cans and bottles will be uncompacted and will take a lot more room than that to store. We note that some premises would have weekly collections and some monthly. Extra storage space would drive costs much higher as it applies to nearly 14,000 premises. If 4m² was required for all premises, the annual cost of storage space would be nearly €20 million more than the cost estimated by Eunomia.

5.8 Transport Costs

The assumptions on transport costs in Section A.6.4 are questionable. For example, it is assumed that

> *"Retailers are located an average drive time of 30 minutes from the vehicle depot and it takes 15 minutes to travel between pick up points;"*

The vehicle depot would have to be located at the sorting centre as this is where the material must be delivered. If the depots are located elsewhere, the transport costs would be even higher. Eunomia proposes 5 sorting centres in Ireland. We fail to see how an average drivetime of 30 minutes from 5 points in Ireland would reach the 16,000 take-back locations. This is a very loose assumption and the actual transport costs could multiples of the predicted €11.7 million per annum.

5.9 Environmental Impacts

The Eunomia report speaks positively about the environmental benefits of recycling 90% of PET Bottles and Aluminium cans, but also recognises the environmental impacts associated with the development of a new collection and processing system that would operate in parallel with the existing collection and processing system for mixed dry recyclables.

Earlier in this submission, we promote the development of a Smart DRS that uses the existing collection and processing infrastructure with only a marginal increase in transport and energy demands. That system would have all the environmental benefits detailed in the Eunomia report, without the negative environmental impacts.

APPENDIX 01

Letter from Tobin Consulting Engineers addressing the 2019 Litter Surveys in Ireland

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Our Ref: ***11012*** 14th October 2020

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Windy Arbour,
Dublin,
D14N2Y7

Dear Mr Walsh,

TOBIN Consulting Engineers have reviewed the 2019 National Litter Pollution Monitoring System (NLPMS) data which is collected by all 31 local authorities. Under the NLPMS, the type of litter pollution is measured by counting litter items while they remain on the ground. These surveys are called Litter Quantification Surveys (LQS).

In 2019, 1552 LQS were completed nationally. Each LQS is completed over a 50m survey stretch. LQS are completed in the most heavily polluted areas (i.e. the clusters or 'black spots') and as long after cleansing as possible to further increase the chances of a large sample size. These surveys allow the local authorities to determine the composition of litter in their areas.

With regards to your request concerning the number of plastic bottles and aluminium cans, we can confirm that in 2019 the number of items recorded by the NLPMS are as follows;

- Number of plastic bottles = 1628
- Number of beverage cans = 1415

Yours sincerely,

Allison Murphy

Allison Murphy

Project Manager/ Senior Scientist

For and on behalf of TOBIN Consulting Engineers

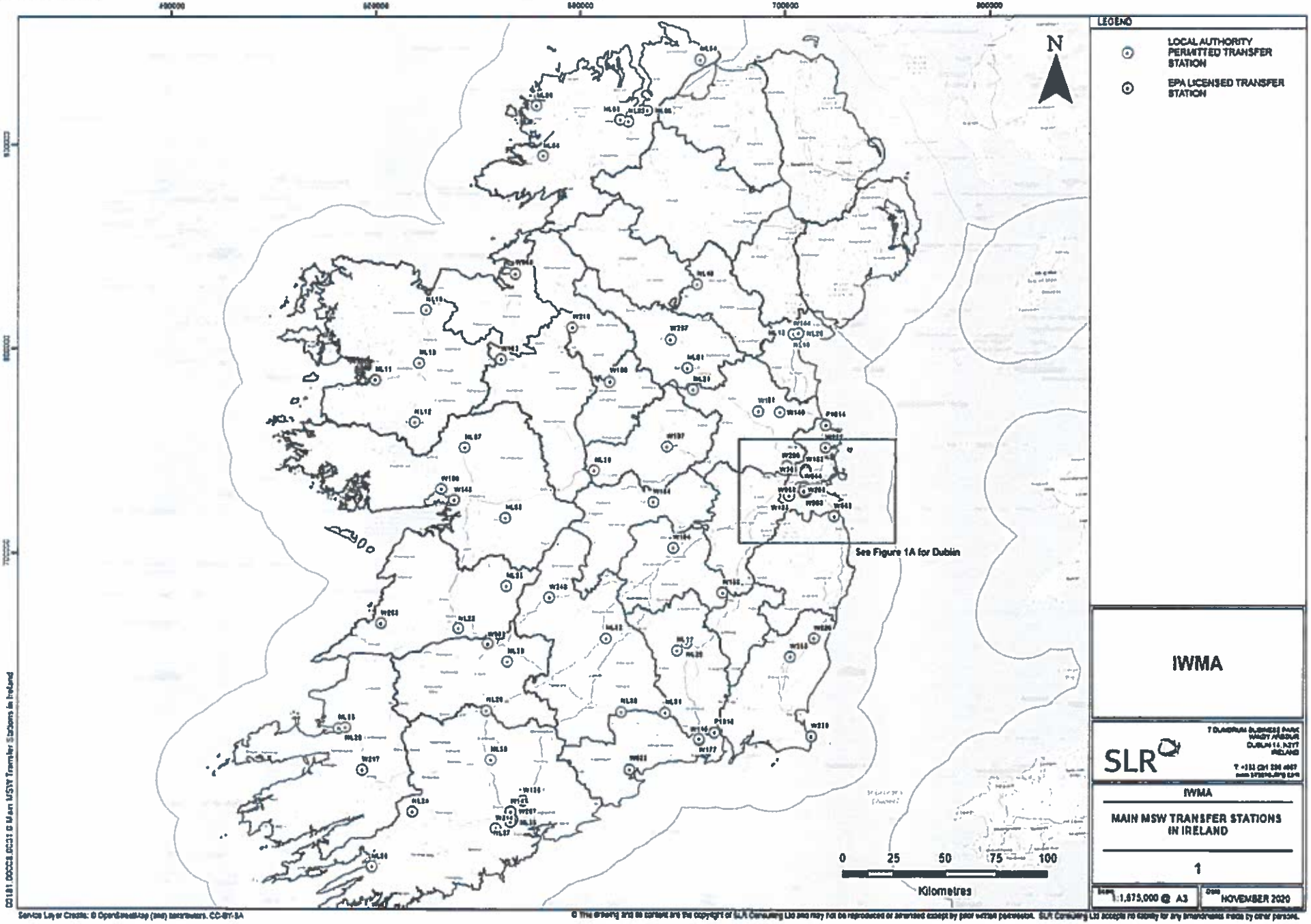
allison.murphy@tobin.ie

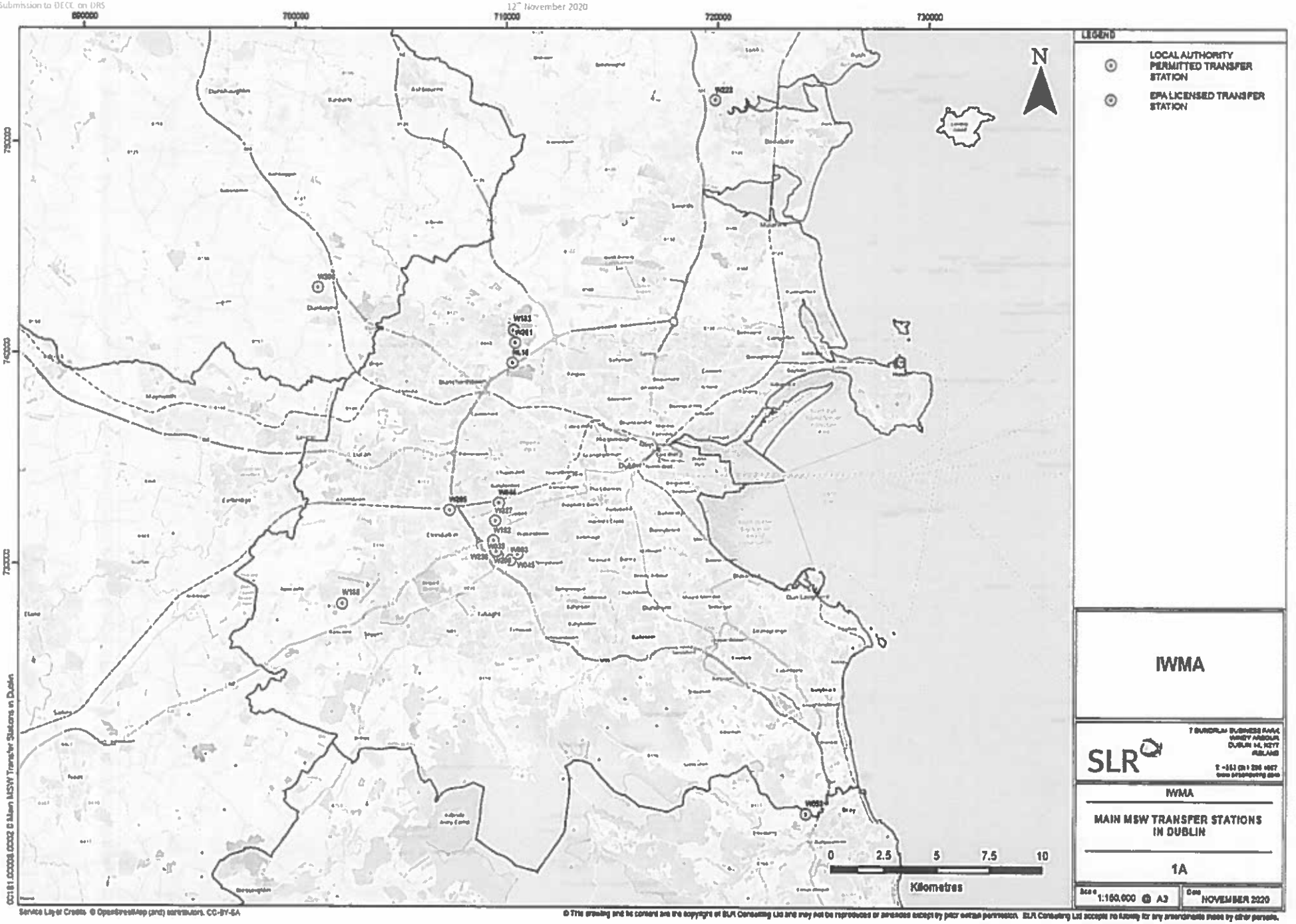
APPENDIX 02

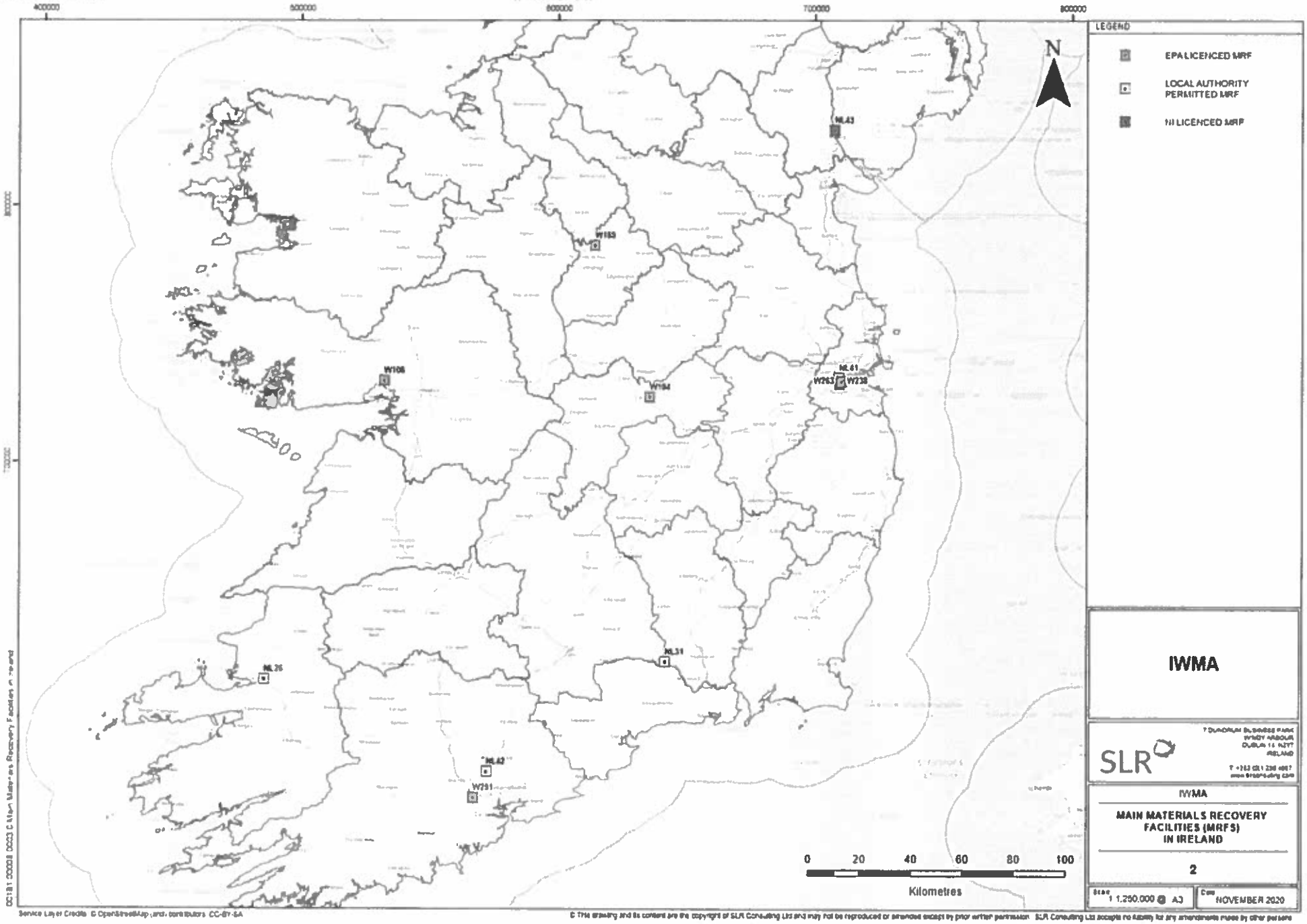
MAPS SHOWING

MAIN WASTE TRANSFER STATIONS

AND MRFS IN IRELAND







LIKELY IMPACT OF A DEPOSIT & RETURN SCHEME ON WASTE MANAGEMENT IN IRELAND

Prepared for:

IWMA

Irish Waste Management Association

SLR

SLR Ref. 501.00047 00025
Revision No: 3 (FINAL)
22nd January 2020

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Executive Summary

The Irish Waste Management Association (IWMA) commissioned SLR Consulting to prepare a report addressing likely impacts of a Deposit & Return Scheme (DRS) for plastic and aluminium beverage containers on waste management in Ireland. The report also considers Ireland's future recycling targets and recommends measures to assist the country in meeting those targets.

Municipal Solid Waste Management in Ireland

The Irish household waste market differs from most countries as the local authorities (or municipalities) do not engage in kerbside household waste collection. The householder in Ireland contracts directly with private sector service providers and generally has a choice of two or three companies for kerbside waste collection. The service is fairly consistent as the minimum number of bins and the types of material collected in each bin have been standardised in legislation, as has the requirement to weigh every bin lift and report the data to each householder. In addition, householders must be charged in a way that incentivises waste prevention and recycling.

The top 20 waste collection companies collect waste from approximately 90% of the household kerbside customers. The other 10% of households are serviced by about 40 small companies, with that number reducing regularly due to consolidation.

Household waste collection largely consists of a 3-bin system for mixed dry recyclables (MDR), food waste and residual waste in urban areas and a 2-bin system for MDR and residual waste in rural areas. The residual and MDR bins are normally 240 litres in size but can be larger or smaller depending on the customer's needs and the frequency of collection. The brown (organic) bins vary in size from small caddies that are designed for food waste without garden waste to 240 litre bins that are suitable for both food and garden waste. Many companies also use 140 litre bins that are suitable for food waste plus some garden waste, such as grass. The food waste bins are not mandated in rural areas, where householders are encouraged to home compost.

The local authorities still play an important role in waste management in Ireland in the areas of planning, permitting, enforcement and the development/operation of civic amenity sites as well as the siting of bring banks. The CA sites and bring bank infrastructure contribute much to recycling in Ireland and will undoubtedly have a greater role in meeting future recycling targets.

A recent waste characterisation study commissioned by the EPA found that the 3-bin kerbside household collection system is somewhat effective in Ireland but could be a lot more effective if the majority of householders made a greater effort to segregate their wastes at home. The report stated that the household recycling bins contained an average of 26.3% non-target materials and the biowaste bins contained an average of 8.2% non-biodegradable materials.

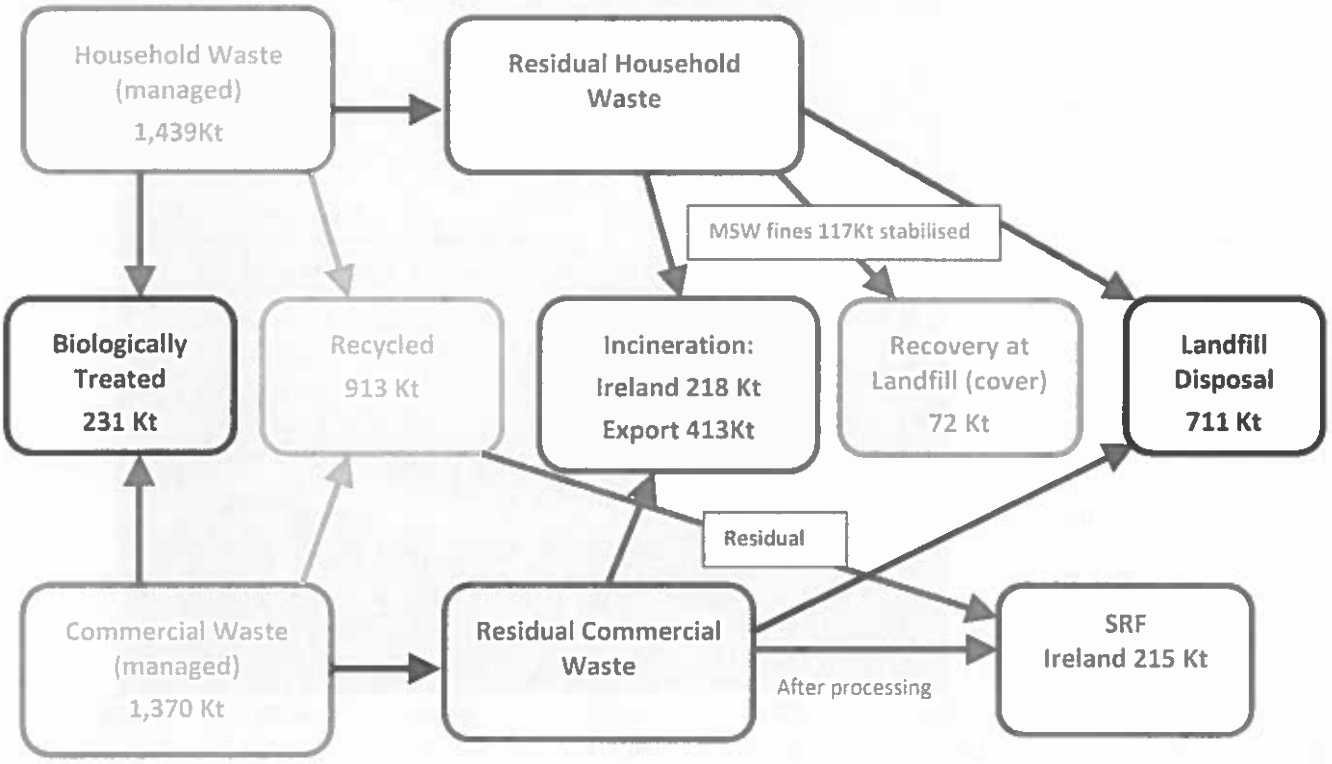
The EPA Characterisation study for non-household (commercial) waste found that the commercial 3-bin system is not producing good quantities and quality of recyclables and could be a lot more effective. The EPA report found that the commercial MDR bins contained 40% non-target materials. However, the commercial biowaste bins performed much better containing just 1.4% non-biodegradable material.

The EPA found that more about 73% of the materials in the commercial residual waste bin should not be there, as they should be recycled. This equivalent figure was 35% for the household residual bin, so greater awareness and incentivisation is clearly needed in the management of commercial waste.

MSW Volumes in Ireland

Municipal Solid Waste (MSW) in Ireland consists of household waste and commercial & industrial wastes that are similar in composition to household waste. Figure 1 below shows the generalised flows of MSW in Ireland in 2016, based on EPA data and SLR's analysis.

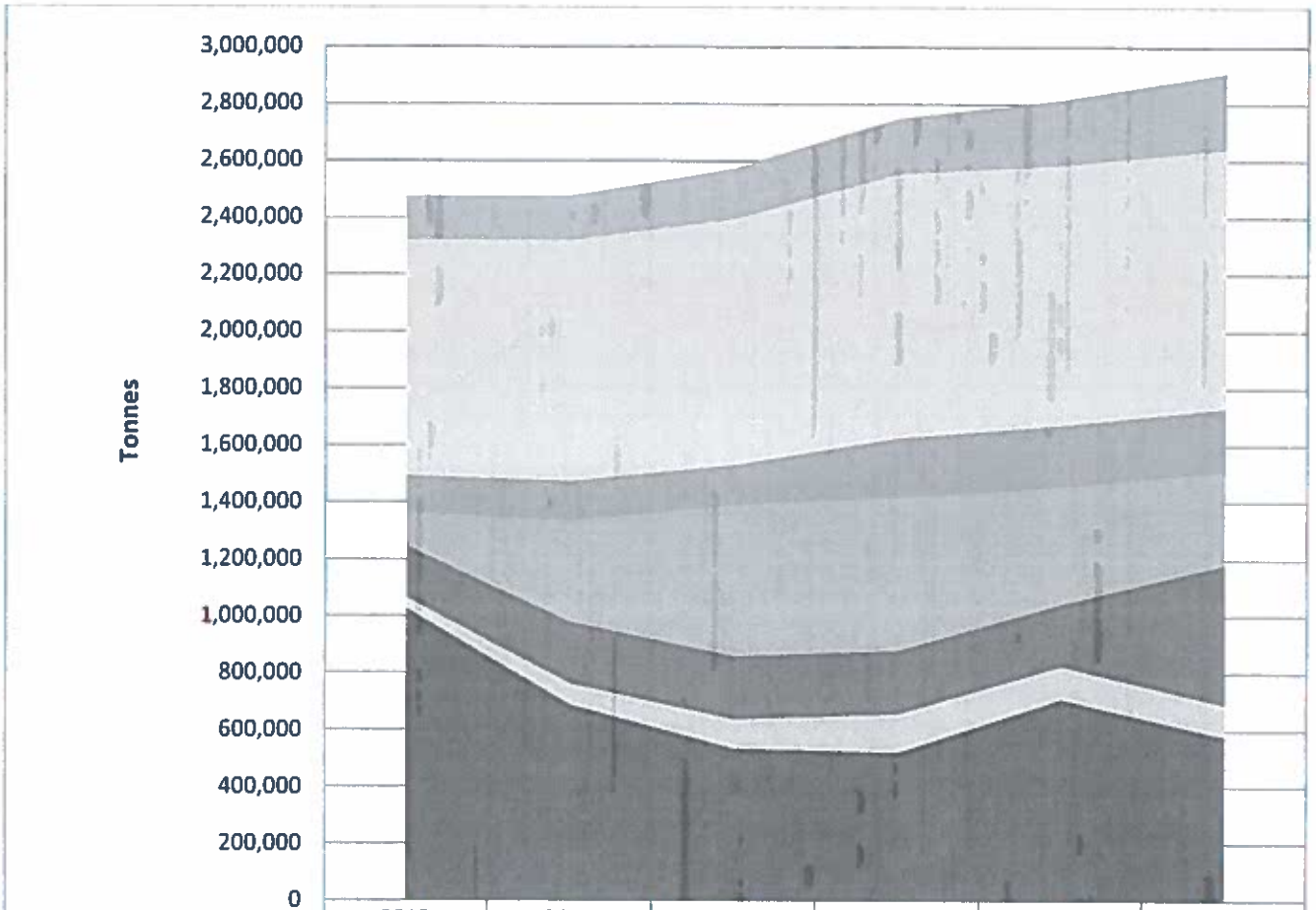
Figure 1 Generalised Flows of MSW in Ireland in 2016



The main difference between 2016 and 2018 is the opening of the Dublin WtE facility at Poolbeg, which is accepting 600Kt/a of rMSW. The export of waste has decreased significantly since the 2014 peak of 531Kt to a projected 221Kt for 2018, based on analysis carried out by the regional waste planning offices. Landfill has also decreased from 711Kt in 2016 to a projected 370Kt in 2018, which is about 13% of managed MSW.

Based on a combination of EPA data and more recent data provided to SLR by the NWCPO and the regional waste planning offices, Figure 2 shows a summary of the treatment of waste generated in Ireland between 2012 to 2017.

Figure 2 Summary of Treatment of Waste Generated in Ireland from 2012 to 2017



	2012	2013	2014	2015	2016	2017
Composting/AD (t)	156,000	158,000	180,017	194,054	230,616	267,827
Material Recycling (t)	828,000	845,884	863,172	927,626	913,480	910,000
SRF Ireland (t)	130,000	139,772	140,000	209,438	215,000	222,000
WtE Export (t)	117,000	354,000	531,064	537,000	413,000	327,000
WtE Ireland (t)	180,000	216,610	222,000	222,664	218,158	491,853
Fines & IBA Recovery (t)	38,914	75,000	102,376	135,645	116,513	113,217
Landfill (t)	1,028,000	689,071	536,621	522,693	710,333	577,932

The recycling rate calculated from that data presented in Figure 2 is as follows:

- 2012 = 39.7%
- 2013 = 40.5%
- 2014 = 40.5%
- 2015 = 40.8%
- 2016 = 40.6%
- 2017 = 40.8%

SLR's analysis predicts that 2018 will see an MSW recycling rate of about 41.8% in response to increased volumes of brown bin material sent for composting and anaerobic digestion, which we estimate should reach about 290Kt (c.10%). Total MSW is expected to be just under 3 million tonnes. Landfill disposal should reduce to less than

400Kt (c.13.5%), as the full impact of the Poolbeg WtE plant boosts the WtE in Ireland figure to more than 800Kt (c.27%).

The stagnated recycling rate is a real concern for the waste sector in Ireland, in the context of the future MSW recycling targets set by the EU in the Circular Economy Package (CEP).

Ireland's Recycling Performance

In this report, SLR has outlined the current performance of municipal solid waste management in Ireland in the context of the recycling challenges set in EU Directives. Ireland has met all targets to date and is on track to meet the 2020 targets, so the performance of the waste sector has been good. This has been achieved by a broad range of actors in the sector including, the waste industry, the local authorities, the regional waste planners, the Government (DCCAE) and the Producer Responsibility schemes, amongst others. Consultation between these stakeholders has been an important factor in Ireland's success and is likely to be equally important in the future, so the IWMA is being proactive in bringing ideas and recommendations to the table. This report falls into that category.

Regardless of Ireland's success to date, the new targets set by the EU in the Circular Economy Package and the Single Use Plastics Directive are much more challenging and Ireland is likely to struggle to meet some targets. The targets of most concern are detailed in Table 1 below.

Table 1 EU Municipal Waste Targets of Greatest Concern to Ireland

EU Directive	By 2025	By 2030	By 2035	Target Specifics	Reference Year	Rate	SLR Comment
Waste Framework Directive (2018/851)	55%	60%	65%	Preparing for re-use and the recycling of municipal waste	2016	41%	Not on Track
Packaging Directive (2018/852)	50%	55%	-	Percentage of **Plastic** packaging waste to be recycled.	2017	34%	Not on Track
EU Directive	**By 2025**	**By 2029**	**By 2035**	**Target Specifics**	**Reference Year**	**Rate**	**SLR Comment**
Single Use Plastics Directive (2019/904)	77%	90%	-	Separate collection for recycling of **single use plastic beverage bottles** with a capacity of up to 3 litres, including their caps and lids, but excluding: • Glass or metal beverage bottles that have caps and lids made of plastic. • Beverage bottles intended and used for food for special medical purposes that is in liquid form.	2018	60.7%	Not on Track

Ireland needs to find ways to boost the recycling of MSW and plastic waste to meet these targets. A step change is required, as gradual increases in recycling will not be enough to increase from the current rate of c.42% MSW recycling to the 2025 target of 55% in just 5 or 6 years. The penalties imposed by the EU for missing these targets could be very expensive for Ireland, so investment now to avoid such penalties would be money well spent.

Deposit and Refund Scheme

A DRS for PET bottles and aluminium cans is currently under consideration by the Oireachtas Joint Committee on Communications, Climate Action and the Environment. The *Waste Reduction Bill 2017* promotes the idea of a DRS in Ireland.

In parallel, the Minister for Communications, Climate Action and the Environment has stated publicly he will commission a review which will consider how we can deliver a 90% collection target for single use plastic bottles in Ireland. This review will also examine the possibility of introducing a DRS and how this might operate in an Irish context. Eunomia has been appointed to carry out that review.

International Examples

In this report, we have looked at examples of similar schemes in each of the States in Australia, where SLR has good waste management expertise. SLR's review found that the DRS schemes in Australia were largely introduced to reduce litter. A secondary element was to increase recycling rates. In particular, the South Australia DRS was targeted at increasing recycling rates as it pre-dated kerbside collections.

In the schemes that have been introduced in recent years in Australia, efforts have been made to work in tandem with kerbside recycling, rather than to compete against it. The New South Wales scheme pays deposits to MRFs for relevant materials that are recycled. This should be considered if a DRS is introduced to Ireland as the impact of a DRS on the MRF gate fees could have wider consequences in terms of the overall viability of kerbside recycling.

Potential Impact on Kerbside Recycling

SLR consulted with each of the MRF Operators in Ireland to see what impact the removal of plastic bottles and aluminium cans would have on the Material Recovery Facilities in Ireland. The MRF Operators estimated that this would have a €20 to €40 per tonne impact on gate fees at their facilities. Some of the MRF Operators also commented that there would be other impacts to be considered, such as:

- Without good quality materials, such as plastic bottles and aluminium cans, it is difficult to move lower quality materials such as plastic pots/tubs/trays and plastic films. Reduced recycling of these materials would impact negatively on Ireland's recycling performance.
- The processing lines at the MRFs would have to be re-configured to manage the changes to the input materials.
- A DRS is likely to impact on all REPAK subsidies, as the producers of aluminium cans and plastic bottles would not provide subsidy for MRF operations, so the existing subsidy could be reduced for all materials.

Based on the tonnages and values of these materials as reported by the MRF Operators, SLR independently analysed the potential impact on the MRFs from a successful DRS. The results are shown in Tables 2 and 3 below.

Table 2 Expected Revenue Losses at MRFs if DRS Materials Removed

Material	Volume Handled (t/a)	Average Value of Material including REPAK subsidy (€)	Loss of Revenue (€)
Aluminium Cans	4,444	915	€ 4,066,260
PET Bottles	11,227	247	€ 2,773,069
Estimated Cost due to Loss of Beverage Containers			**€ 6,839,329**
HDPE Bottles	7,283	415	€ 3,022,445
Estimated Cost due to Loss of Beverage Containers and HDPE Bottles			**€ 9,861,774**

Table 3 Expected Increase in MRF Gate Fees for Household MDR if DRS Materials Removed

Material	Revenue Loss (€)	Household MDR Handled in 2016 (t/a)	Household MDR Handled after DRS materials removed (t/a)	Loss of Revenue per Unit / Potential Gate Fee Increase (€)
Loss of Beverage Containers	€ 6,839,329	253,328	237,657	€ 28.78
Loss of Beverage Containers and HDPE Bottles	€ 9,861,774	253,328	230,374	€ 42.81

The increase in gate fees at the MRFs could have very serious consequences on kerbside recycling in Ireland as the incentive to collect recyclables at kerbside would be reduced to a point where it would favour rogue operators that collect household waste with no source segregation.

Likely Increases in Recycling Rates

It is widely accepted that a DRS would have a positive impact on litter and that has been the focus of many DRS systems across the world. In particular, a DRS with a high value deposit of c.25 cent is expected to attract litter pickers.

However, the impact on recycling rates is not so clear. In countries that do not have a kerbside collection system for recyclables and have a low recycling rate, the impact of a DRS on recycling rates will be greater than in countries with well advanced systems for collecting recyclables.

SLR examined the quantities of beverage containers already recycled in Ireland and assessed the impact on MSW recycling and packaging waste recycling of an increase to 90% recycling of those materials. The results were as follows:

PET Bottles:

- Total on the market = 25,490 t/a.
- Uplift from 60.7% to 90% = 29.3% = 7,469 t/a extra recycled.
- 7,469 t/a out of a total MSW generation of 2.8 million t/a = **0.27%**

Aluminium Cans:

- Total on the market = c.11,456 t/a.[1]
- Uplift from 73% to 90% = 17% = 1,948 t/a extra recycled.
- 1,948 t/a out of a total MSW generation of 2.8 million t/a = **0.07%**

Total Uplift in MSW Recycling rate = **0.34%**

The data suggests that a successful DRS would only increase overall MSW recycling rates by 0.34% which would do little to assist with the WFD requirement to increase MSW Recycling rates from the current 41% rate to 65% by 2035, with intermediate targets for 2025 and 2030.

The extra tonnage of PET bottles would increase the plastic packaging recycling rate from 34% to 36.5%, still well short of the 50% target by 2025 and the 55% target by 2030.

[1] REPAK's annual report states that 8,363 tonnes of aluminium cans were recycled in Ireland in 2018. Later data from REPAK given to the IWMA and to Eunomia states that 73% of aluminium cans are recycled, so we calculate that 11,456 t/a are placed on the market. REPAK has also stated that 9,427 t/a of aluminium cans are placed on the market by REPAK members in RoI, so the additional tonnage is likely to be imported (e.g. Northern Ireland shopping) or placed on the market by non-members of REPAK.

It appears that Ireland has already exceeded the 2025 and 2030 targets for aluminium packaging recycling, so the uplift in that category would be welcome, but is not of greatest concern at this time.

The effect of a successful DRS on the overall packaging recycling targets would be about 0.7% increase in the recycling rate from 65.6% to 66.3%.

A DRS would undoubtedly increase recycling rates for PET bottles and aluminium cans and would assist Ireland in meeting the SUP Directive targets for 2025 and 2029 but would clearly have very little impact on the other recycling targets that are currently not on track.

Costs of a DRS in Ireland

We also estimated the likely costs associated with developing and operating a comprehensive and successful DRS in Ireland. These are rough estimates that are detailed in the main body of the report and are comparable with other estimates that we reviewed in DRS related reports. Rather than consider capital and operational costs, we spread the capital costs over 10 years to view all the costs as 'annual costs'. We summarise these costs as follows.

Table 4 Overview of Potential Annual Costs of DRS in Ireland

Item	Description	Estimated Cost per annum millions
1	Installation of RVMs & Storage Room (spread over 10 years)	€ 25.0
2	Development of 3 Regional Depots (spread over 10 years)	€ 3.8
3	Set-Up costs (spread over 10 years)	€ 2.1
4	Ongoing labour and space costs at stores	€ 6.3
5	Logistics Costs	€ 22.4
6	Counting Centre Costs	€ 3.2
7	Central Administration Costs	€ 2.7
8	Labelling & Security Markings	€ 7.7
	Total Estimated Annual Costs (Gross)	**€ 73.2**
	Added Value of Additional Beverage Containers Captured	€2.6
	Total Estimated Annual Costs (Net)	**€ 70.6**

In light of these estimated costs and considering the additional tonnages of beverage containers likely to be captured and recycled by a DRS, we estimate that the cost of recycling the additional tonnage works out at **€7,497** per tonne. To put this figure in perspective, we calculated the cost of kerbside recycling at just under €500 per tonne and the cost of CA Site recycling at about €240 per tonne.

In order to meet future targets, Ireland needs to recycle a large amount of additional materials and we expect that *'recycling at any cost'* is not a financially sustainable policy for Ireland. Using a modest 2% growth rate, we have calculated that Ireland needs to recycle an additional 1 million tonnes per annum by 2030 and 1.75 million additional tonnes per annum by 2040. It is clear from the data that recycling costs of €7,497 for every additional tonne is not viable for the Irish State as it would cost more than €168 billion over the next 20 years to meet the targets.

Alternative Options to Increase Recycling Rates

Given that a DRS would do little for Ireland's very challenging future MSW and packaging waste recycling targets, the report gives consideration to other ways to increase the relevant recycling rates. Some of the initiatives and ideas presented in the report were derived from IWMA reports and submissions, but SLR also looked at international experiences in that regard.

Recycling Encouragement and Incentivisation

The IWMA has commenced a trial that is designed to encourage and incentivise customers to better source segregate household waste and thereby achieve higher recycling rates individually and collectively. The trial is being conducted by three IWMA Member companies in different parts of the country, covering both urban and rural areas. Each company will involve 500 of their household customers with a broad range of demographics, so there will be a total of 1,500 houses in the trial.

Customers will be informed by text or email on a monthly basis of their household's recycling performance, based on the weights of material in each of the 3 bins. Bins will be checked to ensure that householders do not deliberately place residual wastes in the recycling bins.

Customers will then be encouraged to improve their recycling performance and will receive a financial reward for achieving higher recycling rates. We understand that the financial incentive in the trial is set at €1 per percentage increase in recycling, but that may be subject to change. The trials are part funded by REPAK and part funded by the three companies involved.

The IWMA intends to encourage all members that collect kerbside household waste to partake in a full roll-out of this system, assuming a successful outcome from the trials. The IWMA will also lobby the Government and the relevant Producer Responsibility Schemes to provide finances to assist with incentivisation of householders that improve their recycling performance.

Camera Detection System

An IWMA member has introduced a Camera Detection System (CDS) to its household kerbside waste collection service in Fingal and intends to roll-out this system to other areas where the company collects household waste. Cameras have been fitted to each truck that collects mixed dry recyclables and may in the future also be fitted to each truck that collects brown bin bio-waste. The cameras take a photograph the recyclable waste as it is emptied into the truck.

The system links each photograph to the RFID chip in the bin and this provides a link to the customers address. A warning letter is sent to the customer that includes the photograph and highlights the unacceptable materials. The first warning letter can change behaviour in many cases. A second or third warning letter is required in other cases.

A small minority of customers do not change their behaviour after several warning letters with photographs of the unacceptable materials and in these cases, the company applies the residual waste charge to the bin, as the materials placed in the bin are not compliant with the MDR bin acceptable materials.

Feedback from the company suggests that the camera detection system is very effective in changing customers' behaviour and is encouraging householders to take a greater interest when source segregating their household waste. The company plans to introduce a similar system to its commercial customers to further encourage better source segregation of all municipal wastes.

Improving Commercial Waste Recycling

The IWMA, in a letter to the Department of Communications, Climate Action and Environment in September 2018 recommends the following actions to improve recycling performance from the commercial waste stream:

1. Introduce mandatory charging per kilo for all commercial wastes.
2. Introduce mandatory incentivised charging whereby recycled wastes (including brown bins) have a lower per kilo charge compared with residual wastes.

3. Introduce a ban on placing food waste, garden waste and recyclable wastes in residual waste bins at commercial premises.
4. Consider the introduction of mandatory material separation for different types of commercial premises.
5. Commence and properly fund a strong awareness campaign to inform business owners and the general public of their waste management obligations at home and at work.
6. Encourage and fund enforcement of these obligations.
7. Consider the introduction of a Recycling Performance Rating Scheme for businesses, perhaps along the lines of Building Energy Rating (BER) scheme or another appropriate certification scheme.

The IWMA expects that these recommendations will be considered by DCCAE in emerging waste policy, which is due to be finalised in 2020.

Other Recommended Measures to Increase Recycling Rates

The IWMA made recommendations to the DCCAE in January 2019 with respect to increasing MSW recycling rates in Ireland. These recommendations included the following measures:

- Increasing public awareness by spending at least €5m per annum on an awareness programme including national TV and Radio media to deliver the key messages with regard to recycling.
- The enforcement authorities to review the incentivised charges offered to householders and to seek a revision of the charging systems that provide too little incentive.
- The promotion and subsidisation of home composting in rural areas.
- Improvements in apartment waste management.
- Mandatory deposit and refund system for beverages served at major events in Ireland, such as concerts, sporting events, festivals, etc.
- Better public space recycling.

International Best Practice

Germany has been one of the best performing countries in the world for many years now with respect to MSW recycling rates. SLR reviewed the details behind that performance to see if any recommendations for Ireland could be found.

Wales has also reportedly performed very well in recent years and appears to have made a step change to the MSW recycling rates that Ireland now needs. Wales is relatively close to Ireland in terms of geography, scale, demographics, so a comparison could be interesting, so SLR reviewed the detail behind Wales' MSW recycling figures.

Over-estimated Recycling Rates

Eurostat 2017 data suggests that Germany has an MSW Recycling Rate of 67.6%. However, the German Waste Management Association commissioned work by TOMM+C that showed that the 67.6% figure is no longer valid under the rules of reporting recycling data to Eurostat. The consultants estimate that the actual recycling rate in Germany is somewhere between 47% and 52%. We are informed by the German waste Management Association that the relevant Ministry in Germany has accepted that the recycling rate will drop to 52% under the new EU rules.

The main issues are :

- A large proportion of source separated plastics delivered to sorting plants and counted as recycled, end up being sent to WtE rather than recycled - only 20% to 50% is actually recycled. (4.8 to 7.6% MSW recycling lost)
- There is weight loss in MBT plants, mainly due to bio-drying. This is currently counted as recycled waste, but under EU rules going forward it will be recovery, not recycling. (4.5% MSW recycling lost)
- Bulky waste delivered to sorting plants is counted as recycled, but only 20% to 50% is actually recycled. (1.4 to 2.2% MSW recycling lost)
- Recycling of commercial waste sent to sorting plants also appears to be vastly over-estimated. (2.1 to 2.3% MSW recycling lost)
- Road sweepings will not count for recycling. (1.4% MSW recycling lost)
- Other fractions also appear to be over-estimated but are at low volumes that have little impact on the overall recycling figure.

SLR examined the differences between MSW recycling in Germany and in Ireland and concluded that the main difference was that garden and park waste in Germany is a much greater contributor to MSW Recycling at 10.9% versus 1.8% in Ireland. Whilst the source of the garden and park waste is described as 'household waste', we understand that it includes park waste collected by the municipalities.

MSW Recycling Rates in Wales

Wales is reportedly achieving a very high MSW recycling rates at 62.7% for the year to Oct 2018, according to statistics compiled by the Welsh Government. However, SLR found that the Welsh data reveals the following issues with regard to the measurement of the recycling rate:

- The Welsh MSW recycling figures include rubble and soil collected at civic amenity sites. This is not MSW and should not be counted in MSW figures.
- Incinerator Bottom Ash (IBA) is counted as recycled in Wales, whereas the new EU rules only allow metals recycled from IBA to be counted as MSW recycling.
- The Welsh recycling figures include all collected co-mingled recyclables, whereas the EU rules are now based on actual recycling rather than collection for recycling. In Ireland 26% of collected co-mingled recyclables are non-recyclable and are not counted towards our recycling figures.

The impact of these differences on recycling figures are quantified in Table 5 below:

Table 5 Analysis of MSW Recycling Data Published by the Welsh Government

Material	Quantity Reduction (t)	Impact on Wales Recycling Rate	Comments
Rubble & Soil Recycled	104,942	-6.8%	From CA sites
IBA Recycled	60,300	-3.9%	allow 10% for metal recycling
Residues from Co-Mingled Recyclables	38,328	-1.9%	Conservatively assume 15% over-estimate
Total Reduction in Recycling Rate		**12.6%**	

SLR's analysis suggests that the actual recycling figure in Wales is approximately 50.1%.

As with Germany, discussed above, the big difference between Wales and Ireland is Green/Garden Waste recycling. Wales recycles 160Kt of green waste per annum (10.4% of MSW), compared to 50Kt in Ireland (1.8% of

MSW). The Welsh figure includes 100Kt of green waste collected separately at kerbside, whereas very little green waste is collected separately from food waste at kerbside in Ireland.

Conclusions on International Comparisons

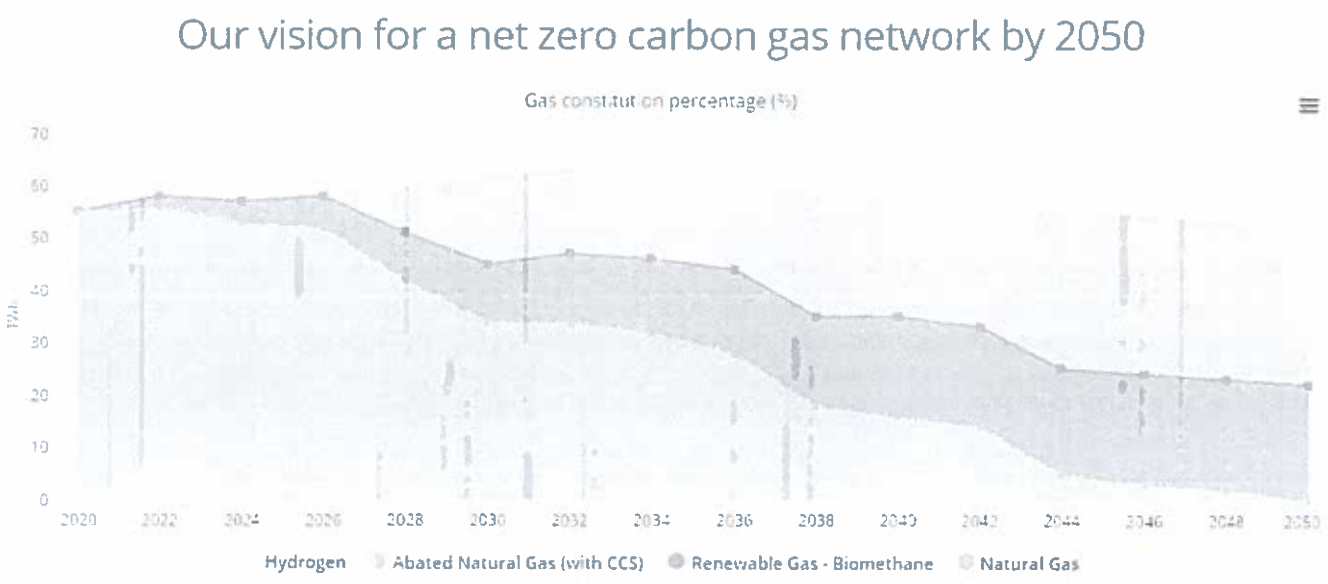
The main conclusion from this section of the report is that Ireland could achieve a 50% MSW recycling rate if green / garden waste recycling was increased to the levels found in Wales and Germany. Ideally, Ireland should try to reach the future MSW recycling targets without increasing waste generation, but if this proves impossible, collecting additional green waste for recycling may be necessary to avoid EU fines.

If Ireland collects and recycles an additional 250,000 tonnes of green and garden waste, it would boost the MSW recycling rate to 50%. If half of this additional waste was sourced from households, with the rest from municipal parks and commercial premises/developments, Irelands household waste generation figure would increase to 343kg per capita, which is still well below the EU average of 419kg per capita. This change would have little impact on the residual waste figures for Ireland, so that performance would still be ranked amongst the best in Europe.

Collecting Biowaste as a Feedstock for Biomethane Production

Consideration should be given to the collection of biowastes for the production of biomethane to generate renewable energy. We understand that Gas Networks Ireland has major plans to feed large quantities of biomethane into the national gas network and feedstock will be required for the AD plants that will generate that biogas. The graph below from GNI's website is very informative in that regard and shows a very aggressive plan that will require a strong drive and serious resources.

Figure 3 Gas Networks Ireland Plans to Replace Natural Gas with Renewable Gas



Technologies have evolved or been adapted in Ireland that facilitate the breakdown of woody material in anaerobic digestion plants, so garden and parks waste can be used as a feedstock for biogas production. It may be more environmentally sustainable to collect garden and parks waste for this purpose rather than to use productive agricultural land to generate feedstock for the new AD plants that we expect to be developed in response to GNI's initiative.

The cost of collecting or delivering the garden and parks waste to these AD plants will be an important factor and may require subsidisation or some form of incentives. However, two national environmental priorities (recycling

and renewable energy) could be advanced by such a move, so it will be in the Government's interest to at least consider this option. It is interesting to note that the collection systems for green and garden waste in Germany are funded by the German climate action funding program, as mentioned earlier in this report.

In 2019, the Irish Parliament declared a Climate Emergency and funding for worthwhile initiatives should follow. Financing the collection and recycling of green/garden waste could be as simple as a fiscal measure that makes biomethane more attractive at its cost of production compared to natural gas, i.e. a tax on natural gas that is used to subsidise biomethane production.

1.0 Introduction

The Irish Waste Management Association (IWMA) commissioned SLR Consulting to prepare a report addressing the likely impacts of a Deposit & Return Scheme (DRS) for plastic and aluminium beverage containers on waste management in Ireland[2].

A DRS for PET bottles and aluminium cans is currently under consideration by the Oireachtas Joint Committee on Communications, Climate Action and the Environment. The *Waste Reduction Bill 2017*[3], sponsored by Catherine Martin and Eamon Ryan of the Green Party, includes the following section:

> ***"Deposit and return schemes***
>
> *4. By 1 July 2019 the Minister shall make regulations in exercise of his/her powers under section 29 of the Act of 1996 to provide for a deposit and return scheme for sealed containers in which beverages are sold."*

The Oireachtas Joint Committee has heard and received submissions on the merits of the Waste Reduction Bill from a number of parties, including opinions on the costs and benefits of a DRS in Ireland. The Committee produced a report[4] outlining the different views on the matters contained in the Waste Reduction Bill.

In parallel, the Minister for Communications, Climate Action and the Environment has stated publicly on 28th January 2019 that he will commission a review which will consider how we can deliver a 90% collection target for single use plastic bottles in Ireland. This review will also examine the possibility of introducing a DRS and how this might operate in an Irish context. Eunomia has now been appointed to carry out that review.

The report prepared by the Oireachtas Joint Committee, mentioned above, states that Eunomia is supportive of the introduction of a DRS in Ireland.[5] The reasons given for this support are stated as follows:

> ***"Eunomia** identifies a number of key benefits with a DRS (in general), as follows:*
>
> *1. Increases in recycling rates, and a correlating reduction in greenhouse gas emissions (as Ireland is increasingly moving from landfill to incineration to manage its waste);*
>
> *2. Reduces littering;*
>
> *3. Improves the quality of materials for recycling by reducing the contamination of recyclable materials; and*
>
> *4. Helps companies meet corporate social responsibility (CSR) objectives."*

The IWMA is concerned that a company that has lobbied for a DRS in Ireland may not be best placed to fairly and independently assess the likely impacts, costs and benefits associated with the introduction of a DRS to Ireland.

In this report, SLR considers the wider picture of municipal waste management in Ireland and the challenges posed by EU Directives on waste. The report considers the potential positive and negative impacts associated with a DRS and also offers alternative ideas that could potentially achieve similar or better results at a lower cost.

[2] In this report where we refer to 'Ireland' and where Eurostat data refers to 'Ireland', this means the Republic of Ireland and does not include Northern Ireland.

[3] Bill 80 of 2017

[4] Joint Committee on Communications, Climate Action and Environment Report of the Joint Committee on the Detailed Scrutiny of the Waste Reduction Bill 2017 [PMB] - 32CCAE006

[5] See Table 6: Summary and categorisation of main stakeholder arguments, page 33.

2.0 Municipal Solid Waste (MSW) Management in Ireland

2.1 Historical Context

The Irish household waste market differs from other countries as the local authorities (or municipalities) do not engage in kerbside household waste collection. The householder in Ireland contracts directly with private sector service providers and generally has a choice of two or three companies for kerbside waste collection.[6] The service is fairly consistent as the minimum number of bins and the types of material collected in each bin have been standardised in legislation.

Traditionally, the private waste sector serviced commercial enterprise while the local authorities generally provided waste collection and disposal services to households across the country. Collection and disposal at landfill was a free service to householders funded by locally collected domestic and commercial rates, hence private operators did not compete in this market. However, domestic rates were abolished in 1978, so the funding of household waste collection services was collected through a combination of commercial rates and central government funding.

The funding of waste collection was clearly a burden on local authorities, but they were obliged to provide the service or arrange for its provision on their behalf. Initially, many authorities withdrew the service from rural areas due to the cost of service provision and actively encouraged privatised collection in those areas. Some authorities withdrew from waste collection altogether following local arrangements with private waste contractors in the area to take over the collection and deliver the waste to the local authority owned and operated landfills.

An inequity evolved during the 1980s and 1990s, whereby householders with private waste collections paid directly for the service, while those with local authority collections received a free service. This inequity was most commonly observed as a rural-urban issue, as the local authorities continued to provide the service in cities such as Dublin, Cork, Waterford, Limerick and Galway (amongst others), while withdrawing from most rural parts of the country (with some exceptions).

In the 1990s, as compliance costs of waste management escalated, the local authorities introduced waste charges that the householders paid directly to the authorities to fund the collection and treatment of their waste. The charges were low compared to private waste companies' charges, so the local authorities maintained control of the household waste market in most urban areas. In addition, local authorities did not charge VAT for the service (this situation has now changed). However, the local authority waste charges increased as they sought to achieve total cost recovery. As the local authority charges increased, critical points were reached that allowed the private sector enter household waste markets in direct competition with the local authorities.

As the market became more competitive, local authorities struggled to introduce efficiencies to their services and improve productivity so by c.2012 practically all local authorities had withdrawn from providing kerbside household waste collection services in Ireland. Most sold their assets, including bins, trucks, customer names and address, etc, to the highest bidder.

[6] In some rare cases, the householder can have a choice of as many as 5 or 6 waste collection companies, but the average is thought to be 3 or less.

2.2 Overview of Household Waste Collection in Ireland

2.2.1 Household Kerbside Collection

As mentioned in the previous section, household waste collection in Ireland is now fully privatised with side-by-side competition that is tightly regulated by the authorities through a permitting system and associated enforcement. The top 20 waste collection companies collect waste from approximately 90% of the household kerbside customers. The other 10% of households are serviced by about 40 small companies, with that number reducing regularly due to consolidation.

Household waste collection largely consists of a 3-bin system for mixed dry recyclables (MDR)[7], food waste and residual waste in urban areas[8] and a 2-bin system for MDR and residual waste in rural areas. The residual and MDR bins are normally 240 litres in size but can be larger or smaller depending on the customer's needs and the frequency of collection. The brown bins vary in size from small caddies that are designed for food waste without garden waste to 240 litre bins that are suitable for both food and garden waste. Many companies also use 120 litre bins that are suitable for food waste plus some garden waste, such as grass.

The food waste bins are not mandated in rural areas, where householders are encouraged to home compost. The IWMA considers that introducing the brown bin to rural areas would be inefficient and would add costs that would make rural kerbside collections quite expensive compared to urban collections. In this scenario, it is possible that more people in rural areas would refuse to avail of a kerbside collection service and this would undoubtedly have a negative environmental outcome.

The IWMA considers that home composting is a better environmental option in rural areas where the efficiency of kerbside waste collection is low and people generally have gardens in which to install and use a home composting unit. The Department of Communications, Climate Action and Environment (DCCAE) commenced a consultation in early 2018 to consider extending the brown (organic) bin roll-out to all houses in the State. The IWMA submission on that consultation suggested that such a move would be likely to lead to a price differential between urban and rural kerbside waste collections and this in turn could lead to an increase in rural households refusing to avail of a kerbside household waste collection service. The IWMA takes the view that the environmental impact of such an unintended consequence could outweigh any environmental benefit achieved through the universal roll-out of brown bins to all households in the State.

Additional service offerings such as glass collections or garden waste collections do occur, generally on a monthly basis, but are not common across Ireland.

Every household bin in Ireland contains a Radio-Frequency Identification (RFID) chip that is linked to the address of the customer. Every bin lift is weighed, recorded and reported. The individual weights are reported to the customers and the accumulated data is reported to the authorities in annual reports.

The EPA 2012 National Waste Report shows that 1,068,918 tonnes of household waste was collected at kerbside in that year, comprising:

- Residual waste 724,244t
- MDR 260,528t
- Food/Organic 80,046t
- Glass 4,100t

[7] Comprising paper, card, aluminium cans, steel cans, plastic bottles and plastic pots/tubs/trays. Other plastics such as film, bags, toys, etc are not acceptable due to the lack of recycling outlets for these materials.

[8] All agglomerations with a population of 500 people or more. Required since 2016.

Data compiled by the National Waste Collection Permit Office (NWCPO) suggests that the quantity of organic (food) wastes collected from households increased to 129,081 tonnes in 2017, an increase of 61% over a 5-year period. This reflects the effect of the roll-out of brown bins to houses with a kerbside collection service in agglomerations of 500 people or more. That roll-out is close to completion and there is now an emphasis on encouraging householders to use the system more effectively to reduce residual waste and increase recycling rates. Participation and presentation rates are varied, particularly for the brown organic bins, so incentivisation to better use the brown bins is clearly needed.

There are roughly 1.2 million houses in Ireland that avail of a kerbside waste collection service. There are believed to be between 200,000 and 300,000 occupied houses that do not avail of a kerbside collection service. A small number of these households cannot access a service due to road limitations, but the vast majority have a choice and choose not to pay for a service.

A 2014 survey by the CSO, which sampled 13,000 households, concluded the following:

> ***"Household's main method for disposing of non-recyclable household waste***
>
> *A wheelie bin collection service was used by 80% of households to dispose of non-recyclable household waste. Another 8% of households brought their non-recyclable household waste to a recycling centre and 4% of households shared a bin with another household such as a neighbour, relative or friend - in one-person households, where the person was aged 65 and over, the rate for sharing was 12%. Apartment dwellers were also more likely to share a bin (18% of apartments).*
>
> *Dublin and the Mid-East had the highest percentage of wheelie bin use at 86%. Rural households made much more use of recycling centres (18% of rural households) compared with 3% of urban households.*
>
> ***Household's main method for disposing of recyclable household waste***
>
> *The most popular method of disposing of recyclable waste was through a wheelie bin service with 76% of households using this method. The second most popular method was to bring this waste to a recycling centre (12%). There was a clear urban/rural divide with 24% of rural households bringing the recyclable waste to a recycling centre compared with 6% of urban households. 2% of households did not recycle waste."*

It is recognised that some households that do not avail of a kerbside waste collection service, dispose of their waste illegally, largely by the following methods:

- Backyard burning;
- Fly-tipping;
- Depositing waste in public litter bins;
- Depositing waste in other people's bins;
- Depositing waste in commercial waste bins.

The EPA 2016 data estimated that 44,868 tonnes of household waste was unmanaged in that year. That accounts for 3% of household waste and 1.6% of MSW. Previous estimates by the EPA of unmanaged household waste were much higher, but the CSO 2014 survey may have influenced the most recent EPA calculation of this figure. It is clear from the CSO survey that many people without a collection service manage their waste responsibly.

To address the issue of unmanaged household waste, the local authorities have introduced new bye-laws on the storage, presentation and collection of household and commercial waste. The bye-laws require householders that do not avail of a waste collection service to account for their waste management. Enforcement of the bye-laws will be critical to their success and it appears at this early stage that the local authorities are making a

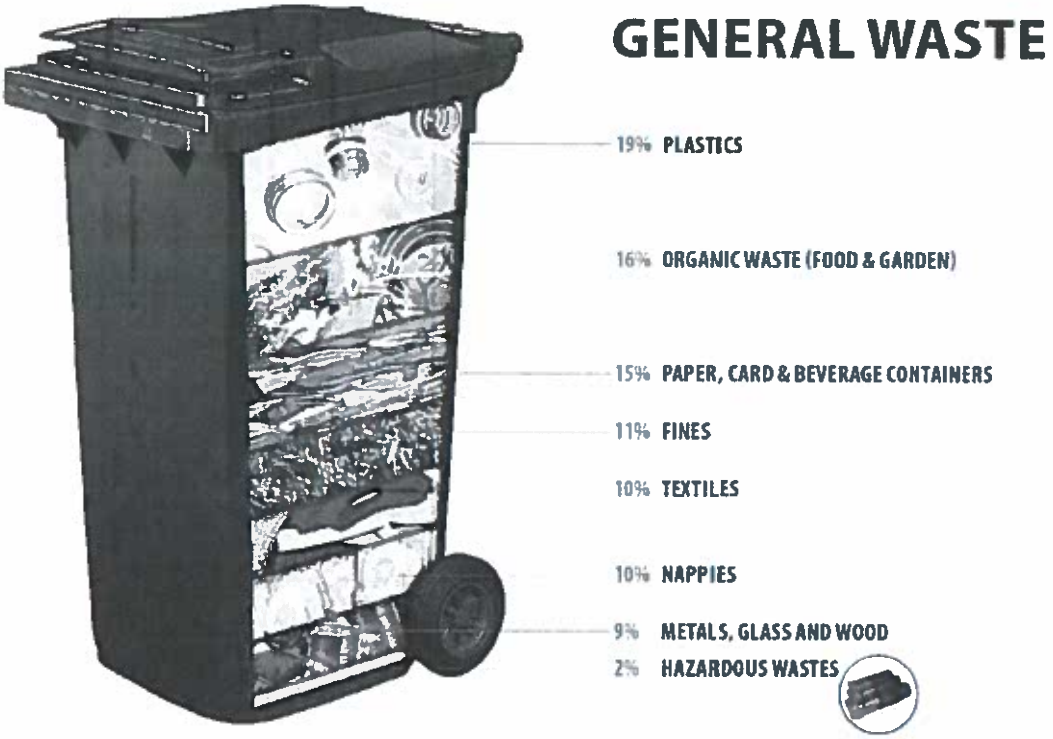
concerted effort in that regard. The IWMA members are supporting the enforcement authorities by providing customer lists, as required by the Waste Management Act.

2.2.2 Effectiveness of Household Kerbside System

A recent waste characterisation study commissioned by the EPA and conducted by RPS found that the 3-bin kerbside household collection system is somewhat effective but could be a lot more effective if the majority of householders made a greater effort to segregate their wastes at home.

The EPA[9] summarised the results as follows:

Figure 2-1
EPA Waste Characterisation for Household General Waste



[9] Presentation by Helen Searson, EPA, to the Irish Waste Conference in November 2018.

Figure 2-2
EPA Waste Characterisation for Household MDR Waste

Figure 2-3
EPA Waste Characterisation for Household Organic Waste

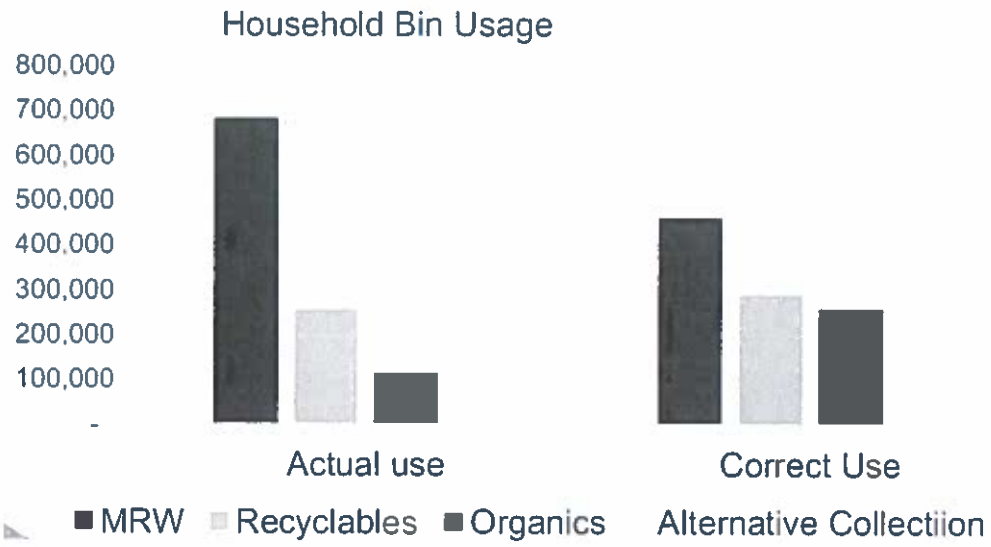
The report stated that the household MDR bins contained 26.3% non-target materials. The non-target materials included plastics (films, EPS, etc.) at 8.1%, textiles and nappies at 3.6%, organic waste at 2.3%, unclassified combustibles (e.g. composite packaging other than composite beverage cartons (e.g. Tetrapak)) at 2.8%, tissue and unrecyclable papers at 2.6%, fines (<20mm) at 1.9%, glass at 2.0%, metals at 1.1%, hazardous waste at 0.7%, WEEE at 0.4%, unclassified incombustibles at 0.8% and wood at 0.5%. These non-target materials end up as residues that are recovered as RDF/SRF rather than recycled.

The report stated that the organic bins contained 14.1% non-target materials. However, some non-target materials such as soiled paper and fines are biodegradable and comprise acceptable feedstock for composting and anaerobic digestion (AD) plants. The EPA/RPS report found that 91.8% of material in the organic/brown bins was found to be biodegradable, so 8.2% comprised non-biodegradable contaminants that end up as non-recycled residues.

Analysis of the data presented in the EPA/RPS Waste Characterisation report suggests that householders are achieving a 27.7% recycling rate at kerbside, when non-recycled residues are discounted from the raw data. This is just part of the overall recycling figure, as it does not include materials brought to bring banks and civic amenity sites.

The EPA has suggested from the waste characterisation data that correct use of the 3-bin system by all householders would have resulted in the following outcome, which is a 56% recycling rate at kerbside.

Figure 2-4
EPA Analysis of Actual Use versus Correct Use for Household Bins



In reality, individual houses can achieve much higher recycling rates by proper use of the 3-bin system, combined with frequent use of bring banks and civic amenity sites. Recycling rates above 70% can be achieved in that way, if householders are diligent.

2.2.3 Civic Amenity Sites and Bring Banks

The kerbside collection system is supported by a network of Bring Banks (BB) for glass bottles, aluminium cans and textiles, as well as Civic Amenity (CA) sites where a wider range of materials are accepted for recycling. Some CA sites also accept residual waste for onward transport to energy recovery (incineration) or landfill disposal.

According to the Regional waste Plans 2015 to 2021, there were 118 CA sites in Ireland in 2012 and 1,825 bring banks. A total of 207,177 tonnes of MSW was brought to those facilities in that year, which was 7.7% of all MSW generated in Ireland in 2012.

The remaining MSW is collected from business premises, as MSW in Ireland includes all commercial wastes collected in a similar manner to household wastes. MSW in Ireland is a broader term than many EU countries where MSW is restricted to wastes collected by the municipalities and most commercial waste is excluded. For this reason, Eurostat data on 'MSW generated per capita' unfairly places Ireland at the higher end of the waste generation scale. By contrast, extrapolation of the Eurostat data puts Ireland at the lower end of the household waste generation scale at 316kg per capita versus the EU average of 419kg per capita. The capture of garden waste can be a big influence on household waste generation per capita and a very low volume of garden waste is collected in Ireland[10] compared to some EU member states that achieve higher recycling rates.

2.3 Overview of Commercial Waste Collection in Ireland

Many companies that collect household waste in Ireland also collect commercial and similar industrial wastes. There are also some companies that only collect commercial wastes. The commercial sector generates a range of single stream wastes that are recycled, such as cardboard, plastic wrap, wooden pallets/crates, glass, metals, etc. However, a recent waste characterisation study commissioned by the EPA and conducted by the Clean Technology Centre (CTC) found that the non-household 3-bin system is not producing good quantities and quality of recyclables and could be a lot more effective. The EPA[11] summarised the results as follows:

Figure 2-5
EPA Waste Characterisation for Non-Household General Waste

[10] Garden waste collected (or delivered) from households accounts for 1.8% of MSW in Ireland (2016 data), compared with 10.9% in Germany (2015 data). Using these figures, Ireland recycles 10.7 kg of garden waste per capita, whereas Germany recycles 69.7 kg of garden waste per capita. But Germany's household waste generation is much higher than Ireland's at 452 kg per capita.

[11] Presentation by Helen Searson, EPA, to the Irish Waste Conference in November 2018.

Figure 2-6
EPA Waste Characterisation for Non-Household MDR

Figure 2-7
EPA Waste Characterisation for Non-Household Organic Waste

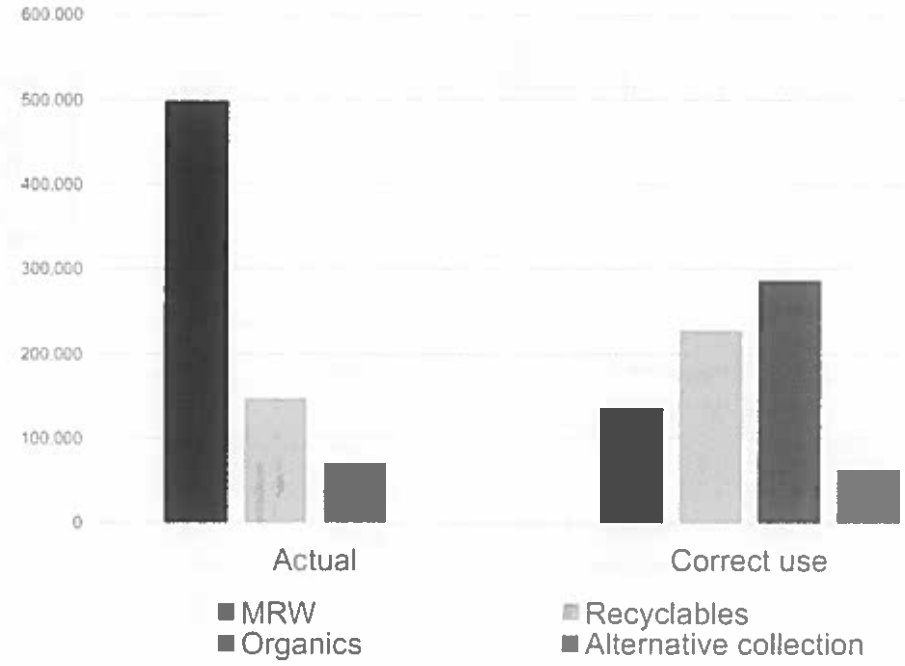
The EPA/CTC report found that the non-household (commercial) MDR bins contained 40% non-target materials. The non-targeted materials included plastics (films, PS, etc.) at 14%, organic waste at 10.1%, tissue paper (7.7%), composites at 2.2% (mainly coffee cups), unclassified materials (2.1%), compostables (1.5%), textiles (including nappies) at 0.9% and hazardous wastes (0.15%).

The EPA/CTC report found that 98.6% of material in the organic/brown bins was found to be biodegradable, so 1.4% comprised non-biodegradable contaminants that end up as non-recycled residues.

Analysis of the data presented in the EPA/CTC Waste Characterisation report suggests that businesses are achieving a 22% recycling rate with the 3-bin system, when non-recycled residues are discounted from the raw data. This is just part of the overall recycling figure, as it does not include materials that are separately collected such as cardboard, plastic wrap, wooden pallets, etc.

The EPA has suggested from the waste characterisation data that correct use of the 3-bin system by businesses would have resulted in the following outcome, which represents an 81% recycling rate.

Figure 2-8
EPA Analysis of Actual Use versus Correct Use for Non-Household Bins



It is clear from this data that there are large gains to be made in recycling rates if businesses are encouraged to put a lot more effort into source segregation of wastes placed in the 3-bin system.

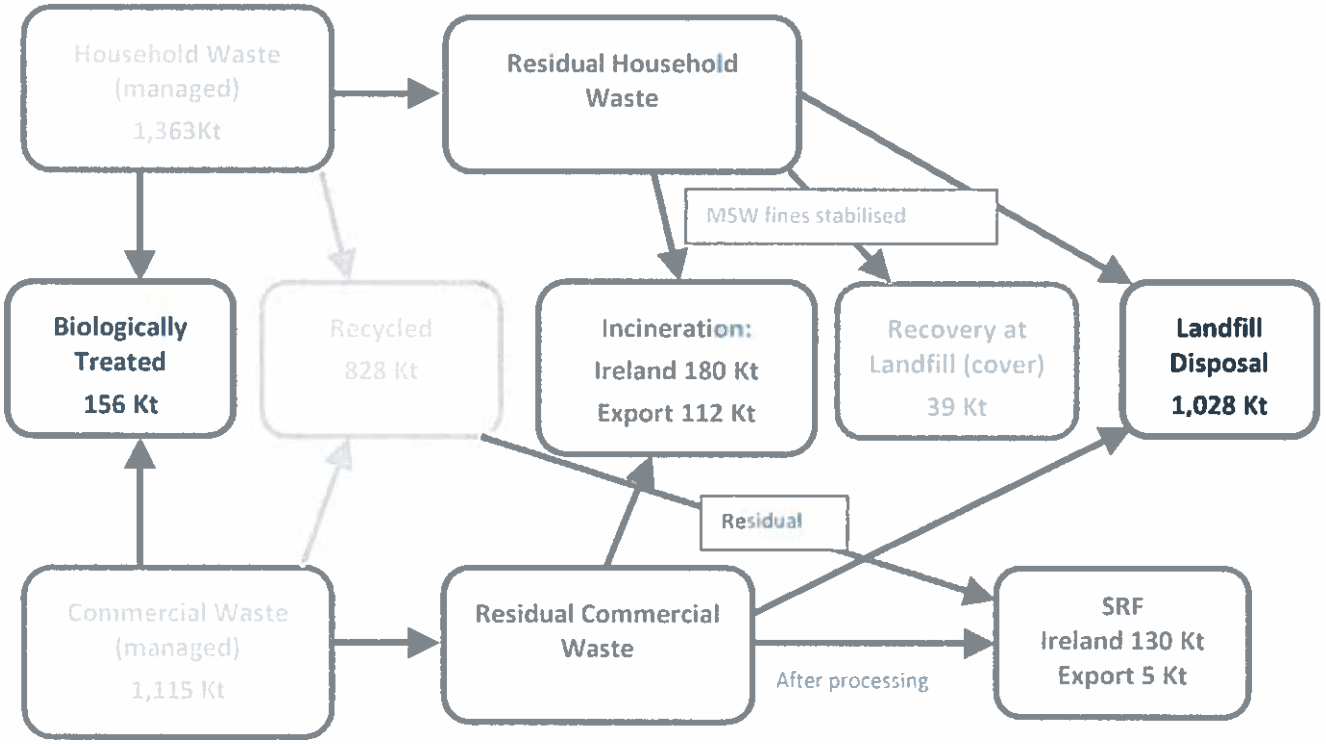
2.4 Waste Generation in Ireland

2.4.1 MSW Volumes

Municipal Solid Waste (MSW) in Ireland consists of household waste and commercial & industrial[12] wastes that are similar in composition to household waste. The EPA produces annual reports on the quantities of MSW generated and managed in Ireland and a breakdown of this data is contained in their National Waste Reports (NWRs).

The latest NWR was issued by the EPA in August 2014 and covered the calendar year 2012. Figure 2-9 shows the flow of MSW in Ireland in 2012.

Figure 2-9 Generalised Flows of MSW in Ireland in 2012

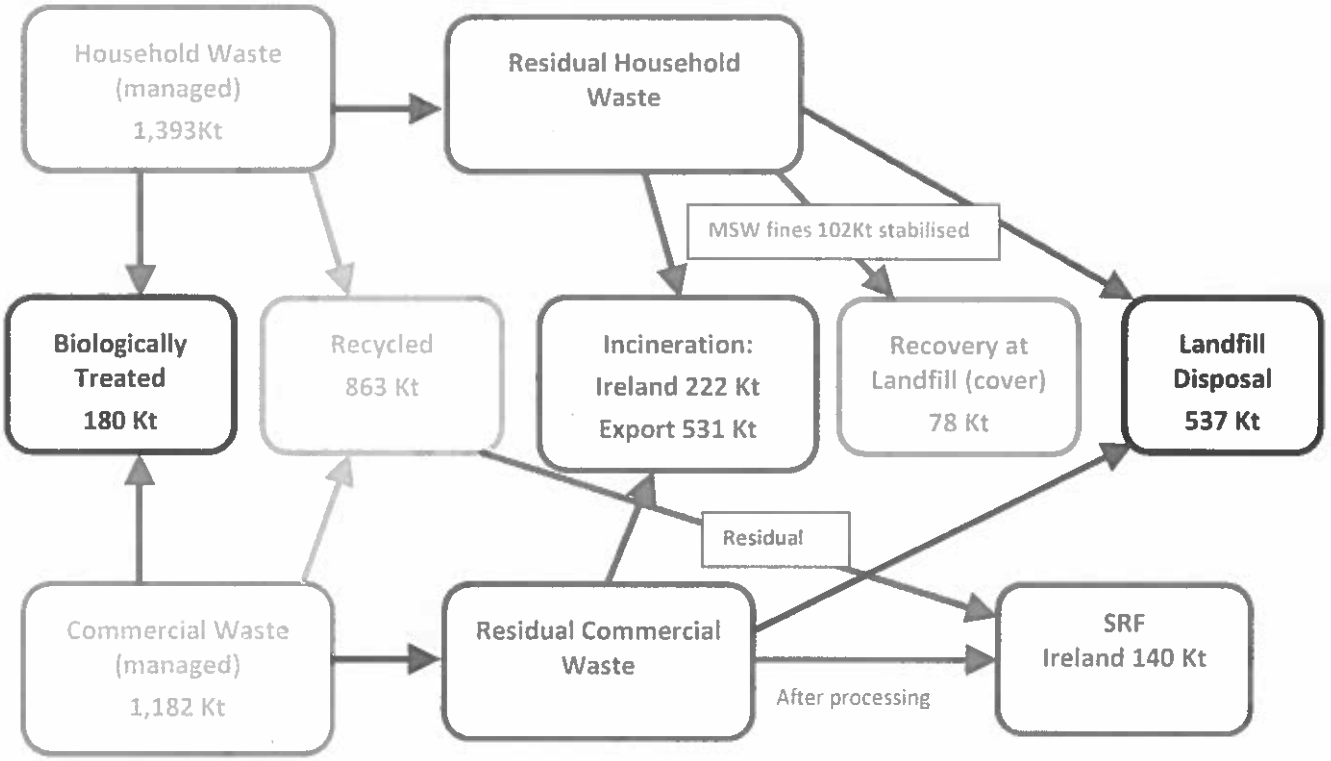


Whilst the EPA has not published a full NWR since 2012, the EPA has provided 2014 and 2016 calendar year data on their website[13]. Figures 2-10 and 2-11 show the MSW flows updated for 2014 and 2016 respectively, using this EPA data, supplemented by data gathered by SLR from Annual Environmental Reports.

[12] In this report the term 'commercial waste' is generally used to describe C&I waste that is similar in nature to household waste. This includes some industrial waste that is collected alongside commercial waste or managed in a similar manner to commercial waste. Industrial waste that is handled differently is not included in MSW.

[13] http://www.epa.ie/nationalwastestatistics/municipal/

Figure 2-10 Generalised Flows of MSW in Ireland in 2014

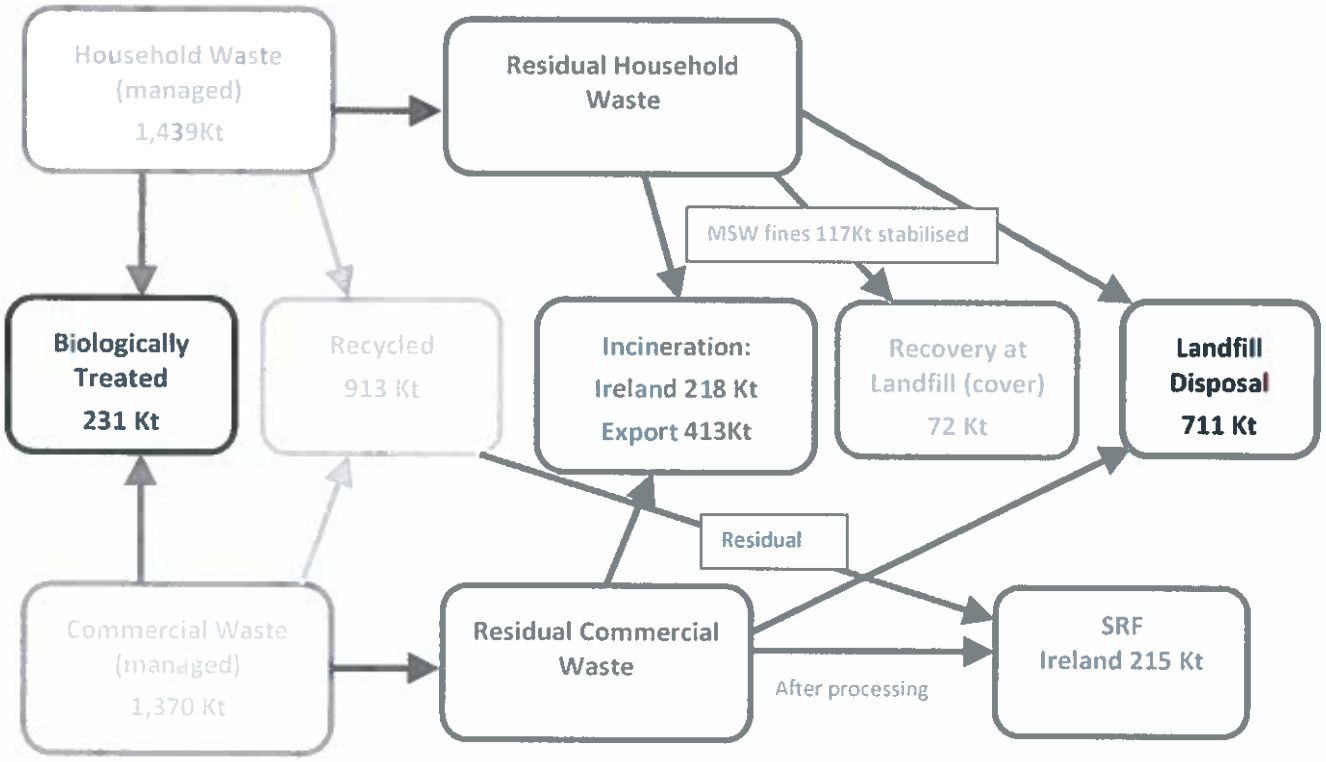


The 2014 data shows a big reduction in landfill disposal from 2012 and a big increase in the export of waste to waste to energy plants in other EU States – mostly Germany, Netherlands, Denmark and Sweden. It also shows increased waste generation and increased recycled tonnage for both mechanically sorted dry recyclables and biologically treated organic recyclables (food and garden waste).

The 2016 EPA data for Municipal Waste has under-reported biological treatment (composting/AD) from commercial sources and also under-reported MSW arisings. This is clear from the EPA survey of biological treatment plants, also on the EPA website. The issue has been discussed with the Agency and whilst they do not intend to change the data, which is already submitted to Eurostat, they recognise that more waste has been biologically treated than reported in the on-line data. The main issue relates to non-reporting of about 40,000 t/a of commercial food waste by a single company and a lesser issue relates to the difference between waste received at biological treatment plants and the quantity considered to be recycled at those plants. We therefore amend the data to include the additional commercial organic waste in this report.

We also find that when we add the individual totals of treatment routes for waste in 2016, as reported by the EPA, we get a higher figure than the EPA total for MSW. We therefore increase the commercial waste element of the MSW arisings to be consistent with the treatment data.

Figure 2-11 Generalised Flows of MSW in Ireland in 2016

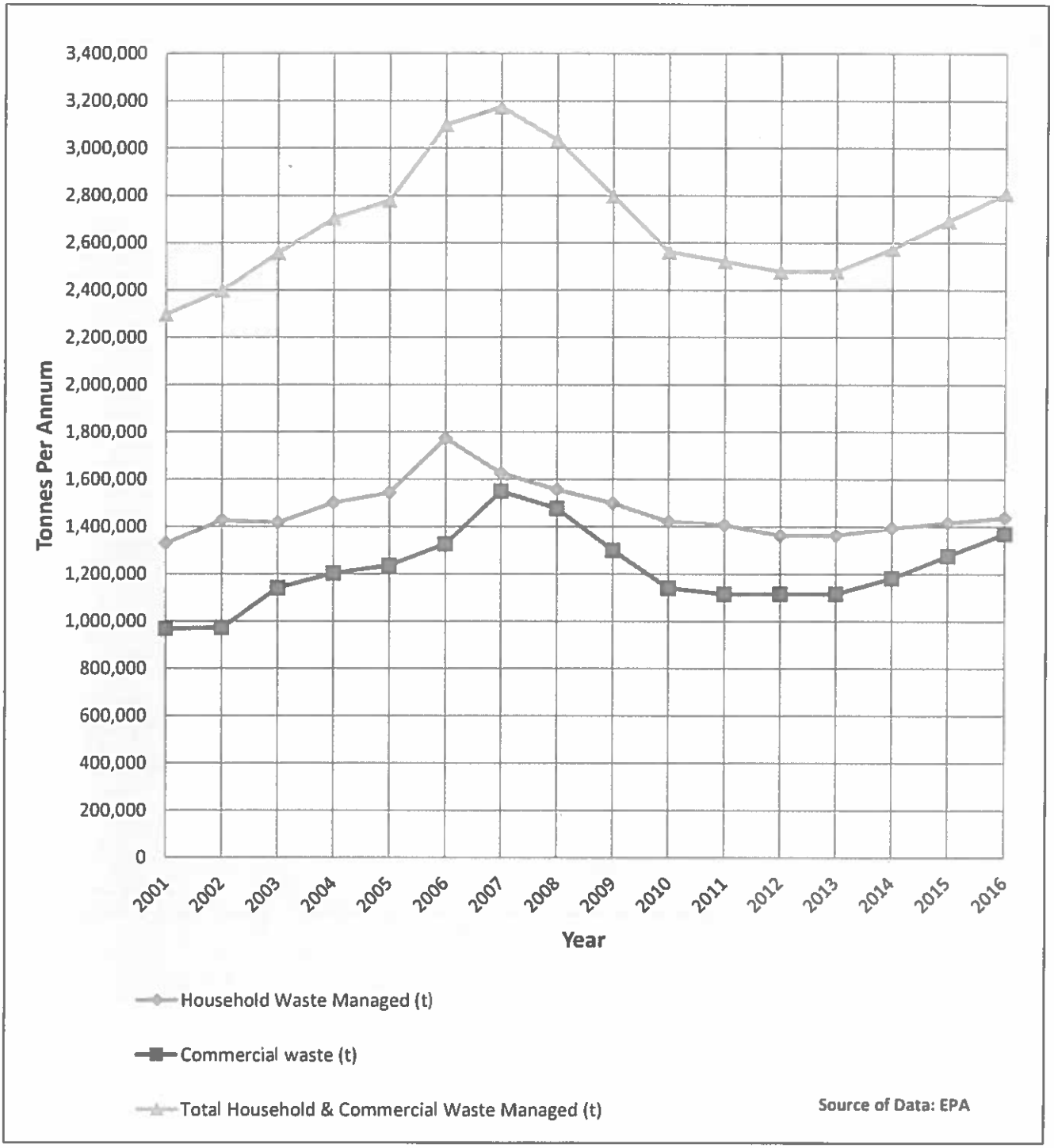


The 2016 data shows an increase in landfill disposal and a decrease in exports for incineration. It also shows continued increases waste generation and recycled tonnage for both mechanically sorted dry recyclables and biologically treated organic recyclables.

The main difference between 2016 and 2018 is the opening of the Dublin WtE facility at Poolbeg, which is accepting 600Kt/a of rMSW. The export of waste has decreased significantly since the 2014 peak of 531Kt to a projected 221Kt for 2018, based on analysis carried out by the regional waste planning offices. Landfill has also decreased from 711Kt in 2016 to a projected 370Kt in 2018, which is about 13% of managed MSW.

Figure 2-12 shows the growth trends in household and commercial wastes in Ireland from 2001 to 2016, based on the EPA National Waste Reports, including the latest on-line data for 2014 and 2016. The EPA did not report on 2013 and 2015, but our analysis of Annual Environmental Returns from key facilities suggests that there was little or no growth from 2012 to 2013, so we use the 2012 data for both years. The data for 2015 is extrapolated from the 2014 and 2016 data.

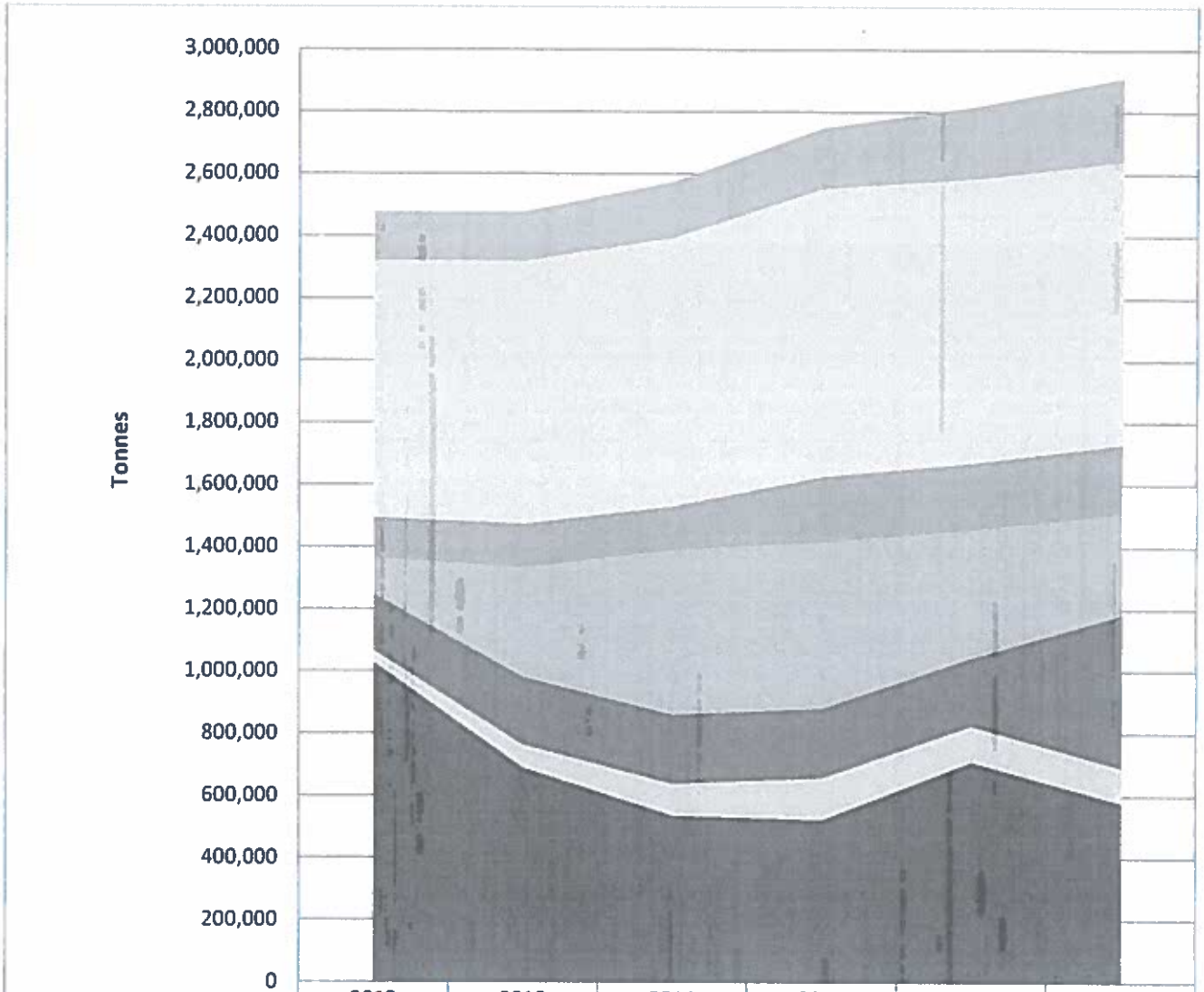
Figure 2-12 Household and Commercial Waste Arisings in Ireland 2001-2016



2.5 Summary of MSW Treatment in Ireland

Based on a combination of EPA data and more recent data provided to SLR by the NWCPO and the regional waste planning offices, Figure 2-13 shows a summary of the treatment of waste generated in Ireland between 2012 to 2017.

Figure 2-13 Summary of Treatment of Waste Generated in Ireland from 2012 to 2017



	2012	2013	2014	2015	2016	2017
Composting/AD (t)	156,000	158,000	180,017	194,054	230,616	267,827
Material Recycling (t)	828,000	845,884	863,172	927,626	913,480	910,000
SRF Ireland (t)	130,000	139,772	140,000	209,438	215,000	222,000
WtE Export (t)	117,000	354,000	531,064	537,000	413,000	327,000
WtE Ireland (t)	180,000	216,610	222,000	222,664	218,158	491,853
Fines & IBA Recovery (t)	38,914	75,000	102,376	135,645	116,513	113,217
Landfill (t)	1,028,000	689,071	536,621	522,693	710,333	577,932

The recycling rate calculated from that data presented in Figure 2-13 is as follows:

- 2012 = 39.7%
- 2013 = 40.5%
- 2014 = 40.5%
- 2015 = 40.8%
- 2016 = 40.6%
- 2017 = 40.8%

SLR's analysis predicts that 2018 will see an MSW recycling rate of about 41.8% in response to increased volumes of brown bin material sent for composting and anaerobic digestion, which we estimate should reach about 290Kt (c.10%). Total MSW is expected to be just under 3 million tonnes. Landfill disposal should reduce to less than 400Kt (c.13.5%), as the full impact of the Poolbeg WtE plant boosts the WtE in Ireland figure to more than 800Kt (c.27%).

The stagnated recycling rate is a real concern for the waste sector in Ireland, in the context of the future MSW recycling targets set by the EU in the Circular Economy Package (CEP), which we discuss in the next Chapter of this report.

3.0 Future EU Targets

Ireland is obliged to meet a range of waste management targets set by the EU for municipal and packaging wastes. The MSW and packaging waste targets, set prior to the Circular Economy Package (CEP) are summarised on the EPA website as follows.

Table 3-1 EPA Analysis of MSW and Packaging Waste Targets (Pre-CEP)

EU Directive	Target Date	Target Specifics	Reference Year	Rate	Indicator
Waste Framework Directive (2008/98/EC)	12/12/2020	Preparing for reuse and recycling of 50% by weight of **household** derived **paper, metal, plastic & glass** (calculation method 1)	2017	50%	On track Due December 2020
Packaging Directive (94/62/EC as amended)	31/12/2011	60% as a minimum by weight of packaging waste will be recovered or incinerated at waste incineration plants with energy recovery.	2017	87%	Achieved
		55% as a minimum by weight of packaging waste will be recycled.	2017	66%	Achieved
		No later than 31st December 2011 the following minimum recycling targets for materials contained in packaging waste will be attained:			
		(i) 60% by weight for glass;	2017	84%	Achieved
		(ii) 60% by weight for paper and board;	2017	79%	Achieved
		(iii) 50% by weight for metals;	2017	72%	Achieved
		(iv) 22.5% by weight for plastics, counting exclusively material that is recycled back into plastics;	2017	34%	Achieved
		(v) 15% by weight for wood.	2017	74%	Achieved

Further targets were set in the Circular Economy Package in 2018, that resulted in revised Waste and Packaging Directives, as well as other Directives that are not relevant to this report. The Single Use Plastics Directive was introduced in June 2019 and sets targets for the separate collection and recycling of plastic beverage containers.

Table 3-2 New MSW and Packaging Waste Targets (CEP)

EU Directive	By 2025	By 2030	By 2035	Target Specifics	Reference Year	Rate	SLR Comment
Waste Framework Directive (2018/851)	55%	60%	65%	Preparing for re-use and the recycling of municipal waste	2016	41%	Not on Track
Packaging Directive (2018/852)	65%	70%	-	Percentage of **all packaging waste** to be recycled.	2017	66%	On Track
	50%	55%	-	Percentage of **Plastic** packaging waste to be recycled.	2017	34%	Not on Track

EU Directive	By 2025	By 2030	By 2035	Target Specifics	Reference Year	Rate	SLR Comment
	25%	30%	-	Percentage of **Wood** packaging waste to be recycled.	2017	74%	Achieved
	70%	80%	-	Percentage of **Ferrous Metal** packaging waste to be recycled.	2017	72%[14]	On Track
	50%	60%	-	Percentage of **Aluminium** packaging waste to be recycled.	2017	73%[15]	On Track
	70%	75%	-	Percentage of **Glass** packaging waste to be recycled.	2017	84%	Achieved
	75%	85%	-	Percentage of **Paper & Cardboard** packaging waste to be recycled.	2017	79%	On Track
EU Directive	**By 2025**	**By 2029**	**By 2035**	**Target Specifics**	**Reference Year**	**Rate**	**SLR Comment**
Single Use Plastics Directive (2019/904)	77%	90%	-	Separate collection for recycling of **single use plastic beverage bottles** with a capacity of up to 3 litres, including their caps and lids, but excluding: • Glass or metal beverage bottles that have caps and lids made of plastic. • Beverage bottles intended and used for food for special medical purposes that is in liquid form.	2018	60.7%[16]	Not on Track

The biggest issue for Ireland going forward is the WFD targets for municipal waste re-use and recycling. Having stagnated at about 40% for the last 6 years (39.7% to 40.8%), increasing to 55% by 2025 will be extremely challenging and is definitely not on track. We consider this to be the biggest issue as it involves a large volume of waste and if it can be tackled, other targets should prove less challenging.

The future targets for recycling of plastic packaging and single use plastic beverage containers are also not on track at this time and will be very challenging.

Ireland now needs solutions to significantly increase recycling rates for MSW, as well as to increase recycling rates for plastic packaging and single use plastic beverage containers, both of which are subsets of MSW.

[14] The reported figure for 2017 is for 'metal packaging'. The EPA and REPAK data do not currently differentiate between ferrous and aluminium packaging.

[15] Figure provided by REPAK in 2019. We understand that this estimate includes the capture of aluminium can from residual waste and from incinerator bottom ash.

[16] REPAK data.

4.0 Deposit and Return Schemes (DRS)

4.1 Introduction

Eunomia has been commissioned by Department of Communications, Climate Action and Environment (DCCAE) to prepare a report on the costs and benefits of introducing a DRS in Ireland. Eunomia's report is expected to be published at the end of Summer 2019. We understand that the report will consider deposit and return of PET bottles and aluminium cans.

The IWMA has reviewed a number of previous reports that Eunomia has prepared on DRS for other countries, including Scotland[17]. The Association has concerns that the cost-benefit analysis in those reports has not adequately addressed the impact on existing kerbside waste recycling schemes. For example, Eunomia's report on Scotland stated in Section 5.2.1 that:

> *"Overall savings to local authorities across Scotland are calculated to be **£4.6m** per annum. This results from £0.5m of savings relating to collection service operations, and £4.1m from the net difference between lost material revenue and avoided disposal benefits."*

The IWMA expects that removing PET bottles and aluminium cans from the kerbside waste collection system would have a negative financial impact as these are the highest value materials in the recycling bins.

For this reason, SLR has been asked to review the potential impact of a DRS on existing kerbside recycling in Ireland, as well as looking at the overall impact of such a scheme.

4.2 Benefits of a DRS

As mentioned in Chapter 1 of this report, Eunomia identified key benefits of a DRS, as follows:

> *"**Eunomia** identifies a number of key benefits with a DRS (in general), as follows:*
>
> *1. Increases in recycling rates, and a correlating reduction in greenhouse gas emissions (as Ireland is increasingly moving from landfill to incineration to manage its waste);*
>
> *2. Reduces littering;*
>
> *3. Improves the quality of materials for recycling by reducing the contamination of recyclable materials; and*
>
> *4. Helps companies meet corporate social responsibility (CSR) objectives."*

We address these issues below.

4.2.1 Increases in Recycling Rates

As detailed in the previous Chapter of this report, the recycling rate for PET Bottles is estimated at 60.7% and the recycling rate for aluminium cans is estimated at 73%.

It is debateable as to whether a DRS would increase those rates to greater than 90%, but if it did, we calculate how that would impact on the other relevant recycling targets as follows.

[17] A Scottish Deposit and Refund System – Final Report for Zero waste Scotland. Eunomia 7th May 2015.

MSW Recycling Targets:

PET Bottles:

- Total on the market = 25,490 t/a.
- Uplift from 60.7% to 90% = 29.3% = 7,469 t/a extra recycled.
- 7,469 t/a out of a total MSW generation of 2.8 million t/a = **0.27%**

Aluminium Cans:

- Total on the market = c.11,456 t/a.[18]
- Uplift from 73% to 90% = 17% = 1,948 t/a extra recycled.
- 1,948 t/a out of a total MSW generation of 2.8 million t/a = **0.07%**

Total Uplift in MSW Recycling rate = **0.34%**

The data suggests that a successful DRS would only increase overall MSW recycling rates by 0.34% which would do little to assist with the WFD requirement to increase MSW Recycling rates from the current 41% rate to 65% by 2035, with intermediate targets for 2025 and 2030.

Packaging Recycling Targets:

A successful DRS would assist the plastic packaging recycling target by adding 7,469 t/a to the existing recycled tonnage of 94,889 t/a, which is estimated by the EPA[19] to be 34% of the plastic packaging placed on the market. That extra tonnage would increase the plastic packaging recycling rate to 36.5%, still well short of the 50% target by 2025 and the 55% target by 2030.

It appears that Ireland has already exceeded the 2025 and 2030 targets for aluminium packaging recycling, so the uplift in that category would be welcome, but is not of greatest concern at this time.

The effect of a successful DRS on the overall packaging recycling targets would be about 0.7% increase in the recycling rate from 65.6% to 66.3%.

A DRS would undoubtedly increase recycling rates for PET bottles and aluminium cans and would assist Ireland in meeting the SUP Directive targets for 2025 and 2029 but would clearly have very little impact on the other recycling targets that are currently not on track.

4.2.2 Reduction in Litter

We would expect that a DRS would reduce the volumes of plastic bottles and aluminium cans in litter. A DRS would also assist with the cost of litter clean-ups as local or charitable groups could reclaim deposits on littered cans and bottles.

However, we expect that there are more cost-effective ways to prevent and to clean-up litter compared to the cost of a DRS, which is addressed later in this report. For example, IWMA members regularly assist 'Tidy Towns' groups and resident associations in local litter clean-up works. This work is largely carried out 'under the radar' but is extensive across Ireland and can be increased in response to requests by interested groups, particularly if the waste industry and/or local government is more pro-active in publicising this collaboration.

[18] REPAK's annual report states that 8,363 tonnes of aluminium cans were recycled in Ireland in 2018. Later data from REPAK given to the IWMA and to Eunomia states that 73% of aluminium cans are recycled, so we calculate that 11,456 t/a are placed on the market. REPAK has also stated that 9,427 t/a of aluminium cans are placed on the market by REPAK members in RoI, so the additional tonnage is likely to be imported (e.g. Northern Ireland shopping) or placed on the market by non-members of REPAK.

[19] EPA published data on www.epa.ie estimates that there were 280,673 tonnes of plastic packaging placed on the Irish market in 2017 and 94,889 tonnes of plastic packaging was recycled in that year.

We are also aware of plans by REPAK to pay for plastic bottles that are collected by sports clubs and other social groups in a manner that is much more cost-effective than a DRS. Trials of this scheme are due to commence in Q3 2019, with a view to full roll-out by 2020. The details of that proposed scheme are outside the scope of this report.

4.2.3 Improving the Quality of Materials for Recycling

Materials collected via DRS should be high quality as they are individually deposited in order to reclaim the deposit. Aluminium cans and plastic beverage bottles placed in the MDR bins are generally segregated by machinery at MRFs with individual pickers used more often for quality control rather than for positive picking of these materials.

In our analysis, we found that the prices paid for aluminium cans and plastic beverage bottles at Irish MRFs appear to be impacted more by the location for collection rather than by the quality of the materials. The prices paid are also consistent with the prices paid in the UK, as reported on www.letsrecycle.com, which is a recognised and reliable source for recycled commodity prices in that jurisdiction.

These facts suggest that the aluminium cans and plastic beverage bottles sorted from MDR at MRFs in Ireland are of sufficient quality to ensure that they are recycled to make new aluminium and PET products, which is the main point of the exercise.

In order to attract more and better segregated recyclables into the MDR bins, the IWMA is working on initiatives to educate customers and to reward good recycling performance. These initiatives are discussed later in this report and it is expected that they will improve the quality of all materials accepted in the MDR bins. The quality of recycled paper is equally if not more important than the quality of plastic beverage bottles and aluminium cans, as paper is easily contaminated by food or liquid and an excess of such contamination can render a bale of paper non-recyclable. Hence, efforts made to improve the quality of all materials in the recycling bins should be more productive than efforts to improve the quality of recycled beverage containers.

4.2.4 Helps Companies to Meet Corporate Social Responsibilities

All waste prevention and recycling efforts assist companies to meet Corporate Social Responsibilities (CSR). The companies responsible for placing beverage containers on the Irish market are already contributing to recycling those products via REPAK.

If Ireland is to meet the very challenging future recycling targets set by the EU, it is inevitable that producers will have to contribute increased funds to support recycling in Ireland. However, it is important that such additional funding is used to maximum effect. Our analysis in this report considers different ways in which such funds could be spent including DRS and alternatives.

4.3 Examples of DRS in Australia

SLR has reviewed a number of DRS schemes[20] operated in different States in Australia, where SLR has a strong presence as a waste management consultancy. Our exports working in Australia provide some details below as background information for this report.

4.3.1 South Australia (SA)

SA was the first State in Australia to introduce a container deposit system in 1975. It was introduced as an anti-litter measure. The deposit amount has increased from the original 5 cents to 10 cents now. The system was

[20] Known as Container Deposit Systems (CDS) in Australia.

introduced before kerbside recycling in SA, as a result, the economics of kerbside recycling in SA developed in a different environment than other jurisdictions.

Consumers return containers to one of 132 approved depots where they redeem their deposits. Depots are run by commercial companies, social enterprises and charities, most notably the Scouts. They are often also places that receive a range of other recyclable and recoverable materials. The containers are delivered to one of several 'super collectors' who pay the deposits, plus a handling fee, to the depot operators. Super collectors sell the collected materials to market and have contracts with the beverage suppliers which pay the deposits based on declared sales. The Northern Territory model is also based closely on that in South Australia.

The range of materials collected under the South Australian system are as follows:

ALCOHOLIC BEVERAGES			
BEVERAGE TYPE	CONTAINER MATERIAL	CONTAINER SIZE	
		INCLUDED	EXEMPTED
Beers/ales/stouts	ALL	3 litres or less	Greater than 3 litres
Spirituous liquor – a liqueur or other alcoholic beverage produced by distillation (eg: brandy, gin, rum, vodka, whisky)	Glass	NIL	ALL
	All other materials	3 litres or less	Greater than 3 litres
Wine (straight wine) – a beverage produced by the fermentation of grapes that contains only grapes and no other beverages. Includes de-alcoholised wine (alcohol has been removed from the wine) but does not include non-alcoholic grape juice which has not undergone fermentation process.	Glass	NIL	ALL
	Aluminium	ALL	NIL
	Plastic	Less than 250ml	250 ml or greater
	Sachets (plastic and/or foil)	Less than 250ml	250 ml or greater
	Aseptic packs/casks (cardboard and/or plastic and/or foil)	Less than 1 litre	1 litre or more
Flavoured alcoholic beverages with a wine base – any beverage that contains wine plus additional beverages, ingredients or flavours. This can include (but is not limited to) fruit-flavoured wine, wine coolers, ready to drink alcoholic beverages (RTDs)	Aseptic packs/casks (cardboard and/or plastic and/or foil)	Less than 1 litre	1 litre or more
	All other materials	3 litres or less	Greater than 3 litres
Alcoholic beverages – derived from fruit or other substances (cider, alcoholic lemonade, plum wine, sake etc)	ALL	Up to and including 3 litres	Greater than 3 litres
Flavoured alcoholic beverages with a spirit base – any beverage that contains spirituous liquor plus additional beverages, ingredients or flavours. This can include (but is not limited to) 'alcopops', ready to drink alcoholic beverages (RTDs) and spirit-based beverages sold in casks	ALL	3 litres or less	Greater than 3 litres

NON-ALCOHOLIC BEVERAGES			
BEVERAGE TYPE	CONTAINER MATERIAL	CONTAINER SIZE	
		INCLUDED	EXEMPTED
Carbonated soft drinks	All	3 litres or less	Greater than 3 litres
Non-carbonated, soft drinks including (but not limited to) fruit juice based drinks (containing less than 90% juice), 'sports' drinks, 'vitamin' drinks, 'energy' drinks, ready to drink cordials	All	3 litres or less	Greater than 3 litres
Water—plain, still or carbonated spring water, mineral water and any other water intended for human consumption	Aseptic packs/casks (made from cardboard and/or plastic and/or foil)	Less than 1 litre	1 litre or more
	All other materials	3 litres or less	Greater than 3 litres
Pure fruit/vegetable juice – means a liquid containing at least 90% fruit juice and/or vegetable juice	ALL	Less than 1 litre	1 litre or more
Flavoured milk — milk to which flavour has been added (milk being cow's milk or the milk of any other animal, soy milk, ultra heat-treated milk, low-fat milk, etc)	ALL	Less than 1 Litre	1 litre or more
• Plain, unflavoured milk • Concentrated fruit and/or vegetable juice intended to be diluted before consumption • Health tonic included on the Australian Register of Therapeutic Goods • Cordial (undiluted)	ALL	NIL	ALL

4.3.2 New South Wales (NSW)[21]

NSW introduced the 'Return and Earn' container deposit scheme (CDS) in December 2017, placing a 10 cent deposit on eligible drink containers which can be redeemed at any of the 650+ approved collection points that have been introduced across the State. Eligible containers include those most commonly used away from the home and found in the NSW litter stream (most glass, cans, plastic and paperboard drink containers between 150ml and three litres).

The primary driver behind the scheme was litter reduction. Drinks containers were thought to represent as much as 44% of litter generation, costing the State an estimated $162M to clean up each year. The scheme was identified as a key mechanism to achieve the State target of reducing litter by 40% by 2020[22].

[21] The section on NSW written by Grant Pearson (SLR). The full article is available here https://www.linkedin.com/pulse/return-earn-what-should-we-learn-grant-pearson/

[22] https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/return-and-earn

How Does the Return and Earn Scheme Work?

A network of collection points continues to be developed across the State by the 'Network Operator' (TOMRA Cleanaway), prioritising collection areas in metropolitan and regional locations through a combination of:

- Reverse vending machines (RVMs);
- Automated depots (for bulk returns);
- Over the counter sites (for small quantities, generally via local shops); and
- Donation stations (self-service RVMs for donations only, with no refunds given).

Local schools, charities, sports teams and community groups can benefit from the scheme, as in some cases those returning containers are able to choose between taking the refund themselves or donating the value to registered organisations in their area.

To fund the scheme, manufacturers, distributors, wholesalers and retailers are all required to register as 'suppliers' and pay a monthly fee which reflects their market share.

The fee structure is designed to include the 10 cent return value plus the costs of administering and managing the scheme. The total estimated range of fees for the first three months after the scheme's introduction (exclusive of GST) was:

- 10.94 to 13.54 cent for aluminium containers;
- 11.36 to 14.07 cent for glass containers; and
- 11.13 to 13.78 cent for PET containers[23].

Management of the system is the remit of the 'Scheme Co-Ordinator' (Exchange for Change) – which provides financial management and community education support.

Although the scheme was introduced primarily to reduce litter, eligible containers collected at the kerbside and delivered to material recycling facilities (MRFs), through NSW's predominantly commingled recyclables collections services, are also included in the system. As a result, one likely outcome is an impact on both the composition and quantity of recyclables collected at the kerbside. Container Deposit Schemes of this type have the potential to reduce quantities of higher value materials collected through household waste services (e.g. aluminium cans and PET plastic bottles) resulting in reduced revenues for MRFs, which may in turn result in them increasing their gate fees for processing mixed recyclables.

In NSW, MRF operators are entitled to receive quarterly 'processing refunds' for eligible containers which pass through their facility, including material received via local government kerbside collections. Using the results of audits conducted on MRF outputs, the NSW Environment Protection Authority (EPA) calculates an 'Eligible Container Factor' for each kilogramme of different materials processed, examples of which are shown in Table 4-2 below for Q1 2018.

[23] http://www.exchangeforchange.com.au/ReturnAndEarn_MediaRelease.pdf

Table 4-2 Eligible Container Factors in NSW – Quarter 1, 2018[24]

Material	Approved Factor (eligible count per kg)	Assumed count per tonne	Assumed CDS income per tonne
Aluminium	59.17	59,170	$5,917
PET segregated	18.96	18,960	$1,896
HDPE segregated	0.69	690	$69
Mixed segregated[25]	3.62	3,620	$362
Mixed combined[26]	8.74	8,740	$874
Glass	2.25	2,250	$225

MRF operators may use this factor to calculate the refund they can claim (based on the weight of eligible material processed) or alternatively can count each eligible container.

Research commissioned by NSW Government into the potential economic impacts of the scheme on MRF operators[27] estimated that additional revenues arising from eligible containers collected through kerbside recycling systems could be worth around $100 million per annum for councils and MRF operators across NSW. The number of eligible containers in each tonne of commingled MRF input material was estimated to be at least 1,500 to 2,000, suggesting that the level of refund available would be between $150 and $200 per input tonne.

The same research concluded that the direct cost of CDS compliance on NSW MRFs is very low (at around 5% of estimated additional revenue) and that eligible containers are worth more from the CDS refunds than their current value in commodity markets.

A key consideration in a wider context is the extent to which a reduction in total tonnage of materials collected at the kerbside, as a result of residents claiming refund values themselves, offsets the additional MRF income derived from CDS refunds.

To be able to claim the eligible refunds specific to council kerbside collections, suitable agreements must be in place between the collecting council and their MRF contractors to define how CDS income will be returned to the supplying council, and how this process will be monitored. Approved mechanisms include:

- the council and its MRF operator entering into a 'Refund Sharing Agreement';
- the council notifying the EPA that the sharing arrangement is 'fair and reasonable' without a Refund Sharing Agreement; or
- the council and the MRF operator entering into a 'Processing Agreement'.

MRF operators must also provide evidence that the containers for which they are claiming the refund have been recycled appropriately, including submission of monthly data, quarterly claims and an annual recycling report which must all be presented in a prescribed format.

[24] https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/return-and-earn/material-recovery-facility-operator

[25] For MRFs which segregate PET and HDPE plastic types, this category refers to the remaining plastic types, in aggregate.

[26] This category applies to MRFs which do not segregate plastic types, and refers to all plastic types, aggregated.

[27] https://www.olg.nsw.gov.au/container-deposit-scheme

Failure to have an appropriate agreement in place or provide suitable evidence of recycling can result in both the council and MRF operator being ineligible to receive applicable refund payments.

A generic summary of material and money flows created by a DRS is shown in Figure 4-1 below.[28]

Figure 4-1 Typical Material and Money Flows in a DRS

Has Return and Earn Worked?

As the scheme nears completion of its first year, some early outcomes can be identified, and conclusions drawn as to its effectiveness.

Inevitably, the overall cost of the scheme to manufacturers, wholesalers and retailers has been passed on to consumers through an uplift in product costs. Anecdotally the level of cost increases being applied has in some cases exceeded the costs associated with the scheme. With higher costs being introduced almost immediately following the introduction of the scheme, there has been some initial criticism associated with residents not being able to offset higher shopping bills by recouping the refund value locally. This has been due to the programmed roll out of collection points not providing sufficiently accessible outlets (particularly in more rural areas) in the early months of implementation[29].

However, in terms of the capture of materials the scheme appears to have been successful, with Exchange for Change indicating that in the first four months almost 200 million containers were recycled that would otherwise have ended up in landfill or in the litter stream. This was accompanied by a rise in the kerbside recycling rate for beverage containers from 33% to 61%.[30] At the time of writing, the Return and Earn website claims that over 700

[28] Source: Envision (2015) The Incentive to Recycle: the case for a container deposit system in New Zealand

[29] http://www.abc.net.au/news/2018-02-14/nsw-recycling-container-deposit-scheme-costing-consumers-more/9444948

[30] https://returnandearn.org.au/exc_news/return-and-earns-resounding-numbers/

million eligible containers have been returned, equating to approximately 3 million containers being returned each day.

In August 2018, Keep Australia Beautiful reported a 33% drop in Return and Earn eligible drink containers in the litter stream since November 2017, immediately prior to the scheme's introduction[31], although in SLR's experience of working in Australia and NSW specifically, collation of robust litter data is often cited as an area for improvement.

4.3.3 Australian Capital Territory (ACT)

The ACT scheme commenced on 30 June 2018 and is run by the same scheme co-ordinator as NSW, Exchange for Change. The network operator is Return It which is owned by ReGroup, the operator of the only MRF in the ACT. Return It also includes some charity partners.

Return It uses a hub-and-spoke network based around three depots and a number of Express Points feeding into them. At the start of May there were 14 return sites in the ACT, including the three depots, with 20 planned by the end of 2019.

The depots have the look of a clean retail environment. Users can redeem containers and receive cash or they can drop off bags of materials which are later counted on-site and the value credited to the user's account.

The Express Points are small stand-alone unstaffed self-serve units, occupying about 1-2 m2 of space, that are often located in charity shops, high rise apartments and office buildings. They do not dispense cash, instead users enter their phone numbers and the value of deposited materials are credited to their account. There are also larger self-serve units called 'pods' which are housed in shipping containers and often located in car parks. These occupy about 10 m2 and are most like a reverse vending machine.

The MRF is included in the scheme and a factor calculated in the same way as in NSW.

4.3.4 Queensland

The Queensland DRS commenced on 1 November 2018. Drivers for a DRS in Queensland were slightly different. Recovery of containers was only 45% before the introduction of the scheme. Queensland was also Australia's most littered state. The Government was expecting that a DRS would increase recovery of materials, provide money for communities, create jobs, provide a clean stream of material and provide opportunities for new investment.

All jurisdictions think they are different and unique but there are a number of factors in Queensland that make a DRS system more problematic. Queensland has a long coastline and there are many islands. It is a large state, so distances are long between towns and cities. Quantities of materials are likely to be small outside the south-east and major centres, and parts of it are inaccessible in the wet season (December to February).

The scheme is run by a project responsibility organisation (PRO) which oversees whole scheme. The PRO is a 'not for profit' company directly appointed by the Minister. The current PRO is 'Containers for Change'.

At the commencement of the scheme there were 250 container return points (CRPs) of which there were a variety of types including depots, bag drop points and RVMs, although RVMs were not available in many places. There are no set operating hours for CRPs but there is a minimum number of hours they must be accessible. Rural and remote communities are a particular challenge and 'pop up' CRPs are often used.

[31] http://wastemanagementreview.com.au/nsw-litter-reduce-third/

MRFs are included in the scheme but each MRF has its own factor and recovered deposits are shared 50:50 between MRFs and councils.

Users get paid by EFT so they must register and get a scheme ID. Collected containers are auctioned through an online portal.

By the end of April 2019 there were more than 300 CRPs and 420 million containers had been returned, $78 million returned and 620 new jobs created.

4.3.5 Lessons from Australian DRS Schemes

The DRS schemes in Australia were largely introduced to reduce litter. A secondary element was to increase recycling rates. In particular, the South Australia DRS was targeted at increasing recycling rates as it pre-dated kerbside collections.

In the schemes that have been introduced in recent years, efforts have been made to work in tandem with kerbside recycling, rather than to compete against it. The NSW scheme pays deposits to MRFs for relevant materials that are recycled. This should be considered if a DRS is introduced to Ireland as the impact of a DRS on the MRF gate fees could have wider consequences in terms of the overall viability of kerbside recycling.

The Scottish DRS proposed by Eunomia is designed to take high value materials away from the kerbside recycling scheme, so it does not support kerbside recycling. We see this as a significant flaw, as addressed later in this report.

Other specific lessons learned from the Australian experience, and wider implications for elsewhere include:

1. Appropriate Level of Refund – the value should be set at a suitable level to influence behavioural change.
2. Achievable Roll Out Programme - sufficient time should be allowed to set up collection points which are accessible for all.
3. Effective Location Management – return points should be available, easy to use and well maintained.
4. Allocation of Scheme Costs – linkages between a DRS and complementary Extended Producer Responsibility (EPR) measures must be fully considered so the overall system is seen as 'fair' whilst driving positive changes in both manufacturer and consumer behaviour.
5. Use of Funds – directing some refund values towards supporting local community organisations and projects would generate positive publicity.
6. Impact on MRF Operators – the operational and economic impact on the MRF sector must be robustly assessed.
7. Impact on Local Authorities – the effects of changes to kerbside collection systems and all other associated costs (e.g. litter management) should be considered.
8. Scope of Container Eligibility – limiting the scope of a DRS to 'on the go' containers consumed outside of the home, could mitigate potential loss of income through reduced kerbside collection tonnages of high value materials.
9. Scope of Materials – focussing on specific materials (e.g. certain types of plastic) could promote development of associated reprocessing infrastructure.
10. Quality Requirements – returned containers should be in a suitable condition for recycling.

The overall financial impacts and linkages with potential wider change in waste management practices will need to be fully considered for maximum benefits to be realised.

4.4 Costs of a DRS in Ireland

4.4.1 Estimate of DRS Costs

A full evaluation of the costs of introducing and operating a DRS in Ireland is beyond the scope of this report, so we take a cursory look at the likely costs in the context of overall municipal waste management in Ireland to put it in perspective.

We are informed by REPAK, that there are 3,887 supermarkets operating in Ireland. For a DRS to operate smoothly, we assume that all of these premises are fitted with Reverse Vending Machines (RVMs) and undergo alterations to their storage arrangements to cater for the collected PET bottles and aluminium cans. The likely cost of the capital works is expected to be about €50,000 per store including the cost of installing the equipment and providing additional storage capacity separate from stock. That comes to a once-off cost of €194.35 million. We assume that this is paid off over 10 years at an interest rate of 5% per annum, which works out at about **€25 million per annum**.

We assume that 3 regional depots would have to be developed for counting and processing of deposit materials at a cost of €10 million each = €30m. Using the same assumptions that this would be paid for over 10 years at 5% interest per annum, the cost would be about **€4 million** per annum.

In order to further analyse the costs of operating a DRS in Ireland, we examined data presented by Eunomia in their report on a DRS in Scotland. The population of Scotland is approximately 5.4 million, which is a little higher than the population of Ireland which is currently estimated to be about 4.8 million. However, Scotland is easier to service as the rural population in Scotland is just 17%, compared with 37% in Ireland[32]. The average cost of labour in Ireland is €31 per person per hour versus €25.7 for the UK, based on Eurostat 2017 data.

Given these facts, we consider that many of the costs predicted for a Scottish DRS should translate to similar, if not higher costs, for a DRS in Ireland.

In Eunomia's report on Scotland, it was estimated that £15 million sterling would be required to cover other set-up costs for the scheme including planning and designing the system, such as deciding on fee structures and creating legal entities, and then implementing the system once the design has been finalised. The latter activities would include those such as procuring logistics contractors, stakeholder communications, populating the container database and setting up a call centre.

Converting this to euro[33] and spreading it over 10 years at 5% interest, this would add **€2.1 million** per annum to the costs of a DRS in Ireland.

Eunomia calculated that ongoing labour and space costs for the RVMs used in a DRS in Scotland would cost about £3.9 million per annum, based on 2,700 RVMs. In this report, we consider the costs of operating 3,887 RVMs, so that cost pro-rata would increase to £5.6 million (c.**€6.3 million** per annum). Eunomia also estimated costs for manual handling at stores without RVMs, but we have not included those costs, as our analysis considers that all supermarkets would have an RVM.

Eunomia calculated that Logistics costs would be c.£20 million (**€22.4 million**) per annum in the Scottish DRS.

Eunomia calculated that counting centre costs would be c.£2.9 million (**€3.2 million**) per annum in the Scottish DRS.

[32] World Bank Statistics for Ireland and UK - see https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS Scotland figure confirm by Government of Scotland here https://www.gov.scot/publications/rural-scotland-key-facts-2018/pages/2/

[33] Based on €1.12 = £1stg

Eunomia calculated that central administration costs would be c.£2.45 million (**€2.7 million**) per annum in the Scottish DRS.

Eunomia's costs for labelling and security for the Scottish scheme are unclear. There is reference to a £4.8 million one-off cost for designing labels and then a reference to a potential £6.9 million per annum for additional security markings on the beverage containers. Given that Ireland has a land border with the United Kingdom, we suggest that security markings would be important to prevent fraud, so we add the £6.9 million (**€7.7 million**) annual cost for security labelling.

We summarise these costs in Table 4-1.

Table 4-3 Overview of Potential Annual Costs of DRS in Ireland

Item	Description	Estimated Cost per annum millions
1	Installation of RVMs & Storage Room (spread over 10 years)	€ 25.0
2	Development of 3 Regional Depots (spread over 10 years)	€ 3.8
3	Set-Up costs (spread over 10 years)	€ 2.1
4	Ongoing labour and space costs at stores	€ 6.3
5	Logistics Costs	€ 22.4
6	Counting Centre Costs	€ 3.2
7	Central Administration Costs	€ 2.7
8	Labelling & Security Markings	€ 7.7
	Total Estimated Annual Costs	**€ 73.2**

A successful DRS could capture an additional 7,469 t/a of plastic beverage containers and an additional 1,948 t/a of aluminium cans. The value of these materials is estimated at:

- Plastic beverage containers: average price[34] €127/t x 7,469t = **€948,563**
- Aluminium cans: average price[35] €850/t x 1,948t = **€1,655,800**

The value of these materials generally depends on the location from which they must be collected, so the average figure is representative of a national spread of materials, as would be the case with a DRS. We have examined the value of these materials in the UK, as quoted in https://www.letsrecycle.com/prices/ for comparison. The quoted prices for the last 4 months (March to June 2019) are in the following range:

- Plastic beverage containers: UK price £20 to £290 per tonne (€22 to €325[36]).
- Aluminium cans: UK price £700 to £780 per tonne (€784 to €874).

The value of materials achieved at the Material Recovery Facilities (MRFs) in Ireland is within the range quoted in the UK, so the data is consistent.

The value of collecting additional materials in a DRS is therefore estimated at €2.6 million per annum, which we discount from the €73.2 million gross costs, leaving a net cost of **€70.6 million per annum**. We recognise that the

[34] Average price received at 8 MRFs in Ireland (2018 data).

[35] Average price received at 8 MRFs in Ireland (2019 data).

[36] Based on €1.12 = £1stg

DRS would collect a lot more material and get the value of that material, but that is not a net gain for the country, it just transfers the revenue from the existing MRFs to the DRS. This report is concerned with the costs and benefits to the country, rather than to the operator of the scheme.

At a net cost of €70.6 million per annum, the cost of recycling each additional tonne of material is estimated at €70.6 million / 9,417 tonnes = **€7,497 per tonne.**

4.4.2 Estimate of Kerbside Recycling Costs

In this subsection of the report, we compare that figure with the cost of recycling other wastes from the municipal waste stream to put it in perspective.

The IWMA considers that the average charge for kerbside household waste collection in Ireland is roughly €270 per house per annum[37] or less. In Table 4-2, we attempt to breakdown that cost into the three fractions collected at kerbside in Ireland (residual waste - grey, mixed dry recyclables – green/blue and food waste - brown), using EPA data[38] for the average tonnage of each waste type collected at kerbside in 2016. There is a degree of guesswork in this analysis, but it provides a reasonable overview of the cost of each element.

This data was peer-reviewed by IWMA members during the course of this project and has been accepted as being a reasonable assessment, although we recognise that each service provider will vary considerably from the data presented below and will vary from the EPA average data on tonnages.

Table 4-4 Rough Breakdown of Average Household Kerbside Service

Item	Number	Unit	Cost per unit (€)	Total Cost (€)
Residual Waste Collections	24	pick-ups	1.9	45.60
MDR Collections	24	pick-ups	1.9	45.60
Food Waste Collections (excludes rural)	16	pick-ups	1.9	30.40
Residual Waste Transfer	0.569	tonne	15	8.53
MDR Transfer	0.212	tonne	15	3.17
Food Waste Transfer	0.094	tonne	15	1.41
Residual Waste Transport & Disposal/Recovery[39]	0.569	tonne	128	72.82
MDR Transport & Recycling	0.212	tonne	80	16.93
Food Waste Transport & Composting/AD	0.094	tonne	84	7.89
Residual Waste Overheads & Profit	0.569	tonne	6	3.41
MDR Overheads & Profit	0.212	tonne	6	1.27
Food Waste Overheads & Profit	0.094	tonne	6	0.56
Subtotal (ex VAT)				**237.61**

[37] The CCPC confirmed this in their report '*Operation of the Household Waste Collection Market*, published on 28th September 2018. A consumer survey taken by Behaviour and Attitudes, summarised in Appendix E found that the typical home was paying between €230 and €280 per annum for a waste collection service. Elsewhere in the report, the CCPC estimated that the average charge was €228 per house, but this was based on data from operators in 11 counties and was skewed towards Dublin.

[38] Provided by Helen Searson EPA in March 2019, using 2016 kerbside data.

[39] We assume €14 per tonne transport costs from transfer station to final destination. Recyclables may have a shorter journey than residual or organic wastes as there are more facilities available in urban areas. However, the material is lighter so the cost per km is higher.

Item	Number	Unit	Cost per unit (€)	Total Cost (€)
VAT			13.50%	32.08
Total (incl. VAT)				**269.69**

Using the data presented in Table 4-2, we estimate the cost of each fraction as follows. We have excluded VAT from the breakdown as that is not a real cost.

Table 4-5 Breakdown Costs of Average Household Kerbside Service by Fraction

Fraction	Estimated Cost per House (ex. VAT) in euro
Residual Waste Cost	130.37
MDR Cost	66.98
Food Waste Cost	40.27
Total Cost	237.61

Kerbside MDR recycling is subsidised by REPAK to the value of €12.8 million per annum[40] currently. There are approximately 1.2 million houses on a kerbside collection service, so this contributes €10.66 per house. We add this to the cost of €66.98 calculated above to get an overall average cost per house of €77.64 per annum for MDR recycling.

This relates to the collection of 212 kg per annum form the average house. However, we know from the EPA/RPS Waste Characterisation study quoted earlier in this report, that there is an average of 26.3% non-target materials in the MDR collections. We therefore conclude that 156 kg (73.7%) of the collected 212kg is actually recycled. At a cost of €77.64 for 156kg, we estimate that it costs **€497** per tonne to recycle kerbside household waste. This puts some perspective on using a DRS to chase additional recyclables at a cost that is almost 12 times the cost of kerbside recycling.

4.4.3 Cost of Civic Amenity Sites and Bring Banks

We have reviewed the three Regional Waste Management Plans that were published in Ireland in 2015 to estimate the costs associated with materials recycled at civic amenity sites and bring banks. Table 18-1 of each regional waste plan provides details the amount of money spent by local authorities on waste recovery and recycling in 2013.

These costs relate to civic amenity centres, bring sites and bottle banks. Occasional and seasonal expenditures, such as Christmas tree recycling, are generally included under this expenditure heading also. The total spend for the local authorities in this area was €31.14 million in 2013.

The EPA National Waste Report for 2012 states that the following tonnages of waste were received at CA Sites and Bring Banks in 2012:

- Bring Banks 77,041 tonnes
- Civic Amenity Sites 129,897 tonnes

[40] REPAK annual report for 2018, page 29.

We assume that a similar amount was received in 2013, as data is not publicly available for that year. The cost of operating this infrastructure and managing the materials is therefore estimated at **€240 per tonne per annum.**

In 2012, the CA sites accepted 31,600 tonnes of mixed residual waste (MRW), 13,400kt/a bulky wastes and 7,647 tonnes of C&D (DIY) waste. We recognise that the MRW and a lot of the bulky and C&D wastes were probably not recycled, but the cost of disposal or energy recovery would have been higher than the cost of recycling, so the average cost of recycling at bring banks and CA sites, which accounted for an estimated 75% of the materials accepted at those facilities, was undoubtedly less the €240 per tonne.

4.4.4 Putting DRS Costs in perspective

To put the cost of additional recycling via DRS in context, in Table 4-4 we have put that cost (€7,497) on every additional tonne of recycling required to meet the MSW recycling targets set by the EU.

Using a modest 2% growth rate, it can be seen that Ireland needs to recycle an additional 1 million tonnes per annum by 2030 and 1.75 million additional tonnes per annum by 2040. It is clear from the data that recycling costs of €7,497 for every additional tonne is not viable for the Irish State as it would cost more than €168 billion over the next 20 years to meet the targets.

Table 4-6 DRS Costs for Additional Recycling Applied to MSW Recycling Requirements

Year	MSW Generation (t/a)	Recycling Rate to meet targets	Recycling Required (t/a)	Additional Recycling Required above 2016 rate (t/a)	Cost Equivalent to DRS at €7,497 per tonne for additional recycling
2016	2,763,166	41%	1,132,898	0	€ 0
2017	2,818,429	42%	1,183,740	50,842	€ 381,162,474
2018	2,874,798	43%	1,236,163	103,265	€ 774,177,705
2019	2,932,294	44%	1,290,209	157,311	€ 1,179,360,567
2020	2,990,940	46%	1,375,832	242,934	€ 1,821,276,198
2021	3,050,759	48%	1,464,364	331,466	€ 2,485,000,602
2022	3,111,774	50%	1,555,887	422,989	€ 3,171,148,533
2023	3,174,009	52%	1,650,485	517,587	€ 3,880,349,739
2024	3,237,489	54%	1,748,244	615,346	€ 4,613,248,962
2025	3,302,239	55%	1,816,232	683,333	€ 5,122,947,501
2026	3,368,284	56%	1,886,239	753,341	€ 5,647,797,477
2027	3,435,650	57%	1,958,320	825,422	€ 6,188,188,734
2028	3,504,363	58%	2,032,530	899,632	€ 6,744,541,104
2029	3,574,450	59%	2,108,925	976,027	€ 7,317,274,419
2030	3,645,939	60%	2,187,563	1,054,665	€ 7,906,823,505
2031	3,718,858	61%	2,268,503	1,135,605	€ 8,513,630,685
2032	3,793,235	62%	2,351,806	1,218,908	€ 9,138,153,276
2033	3,869,099	63%	2,437,533	1,304,635	€ 9,780,848,595
2034	3,946,481	64%	2,525,748	1,392,850	€ 10,442,196,450
2035	4,025,411	65%	2,616,517	1,483,619	€ 11,122,691,643

Year	MSW Generation (t/a)	Recycling Rate to meet targets	Recycling Required (t/a)	Additional Recycling Required above 2016 rate (t/a)	Cost Equivalent to DRS at €7,497 per tonne for additional recycling
2036	4,105,919	65%	2,668,848	1,535,949	€ 11,515,009,653
2037	4,188,038	65%	2,722,225	1,589,326	€ 11,915,177,022
2038	4,271,798	65%	2,776,669	1,643,771	€ 12,323,351,187
2039	4,357,234	65%	2,832,202	1,699,304	€ 12,739,682,088
2040	4,444,379	65%	2,888,846	1,755,948	€ 13,164,342,156
				Total Cost:	**€ 167,888,380,275**

The MSW recycling targets are just as important as the SUP targets for recycling plastic beverage containers, so costs associated with increasing recycling rates must be viable and *'recycling at any cost'* is not considered to be a viable policy for Ireland. More cost-effective alternatives are considered later in this report.

4.5 Likely Impact of a DRS on Kerbside Recycling in Irelan

4.5.1 Potential Price Increases

SLR consulted with the operators of Materials Recovery Facilities (MRFs) in Ireland to establish the likely impact of a DRS on the gate fees for acceptance of co-mingled Mixed Dry Recyclables (MDR) if the aluminium cans and plastic bottles were removed from the MDR bins.

We received responses from all 9 MRFs that are processing the MDR collected in Ireland. The average current gate fee for these facilities is €66 per tonne. Each MRF Operator calculated the impact of taking plastic bottles and aluminium cans out of the MDR stream and they responded with a range of €20 to €40 for the likely increase in gate fee as a result of the loss of these high value materials. The average gate fee increase figure provided by the MRFs was €28.44 per tonne, with the weighted average at €29.53.

Some of the MRF Operators also commented that there would be other impacts to be considered, such as:

- Without good quality materials, such as plastic bottles and aluminium cans, it is difficult to move lower quality materials such as plastic pots/tubs/trays and plastic films. Reduced recycling of these materials would impact negatively on Ireland's recycling performance.
- The processing lines at the MRFs would have to be re-configured to manage the changes to the input materials.
- A DRS is likely to impact on all REPAK subsidies, as the producers of aluminium cans and plastic bottles would not provide subsidy for MRF operations, so the existing subsidy could be reduced for all materials.

SLR has carried out an independent analysis to verify the figures provided by the MRF Operators. Based on actual tonnages supplied by the MRF Operators and average values of materials and REPAK, as quoted by the MRF Operators, we calculate the following revenue losses that would occur if DRS materials were removed from the MDR bins.

Table 4-7 Expected Revenue Losses at MRFs if DRS Materials Removed

Material	Volume Handled (t/a)	Average Value of Material including REPAK subsidy (€)	Loss of Revenue (€)
Aluminium Cans	4,444	915	€ 4,066,260
PET Bottles	11,227	247	€ 2,773,069
Estimated Cost due to Loss of Beverage Containers			**€ 6,839,329**
HDPE Bottles	7,283	415	€ 3,022,445
Estimated Cost due to Loss of Beverage Containers and HDPE Bottles			**€ 9,861,774**

The EPA estimates that 253,328 tonnes of household MDR was collected in Ireland in 2016. Spreading the loss in revenues across that tonnage, we estimate that the MRFs would have to increase gate fees for household MDR by the following amounts to cover the loss.

Table 4-8 Expected Increase in MRF Gate Fees for Household MDR if DRS Materials Removed

Material	Revenue Loss (€)	Household MDR Handled in 2016 (t/a)	Household MDR Handled after DRS materials removed (t/a)	Loss of Revenue per Unit / Potential Gate Fee increase (€)
Loss of Beverage Containers	€ 6,839,329	253,328	237,657	€ 28.78
Loss of Beverage Containers and HDPE Bottles	€ 9,861,774	253,328	230,374	€ 42.81

The figure of €28.78 is very close to the €28.44 average figure and the €29.53 weighted average figure estimated by the MRF Operators for likely gate fee increase after removal of plastic beverage containers and aluminium cans, so the data is considered to be credible. Removal of HDPE bottles would have an even greater impact as it would result in an estimated increase of €42.81 in the MRF gate fees.

There are approximately 1.2 million houses in Ireland with a kerbside waste collection service. If waste companies decided to regain the revenue loss directly through increases in prices, the required price increases would be as follows.

Table 4-9 Potential Price Increases to Householders to Cover Revenue Losses due to DRS

Material	Revenue Loss (€)	Total Number of Household Customers	Potential Price Increase Excluding VAT (€)
Loss of Beverage Containers	€ 6,839,329	1,200,000	€ 5.70
Loss of Beverage Containers and HDPE Bottles	€ 9,861,774	1,200,000	€ 8.22

In a successful DRS, the removal of the DRS materials from the collection system would also remove similar materials from the residual waste stream and that would result in cost savings to compensate the revenue losses. It is unlikely that removing a small percentage of the overall residual waste would result in reduced collections at

kerbside or reduced costs at transfer stations, but final disposal/recovery costs, including transport would be reduced.

Using the EPA Waste characterisation data and the EPA estimation of 681,027 tonnes of MRW collected in Ireland in the household kerbside system in 2016, we calculate these potential cost savings as follows.

Table 4-10 Potential Cost Savings in Recovery/Disposal of MRW due to DRS

Material	% of MRW	Estimated Volume in MRW (t/a)	Cost per tonne for Residual Waste Transport & Disposal/Recovery (€)	Total Saving (€)	Saving per Household Excluding VAT (€)
Aluminium Cans	1.30%	8,853[41]	128	€1,133,229	€ 0.94
PET Bottles	1.20%	8,172	128	€1,046,057	€ 0.87
Saving due to Loss of Beverage Containers				€2,179,286	**€ 1.82**
HDPE Bottles	1.30%	8,853	128	€1,133,229	€0.94
Saving due to Loss of Beverage Containers and HDPE Bottles				€3,312,515	**€ 2.76**

The revenue losses outweigh the cost savings leaving an overall negative impact as follows.

Table 4-11 Overall Impact of DRS on Kerbside Household Waste Collections

Material	Overall Costs (MDR Revenue Loss less MRW Savings) (€)	Potential Price Increase excluding VAT (€)	Potential Price Increase including VAT (€)
Loss of Beverage Containers	€ 4,660,043	€ 3.88	€ 4.41
Loss of Beverage Containers and HDPE Bottles	€ 6,549,259	€ 5.46	€ 6.19

4.5.2 Potential Impact on Wider Recycling

The potential price increase for household waste collection due to a DRS is relatively modest. However, there is a greater concern that the MRF Gate Fees could reach a tipping point that would discourage recycling altogether. In the previous section, we have calculated that removal of PET Bottles and aluminium cans from MRFs would increase the gate fees by c.€29 and if HDPE bottles were included in the DRS, that increase would be c.€43 per tonne.

At a current MRF gate fees of between €60 and €75 per tonne, a DRS would increase these gate fees to between €89 and €104 per tonne and if HDPE bottles were included, this would increase to between €102 and €117. Gate

[41] Note that REPAK has indicated that 18% of recycled aluminium cans are recovered from MRW, which we calculate to be approximately 2,062 t/a. The remaining estimate of 6,791 tonnes of aluminium cans in MRW is higher than expected. This may be due to a number of factors such as inconsistencies in the waste characterisation returns from different transfer stations (range of 0.49% to 3.18%), contamination with liquids of other residual materials or there may be more aluminium cans in the system than we realise.

fees at that level would be similar to WtE gate fees and would be higher than cement kiln gate fees for SRF. That then introduces an incentive for waste collectors to avoid recycling altogether.

Legislation in Ireland requires waste collectors to collect MDR at kerbside and to recycle it after it is collected. However, there are a small number of unauthorised rogue collectors operating in Ireland[42] and the enforcement authorities have so far been unable to stamp them out. A change to the dynamics whereby MDR costs the same or more than MRW, gives a boost to rogue collectors that will collect mixed waste with no recycling. It is less expensive to collect unsegregated waste and if there is no saving available for MDR gate fees, there will be a significant incentive to collect unsegregated wastes.

Such high MRF gate fees would also introduce an incentive for waste collectors to mix residual and recyclable wastes and send that mixture to landfill or WtE. Residual and recyclable wastes can be collected in a single truck if the truck has a split body and the two waste types are kept separate. However, high gate fees at MRFs remove the financial incentive that encourages all collectors to keep these waste streams separate.

There is currently a 'carrot and stick' approach that ensures that dry recyclables are delivered to MRFs. However, there is a concern that if the carrot is removed[43], this would result in an over-reliance on the stick (enforcement). In this scenario, there is a high risk that unethical waste collectors will find ways to mix these ways without detection and that encourages rogue behaviour and criminal interest in waste collection, which should be avoided at all costs. The level of criminal activity in waste collection in Ireland is relatively low compared to many countries, but it clearly exists and any measure that encourages its expansion should be avoided.

[42] 'Man in the Van' operators that collect black bags of mixed household waste at a low price and are highly likely to fly-tip this waste.

[43] i.e. MRF gate fees increasing to match residual waste gate fees

5.0 Improving Ireland's Recycling Performance

5.1 Introduction

The previous Chapters of this report show that a DRS would have some benefits in relation to waste management and litter prevention in Ireland but would do little to increase MSW recycling rates in Ireland, which is considered the biggest challenge associated with the future EU targets.

We have also shown that a DRS would be very expensive to set up and to operate. It would therefore require significant financial resources that the IWMA suggests could be better spent in assisting Ireland to achieve a wider range of EU waste management obligations.

5.2 Co-mingled Collections of Dry Recyclables

One important aspect to consider prior to considering alternatives to DRS is the wording in the SUP Directive that requires:

> *"Separate collection for recycling of single use plastic beverage bottles with a capacity of up to 3 litres, including their caps and lids".*

Plastic beverage bottles are currently collected alongside other dry recyclables in a co-mingled manner in household bins that are generally green or blue in colour. In fact, the co-mingled collection of dry recyclables is required by legislation. The Waste Management (Collection Permit) Regulations 2007 (as amended) contains the following regulations:

> "20. (1) The nominated authority shall attach to each waste collection permit that may be granted by it such conditions as are in the reasonable opinion of the nominated authority, necessary to—
>
> (*g*) In the case of household kerbside waste collection, ensure that the following actions are taken—
>
> (VII) provide for the collection of at least the recyclable waste materials listed in the seventh schedule as part of the segregated collection arrangements provided in accordance with (VIII) for household kerbside waste collection.
>
> (VIII) provide that the collection of recyclable household kerbside waste shall occur at least once every fortnight,"

The Seventh Schedule of the Regulations is as follows:

> **"SEVENTH SCHEDULE (Article 20)**
>
> **Recyclable Household Waste Materials**
>
> **Paper**
> Newspapers
> Magazines
> Junk mail
> Envelopes
> Paper
> Phone books
> Catalogues
> Tissue boxes
> Sugar bags
> Calendars
>
> **Plastic Bottles (PET 1)**
> Mineral Bottles
> Water Bottles
> Mouthwash bottles
> Salad dressing bottles
>
> **Steel cans**
> Pet food cans
> Food cans
> Biscuit tins
> Soup tins

Dairies
Letters
Computer paper
Used Beverage and Juice cartons Milk cartons
Egg Boxes
Holiday brochures
Paper Potato bags

Plastic Bottles (HDPE2)
Milk Bottles
Juice Bottles
Cosmetic bottles
Shampoo bottles
Household cleaning bottles
Laundry detergent bottles
Window Cleaning Bottles
Bath room bottles

Aluminium cans
Drink cans

Plastic packaging (PP)
Yogurt containers
Margarine tubs
Rigid food packaging- (except black)
Liquid Soap Containers
Fruit containers

Cardboard
Food boxes
Packaging boxes
Cereal boxes Kitchen
Towel tubes

(Optional — In addition, we will accept the following items in the recycling bin:)"

The Waste Management Regional Planners have done a lot of good work in promoting the current mixed dry recycling system in Ireland and have produced the following image as a clear representation of the materials to be placed in the mixed dry recycling bins.

Figure 5-1 Materials Accepted in MDR Bins

This and similar images have been distributed nationally through billboards, buses, websites, social media, public engagement, etc. This is now well established as the definitive list of materials to be placed in dry recycling bins. Any change from that position would undo several years of promotional work by the Regional Authorities and other parties, including the Department of Communications, Climate Action and Environment.

SLR believes[44] that collecting beverage containers alongside other dry recyclables in co-mingled collections can continue to fulfil the *'separate collection'* requirement of the EU Directives on waste as it currently does under

[44] Until proven otherwise. An enquiry has been made by the IWMA to the EU Commission via FEAD for a definitive position on this issue.

the waste framework directive (WFD) which also requires *'separate collection'* of recyclables including paper, metal, plastic and glass.

Recital 42 of the WFD states:

"(42) Separate collection could be achieved through door-to-door collection, bring and reception systems or other collection arrangements. While the obligation to separately collect waste requires that waste be kept separate by type and nature, it should be possible to collect certain types of waste together provided that this does not impede high-quality recycling or other recovery of waste, in line with the waste hierarchy. Member States should also be allowed to deviate from the general obligation to separately collect waste in other duly justified cases, for instance where the separate collection of specific waste streams in remote and scarcely populated areas causes negative environmental impacts that outweigh its overall environmental benefits or entails disproportionate economic costs. When assessing any cases in which economic costs might be disproportionate, Member States should take into account the overall economic benefits of separate collection, including in terms of avoided direct costs and costs of adverse environmental and health impacts associated with the collection and treatment of mixed waste, revenues from sales of secondary raw materials and the possibility to develop markets for such materials, as well as contributions by waste producers and producers of products, which could further improve the cost- efficiency of waste management systems."

More specifically, Article 10 of the WFD says:

"Article 10

Recovery

1. Member States shall take the necessary measures to ensure that waste undergoes preparing for re-use, recycling or other recovery operations, in accordance with Articles 4 and 13.
2. Where necessary to comply with paragraph 1 and to facilitate or improve preparing for re-use, recycling and other recovery operations, waste shall be subject to separate collection and shall not be mixed with other waste or other materials with different properties.
3. Member States may allow derogations from paragraph 2 provided that at least one of the following conditions is met:
   a. collecting certain types of waste together does not affect their potential to undergo preparing for re-use, recycling or other recovery operations in accordance with Article 4 and results in output from those operations which is of comparable quality to that achieved through separate collection;
   b. separate collection does not deliver the best environmental outcome when considering the overall environmental impacts of the management of the relevant waste streams;
   c. separate collection is not technically feasible taking into consideration good practices in waste collection;
   d. separate collection would entail disproportionate economic costs taking into account the costs of adverse environmental and health impacts of mixed waste collection and treatment, the potential for efficiency improvements in waste collection and treatment, revenues from sales of secondary raw materials as well as the application of the polluter-pays principle and extended producer responsibility.

   Member States shall regularly review derogations under this paragraph taking into account good practices in separate collection of waste and other developments in waste management."

Also, Recital 27 of the SUP Directive addresses separate collection as follows:

"While the obligation to separately collect waste requires that waste be kept separate by type and nature, it should be possible to collect certain types of waste together provided that this does not impede high-quality recycling in line with the waste hierarchy in accordance with Article 10(2) and point (a) of Article 10(3) of Directive 2008/98/EC."

A legal firm[45] has examined this issue for the IWMA and their advice suggests that plastic bottles can continue to be collected co-mingled with other recyclables, provided that the criteria quoted above are met and provided that the Irish Government continues to allow and promote the collection of co-mingled dry recyclables.

We therefore proceed with this report on the basis that co-mingled collections of dry recyclables can continue to collect plastic beverage containers alongside other dry recyclable materials, which is important in the context of considering alternative ways to increase recycling rates of municipal solid waste in Ireland.

5.3 Improving Household kerbside Recycling

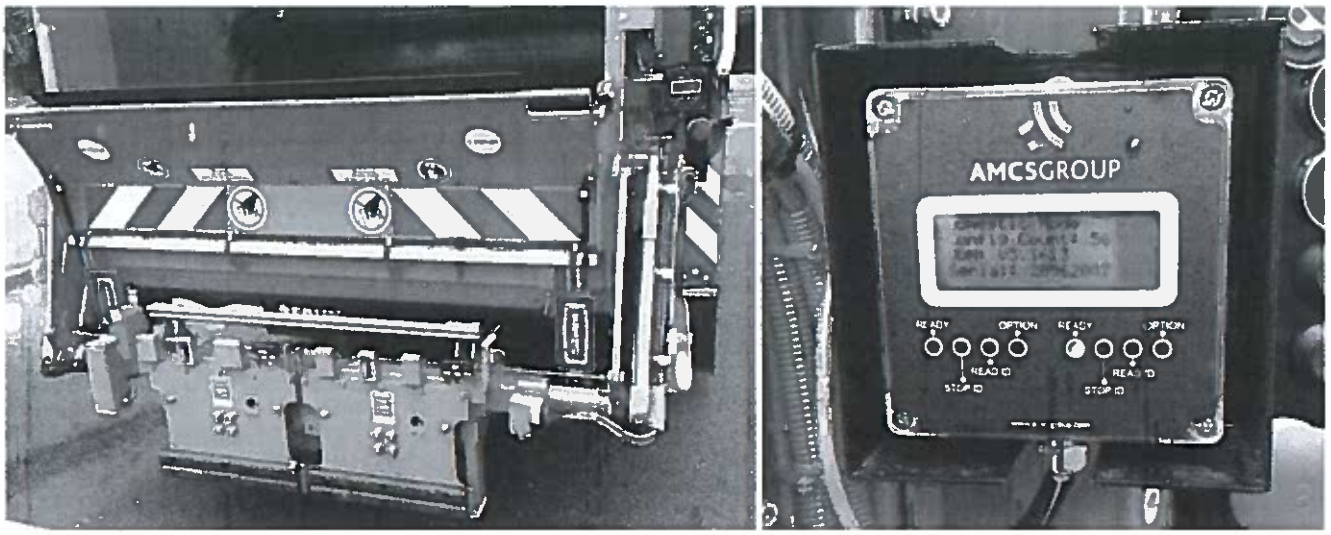
5.3.1 Introduction

Some IWMA members have taken pro-active steps to improve household kerbside recycling performance. These measures are supported by the IWMA and the Association will encourage other members to roll-out successful initiatives after results of trials have been analysed. Some of these initiatives are described briefly below.

5.3.2 Recycling Encouragement and Incentivisation

Ireland is in a unique position whereby every household bin is fitted with a Radio Frequency Identification (RFID) chip with details of the owner/address and each bin is weighed as it is lifted by the waste collection company. The data from every household bin lift is then recorded and reported to the householder on a regular basis.

Photo 1 – Example of Weighing System on Refuse Collection Vehicle in Ireland



There is also national consistency with respect to the materials accepted in each bin, although the variable bin size for brown bins have an impact on the type of biowaste that can be deposited in each. Larger brown bins are suitable for both food and garden waste, whereas small brown bins (caddies) are only suitable for food waste.

The IWMA has commenced a trial that is designed to encourage and incentivise customers to better source segregate household waste and thereby achieve higher recycling rates individually and collectively. The trial is being conducted by three IWMA Member companies[46] in different parts of the country, covering both urban and rural areas. Each company will involve 500 of their household customers with a broad range of demographics, so there will be a total of 1,500 houses in the trial.

[45] A&L Goodbody

[46] Clean Ireland Recycling, McElvaneys Waste & Recycling and Panda.

Customers will be informed by text or email on a monthly basis of their household's recycling performance, based on the weights of material in each of the 3 bins. Bins will be checked to ensure that householders do not deliberately place residual wastes in the recycling bins.

Customers will then be encouraged to improve their recycling performance and will receive a financial reward for achieving higher recycling rates. We understand that the financial incentive in the trial is set at €1 per percentage increase in recycling, but that may be subject to change. The trials are part funded by REPAK and part funded by the three companies involved.

The IWMA intends to encourage all members that collect kerbside household waste to partake in a full roll-out of this system, assuming a successful outcome from the trials. The IWMA will also lobby the Government and the relevant Producer Responsibility Schemes to provide finances to assist with incentivisation of householders that improve their recycling performance.

The funding of the incentives could be sourced from new environmental levies imposed by the Irish Government or from fees paid as part of Extended Producer Responsibility schemes. Under such schemes, the producers that place products on the market are obliged to financially assist with the recovery and recycling of the products after they have been discarded by the consumer, so this would seem to be a good fit for that obligation.

The IWMA expects that this system would provide a good return on investment in the following ways:

- Providing monthly data directly to householders will cost little and will encourage some householders to better segregate their wastes for environmental reasons.
- The addition of a financial reward for higher recycling rates should attract interest from the majority of householders who would be expected to better segregate their wastes for both environmental and financial benefits.
- Providing householders with information on local bring banks, civic amenity sites and other drop-off recycling points, in conjunction with this new reward system, should encourage people to divert the following wastes from the household bins for recycling:
    - Glass bottles and jars – to bring banks or CA sites
    - Textiles – to bring banks or CA sites
    - Electrical goods – to electrical retailers
    - Batteries – to supermarkets/other stores or CA sites
    - Paints & varnish – to CA sites
    - Wood/ timber – to CA sites
    - Large metal goods – to CA sites
    - Waste Oil – to CA sites
    - Household hazardous materials – to CA sites
    - Bulky goods – to CA sites
    - Garden waste (where brown bin is not large enough for garden waste) – home composting or CA sites
    - Reuse or re-sale of unwanted items – several on line options for resale or www.freetradeireland.ie for free trades
- The removal of these materials from the residual waste stream will increase recycling rates for the householder and will also reduce the pressure on residual waste treatment in Ireland, which is currently supplemented by exports to Waste to Energy plants in other countries such as Netherlands, Germany, Denmark and Sweden.

- The actions of householders in response to the information, encouragement and incentivisation should increase municipal waste recycling rates and assist Ireland in meeting the targets discussed earlier in this report. Investment now will help to avoid large fines from the EU if Ireland misses the future recycling targets.
- The encouragement to use CA sites, bring banks and other drop off points should assist Ireland in meeting targets set in other Directives addressing landfill, packaging, WEEE, batteries, waste oils, etc.
- When householders become more interested in recycling at home, they become more aware of non-recyclable materials and are more likely to avoid purchasing those items.

5.3.3 Camera Detection System

An IWMA member[47] has introduced a Camera Detection System (CDS) to its household kerbside waste collection service in Fingal and intends to roll-out this system to other areas where the company collects household waste. Cameras have been fitted to each truck that collects mixed dry recyclables and may in the future also be fitted to each truck that collects brown bin bio-waste. The cameras take a photograph the recyclable waste as it is emptied into the truck. The sequence is timed to avoid the packer plate that pushes the materials into the main body of the truck where it is compacted.

Photo 2 below shows material delivered by a good recycler, with excellent quality recyclables placed in the MDR bin.

Photo 2 – Well Sorted Materials Placed in an MDR Bin

[47] Panda / Greenstar

By contrast, Photo 3 shows an example of materials placed in an MDR bin by a householder that has taken less care with respect to acceptable materials. The bin contained unacceptable materials including a Flexible Intermediate Bulk Container (FIBC) bag as well as crisp packets and other non-recyclable plastics. Some materials were also contained within a bag, which is not permitted in the MDR bin.

Photo 3 – Poorly Sorted Materials Placed in an MDR Bin

The system links each photograph to the RFID chip in the bin and this provides a link to the customers address. A warning letter is sent to the customer that includes the photograph and highlights the unacceptable materials. The first warning letter can change behaviour in many cases. A second or third warning letter is required in other cases.

A small minority of customers do not change their behaviour after several warning letters with photographs of the unacceptable materials and in these cases, the company applies the residual waste charge to the bin, as the materials placed in the bin are not compliant with the MDR bin acceptable materials.

Photo 4 shows an example of a warning letter sent to a customer by the company.

Photo 4 – Example of Warning Letter

This is our second time writing to ask you to stop contaminating or putting full bags in your recycling bin. Failure to comply will result in a waste bin charge being added to your account. Most contamination we get is inside bags, so please empty the contents of any bags into your recycling bin loosely.

Number	Contamination	Level	Remarks
1	Bags must be empty	1	

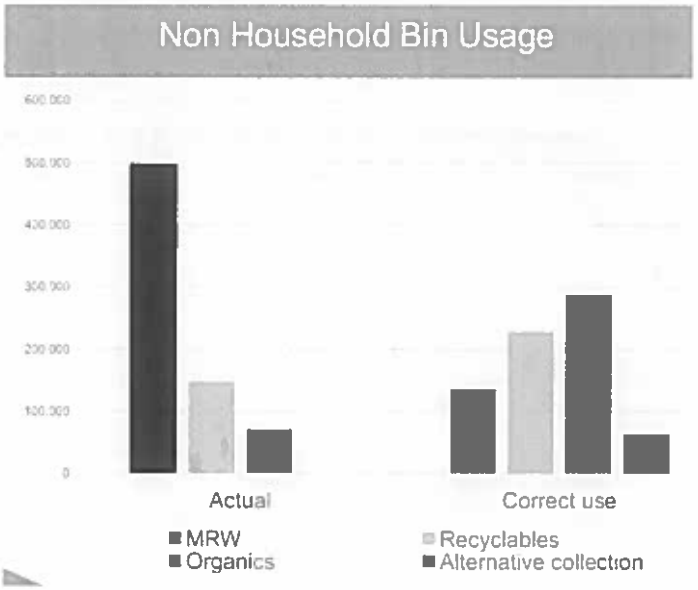
Feedback from the company suggests that the camera detection system is very effective in changing customers' behaviour and is encouraging householders to take a greater interest when source segregating their household waste. The company plans to introduce a similar system to its commercial customers to further encourage better source segregation of all municipal wastes.

5.4 Improving Commercial Waste Recycling

The 2018 waste characterisation study of non-household waste carried out for the EPA[48] has confirmed that commercial waste is poorly presented with a lot of waste placed in inappropriate bins. The following two slides from an EPA presentation[49] at the Irish Waste Management Conference clearly illustrate the extent of the problem:

Figure 5-2 Profile of Residual Commercial Waste in Ireland – EPA 2018

Figure 5-3 Actual v Correct Use of Commercial Waste Bins in Ireland – EPA 2018



[48] Non-Household Waste Characterisation Campaign - final report, Clean Technology Centre for the EPA, 2018.

[49] By Helen Searson, EPA. November 2018

The EPA found that more about 73% of the materials in the commercial residual waste bin should not be there, as they should be recycled. This equivalent figure was 35% for the household residual bin, so greater awareness and incentivisation is clearly needed in the management of commercial waste.

The IWMA, in a letter to the Department of Communications, Climate Action and Environment in September 2018 recommends the following actions to improve recycling performance from the commercial waste stream:

1. Introduce mandatory charging per kilo for all commercial wastes.

2. Introduce mandatory incentivised charging whereby recycled wastes (including brown bins) have a lower per kilo charge compared with residual wastes.

3. Introduce a ban on placing food waste, garden waste and recyclable wastes in residual waste bins at commercial premises.

4. Consider the introduction of mandatory material separation for different types of commercial premises. For example, wastes generated at offices should have separate paper bins, whereas a distribution warehouse should have separate collection of cardboard, pallet wrap, pallets, etc. The work carried out by The Clean Technology Centre for the EPA Waste Characterisation study should assist in this regard.

5. Commence and properly fund a strong awareness campaign to inform business owners and the general public of their waste management obligations at home and at work.

6. Encourage and fund enforcement of these obligations.

7. Consider the introduction of a Recycling Performance Rating Scheme for businesses, perhaps along the lines of Building Energy Rating (BER) scheme or another appropriate certification scheme. Independent assessors could rate the recycling performance of businesses using unannounced spot checks. The resultant rating or certification could be sought in tenders and could be used by these businesses in their Environmental Policies, Environmental Management Systems and/or Annual Reports. It could be a voluntary scheme, so long as there are some advantages to businesses that partake and perform well in the scheme, such as extra points in tenders and/or marketing advantages.

The IWMA expects that these recommendations will be considered by DCCAE in emerging waste policy, which is due to be finalised in 2020.

5.5 Other Measures to Increase Recycling Rates

The IWMA made recommendations to the DCCAE in January 2019 with respect to increasing MSW recycling rates in Ireland. Some of these recommendations are repeated below.

5.5.1 Increase Public Awareness

It is clear from Municipal Waste Characterisation data published by the EPA in 2018 and discussed earlier in this report, that the residual waste bins in Ireland contain high levels of recyclable materials. The data also shows that the recycling bins contain high levels of residual waste. This is true of both household waste and commercial waste.

Strong messages are needed to raise greater awareness of recycling in Ireland and to appeal to the public to make greater efforts in this area. The Government has made available a relatively modest budget (c.€1.5million/annum) that is being used by the Regional Planners to good effect to help educate the public on how best to recycle. We suggest that this budget should be increased substantially to at least €5m per annum if it is to use national TV and Radio media to deliver the key messages with regard to recycling.

We suggest that this this level of budget would be a good investment to assist Ireland in avoiding very large EU fines, as well as avoiding reputational damage to the Irish State.

5.5.2 Incentivised Charging

All households in Ireland with a kerbside collection service are charged in a way that financially incentivises waste prevention, re-use and recycling. Some charging structures are more incentivised than others. We recommend that the enforcement authorities review the charges offered and seek a revision of the charging systems that provide too little incentive.

5.5.3 Home Composting in Rural Areas

The roll-out of brown bins to agglomerations of 500 people or more should be completed now. We expect that more than 700,000 houses, out of a total of 1.2 million that are on a collection service, now have a brown bin, based on recent trends and industry knowledge. We understand that the enforcement authorities are being very proactive in cases where they consider that waste collectors have not fulfilled their obligations in that regard.

The IWMA has suggested that extending the roll-out to all rural areas is likely to produce a diminished return and may be too costly to be supported by the public. Price increases in rural areas would be inevitable and could lead to more people opting out of participation in kerbside household waste collection, so the initiative may have a negative environmental impact.

For these reasons, the IWMA recommends that a programme to promote home composting in rural areas should be developed with adequate available resources. Local authorities and waste collectors could provide the bins and supporting information at a reasonable cost or even at a rate subsidised by the Environment Fund.

5.5.4 Apartment Waste Management

Waste collected from apartments in Ireland is generally very poorly sorted and is not a good contributor to recycling rates. Ireland has one of the lowest rates of apartment dwelling in Europe at 7.3%, but this is likely to increase towards the European average of 41.8% in future years. That could have a negative impact on recycling rates unless it is tackled now.

Dublin City Council, supported by IWMA members, is working on trials to increase recycling rates at apartment blocks. There is a particular focus in the trials on the sorting and collection of bio-waste. Further initiatives in this area would undoubtedly assist with meeting future recycling targets for MSW.

5.5.5 Deposit and Refund Schemes at Major Events.

The IWMA recommends that it should be mandatory for all festivals, concerts, matches and other major public events to only supply beverages on a deposit and refund basis. This can be controlled through the existing system of licensing events. Charging a €1 deposit on rigid plastic cups that can be washed and re-used on site is very effective and saves large scale wastage of single use plastic containers.

Photo 5 – Example of Deposit & Refund at Major Events

5.5.6 Public Space Recycling.

There is a lack of recycling facilities in streets and public spaces in Ireland. The IWMA suggests that this sends a negative message to the public that it is acceptable to mix wastes. With greater public awareness and some innovative thinking, we expect that public space recycling could be improved greatly, even if it is just a two-bin system (dry recyclables and residual waste). The use of different colours and shaped openings can make it obvious to the public that they should put recyclables in the recycling bins. Simple and consistent messages would help.

Photo 6 – Example of Street Recycling

5.6 International Best Practice

5.6.1 Introduction

Germany has been one of the best performing countries in the world for many years now with respect to MSW recycling rates. We decided to review the details behind that performance to see if any recommendations for Ireland could be found.

Wales has also reportedly performed very well in recent years and appears to have made a step change to the MSW recycling rates that Ireland now needs. Wales is relatively close to Ireland in terms of geography, scale, demographics, so a comparison could be interesting, so we reviewed the detail behind Wales' MSW recycling figures.

5.6.2 MSW Recycling Rates in Germany

Eurostat 2017 data suggests that Germany has an MSW Recycling Rate of 67.6%. However, the German Waste Management Association commissioned work by consultants Thomas Obermeier and Sylvia Lehmann of TOMM+C that showed that the 67.6% figure is no longer valid under the rules of reporting recycling data to Eurostat.

The consultants estimate that the actual recycling rate in Germany is somewhere between 47% and 52%. The following Table provides the detail:

Table 5-1 Recalculation of Germany's Recycling Rate by TOMM+C

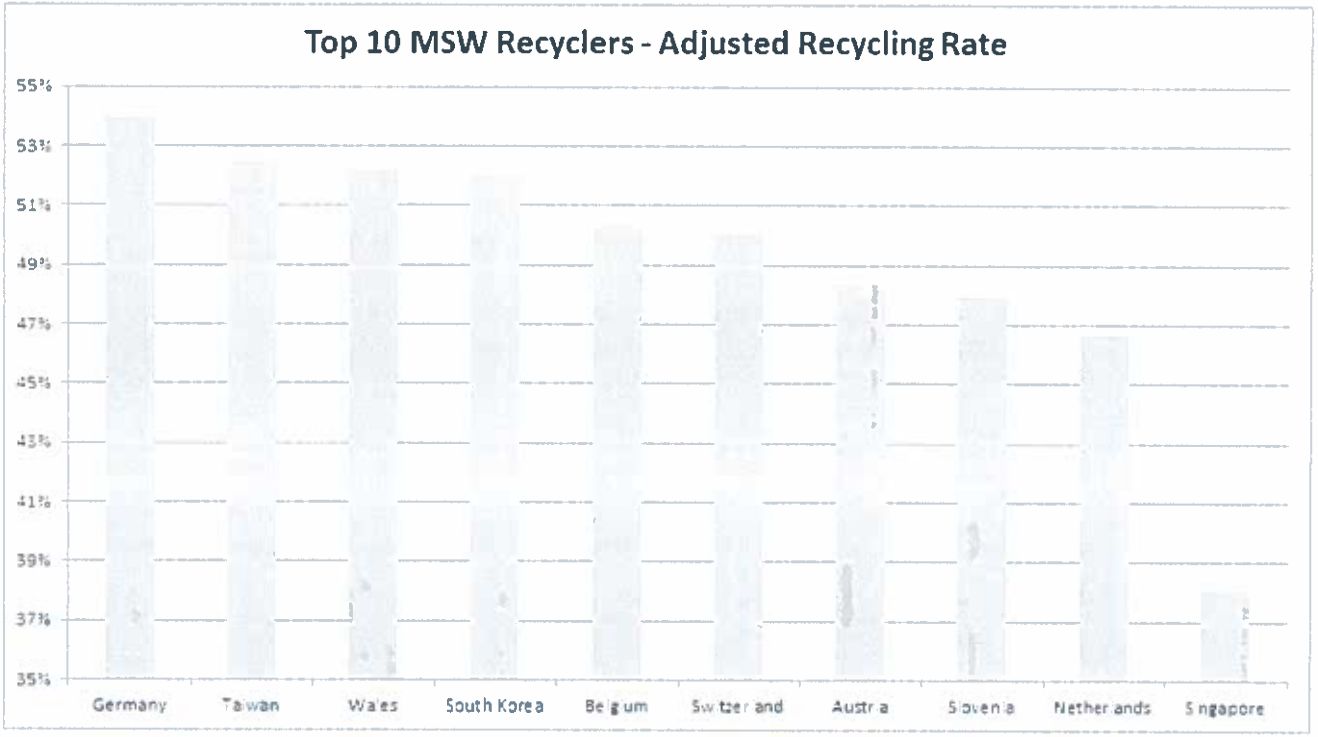
2015 Municipal solid waste (MSW), total	Waste key number (EWC)	Waste type	Waste amount, total in 1000 tonnes	Treatment and Recycling: Recycling plants R2 - R13 percentage of waste amount	Input R2 - R13 in 1000 tonnes	Output R2-R13 percentage of waste amount	Output R2-R13 in 1000 tonnes
Household was	20030101, ex 20030100	Household waste, similar commercial waste[1]	14,147	MBT / mechanical-physical drying (MPS)	2,443	5%	122
	200307	Bulky waste[8]	2,495	Sorting plant	1,434	20% - 50%	287 - 717
	20030104	Bio-waste[2,3]	4,232	Composting/digestion plants	4,147	100%	4,147
	200201	Green and garden waste[2,3]	5,771	Composting/digestion plants	5,623	100%	5,623
	150107, 200102	Glass[4]	2,553	Sorting plant	2,550	100%	2,550
	150101, 200101	Paper, cardboard[4]	8,103	Sorting plant	8,047	100%	8,047
	150102, 15010600, 15010601, 15010602, 20010601, 200139	Light weight packaging / plastics[4,9]	5,952	Sorting plant	4,925	20% - 50%	985 - 2,463
	200123*, 200135*, 200136	Waste Electrical and Electronic Equipment (WEEE)	591	Sorting plant	590	70% - 80%	413 - 472
	150103, 150104, 150105, 150109, 200110, 200111, 200113*, 200114*, 200115*, 200140, 20019900, 200399, 200117*, 200119*, 200126*, 200127*, 200128, 200129*, 200130, 200131*, 200132, 200133*, 200134, 200138	Others (composite material, metals, textile, etc.)[4,5,8]	2,087	Sorting plant	1,528	56%	856
Other MSW	20030102, ex 20030100	Commercial waste similar to household waste, separate collection[7]	3,506	Sorting plant	1,365	13% - 20%	177 - 273
	200202, 200203, 200303	Road sweepings / garden and park waste (soil, stones)	986	k.A.	717	0%	0
	200108	biodegradable kitchen waste	928	Digestion plant	875	100%	875
	200302	Market waste	60	Composting/ digestion plants	50	100%	50
	200121*	Fluorescent tubes and other mercury containing waste	11	Sorting plant	10	70% - 80%	7 - 8
	150110*, 150111*, 200126, 200137*, 200141, 200304, 200350	Other separate collected fractions[8]	205	Sorting plant	147	10%	15
Municipal solid waste (MSW), total			51,625	67%	34,453	47% - 51%	24,154 - 26,210
				Metal recycling from Waste to Energy plants[4,11]			80 - 400
				Recycling quotas including metal recycling		47% - 52%	24,234 - 26,610

The main issues are :

- A large proportion of source separated plastics delivered to sorting plants and counted as recycled, end up being sent to WtE rather than recycled - only 20% to 50% is actually recycled. (4.8 to 7.6% MSW recycling lost)
- There is weight loss in MBT plants, mainly due to bio-drying. This is currently counted as recycled waste, but under EU rules going forward it will be recovery, not recycling. (4.5% MSW recycling lost)
- Bulky waste delivered to sorting plants is counted as recycled, but only 20% to 50% is actually recycled. (1.4 to 2.2% MSW recycling lost)
- Recycling of commercial waste sent to sorting plants also appears to be vastly over-estimated. (2.1 to 2.3% MSW recycling lost)
- Road sweepings will not count for recycling. (1.4% MSW recycling lost)
- Other fractions also appear to be over-estimated but are at low volumes that have little impact on the overall recycling figure.

Interestingly, work by Eunomia[50] confirms this issue and also shows that other countries that are considered the world's best performers in MSW Recycling have over-estimated their recycling figures. The graph below shows Eunomia's estimate of the Top 10 MSW Recycling countries in the world, using the new EU Rules for reporting to Eurostat. Eunomia puts Germany at 54%, which is slightly higher than the estimates by TOMM+C, working for the German Waste Management Association.

Figure 5-4 Eunomia's Estimate of Top 10 Recycling Countries in the World



[50] https://www.eunomia.co.uk/reports-tools/recycling-who-really-leads-the-world/

Based on Eunomia's conclusions, other European countries in the world Top 10 recyclers will be obliged to adjust their recycling rates as follows:

Table 5-2 Adjustments Required to Recycling Rates According to Eunomia

Country	Eurostat 2017 MSW Recycling Rate	Adjusted Rate Based on New Calculation Methods according to Eunomia
Germany	67.6%	54%
Belgium	53.7%	50%
Switzerland	52.5%	50%
Austria	57.7%	48%
Slovenia	57.8%	48%
Netherlands	54.2%	47%

This data shows that the EU Circular Economy recycling targets of 55% by 2025, rising to 65% by 2035 will be very challenging for Ireland and for all EU Member States.

Table 5-3 compares the details of Ireland's MSW Recycling with that of Germany, after the adjustments made by TOMM+C. The data from Germany is 2015, whereas the data from Ireland is mostly from 2017 and includes some interpretation by SLR, as the breakdown is only partially provided by the EPA.

Table 5-3 Comparison of Recycled MSW in Germany v Ireland

MSW Type	Source of Recyclables	Germany	Ireland
Household Waste	Recyclables captured in Mechanical Biological Treatment	0.2%	0.0%
	Bulky waste	0.6% to 1.4%	1.3%
	Biowaste	8.0%	4.7%
	Biodegradable garden and park waste	10.9%	1.8%
	Glass	4.9%	4.8%
	Paper, cardboard, cardboard boxes	15.6%	11.8%
	Light packaging/plastics	1.9% to 4.8%	3.6%
	WEEE	0.8% to 0.9%	1.8%
	metal packaging		1.7%
Non-Household MSW	Commercial waste sent to sorting plants	0.3% to 0.5%	
	Street Sweepings/Garden and Park Waste (Soil, Stones)	0.0%	
	Biodegradable kitchen and Canteen waste (commercial)	1.7%	3.9%
	Market waste	0.1%	
	Metal recycled from Incinerator Bottom Ash	0.2% to 0.8%	0.6%
	Wooden Packaging		2.1%
	Other	1.7%	3.7%
Total MSW		**46.9% to 51.6%**	**41.8%**

The details provided for Germany's MSW recycling figures by TOMM+C do not correlate exactly with the available data for Ireland's MSW Recycling, so SLR has attempted to match the data for comparison purposes. The notable differences between Germany and Ireland are as follows.

Biodegradable Garden and Park Waste

Biodegradable garden and park waste from households in Germany is a much greater contributor to MSW Recycling at 10.9% versus 1.8% in Ireland. Whilst the source of the garden and park waste is described as 'household waste', we expect that it includes park waste collected by the municipalities. A report by Rostock University[51] indicates that this fraction includes both yard waste from households alongside waste from the landscape management of public land.

We consulted with the German Waste Management Association to get more detail on green and garden waste collections in Germany and were informed as follows:

> *"In the German federal states kerbside and bring systems are used to collect green and garden waste. Mostly, green and garden waste is collected through the bio bin within a kerbside system. Citizens are encouraged to separate bio waste and also green and garden waste in the bio bin and deposit it at the kerbside for regular collection. Additionally, cities and regions can make use of different systems.*
>
> *On the one hand, they can make use of bring systems with fixed point systems or drop-off centers such as civic amenity sites, green waste collecting places or compost plants with large recycling containers. Those sites are either reachable all the time or have special opening hours during the day. Also, there can be limited opening hours in periods of less vegetation.*
>
> *On the other hand, cities and regions also combine the bio bin with pick-up methods where citizens can drop their green and garden waste at a given date and time in a mobile container or collection vehicle. Also, some collect greenery bags or bundles of green and garden waste in a door to door system.*
>
> *Unfortunately, there also exists illegal disposal (e.g. in the woods) and burning (e.g. Easter fires). A mandatory ban of burning combined with a widespread collection system in easily accessible places could lead to an explicit rise of green and garden waste recycling.*
>
> *One civic amenity site as collecting point for all kinds of waste as well as green and garden waste has to handle green and garden waste of between 500 and 300,000 citizens. Although, the collected amounts vary across the federal states. For now, backyard composting has not been part of the statistics you have. However, there could be a change with the new methods on calculating recycling quotes. The German ministry of environment signalizes that in the future the new methods on calculating recycling quotes should also include backyard composting and that even more effort is needed concerning the development of separate collection.*
>
> *At the moment the collecting systems for green and garden waste are funded by the German climate action funding program."*

Biowaste

Biowaste collected from households appears higher in Germany than in Ireland, but when commercial bio-waste is added, the figure is not that different.

Paper & Cardboard

Germany is performing better with respect to recycling of paper and cardboard. It can be seen from earlier in this report that the residual waste bins in Ireland contain significant quantities of paper and cardboard, particularly in the commercial sector.

[51] *'Bio-Waste Recycling in Germany – Further Challenges'* A. Schücha,b, G. Morschecka, A. Lemkea, M. Nellesa,b,** University of Rostock, Department of Waste Management and Material Flow and German Biomass Research Centre gGmbH (DBFZ)

5.6.3 MSW Recycling Rates in Wales

Wales is reportedly achieving a very high MSW recycling rates at 62.7% for the year to Oct 2018, according to statistics compiled by the Welsh Government. However, Eunomia puts the figure at 52% as shown in Figure 5-4 of this report.

The Welsh data reveals the following issues with regard to the measurement of the recycling rate:

- The Welsh MSW recycling figures include rubble and soil collected at civic amenity sites. This is not MSW and should not be counted in MSW figures.
- Incinerator Bottom Ash (IBA) is counted as recycled in Wales, whereas the new EU rules only allow metals recycled from IBA to be counted as MSW recycling.
- The Welsh recycling figures include all collected co-mingled recyclables, whereas the EU rules are now based on actual recycling rather than collection for recycling. In Ireland 26% of collected co-mingled recyclables are non-recyclable and are not counted towards our recycling figures.

The impact of these differences on recycling figures are quantified in Table 5-4 below:

Table 5-4 Analysis of MSW Recycling Data Published by the Welsh Government

Material	Quantity Reduction (t)	Impact on Wales Recycling Rate	Comments
Rubble & Soil Recycled	104,942	-6.8%	From CA sites
IBA Recycled	60,300	-3.9%	allow 10% for metal recycling
Residues from Co-Mingled Recyclables	38,328	-1.9%	Conservatively assume 15% over-estimate
Total Reduction in Recycling Rate		**12.6%**	

SLR's analysis suggests that the actual recycling figure in Wales is approximately 50.1%, which is a little lower than the Eunomia's estimate.

As with Germany, discussed above, the big difference between Wales and Ireland is Green/ Garden Waste recycling. Wales recycles 160Kt of green waste per annum (10.4% of MSW), compared to 50Kt in Ireland (1.8% of MSW). The Welsh figure includes 100Kt of green waste collected separately at kerbside, whereas very little green waste is collected separately from food waste at kerbside in Ireland.

5.6.4 Conclusions on International Comparisons

The main conclusion from this section of the report is that Ireland could achieve a 50% MSW recycling rate if green / garden waste recycling was increased to the levels found in Wales and Germany. However, it is notable that household waste generation is higher in both Wales (419kg/capita) and Germany (452kg/capita), compared with Ireland (316kg/capita), so collecting more waste for recycling could be considered unhelpful to Ireland's waste prevention efforts.

The following Table shows that Ireland is performing well with respect to the amount of residual household waste generated after recycling. Some of the countries above Ireland in this ranking have relatively poor collection systems and the low waste generation figures may not be a true reflection of environmental performance, so Ireland could be ranked even higher if those countries had a more comprehensive waste collection service.

Table 5-5 Comparison of Residual Household Waste Per Capita across Europe

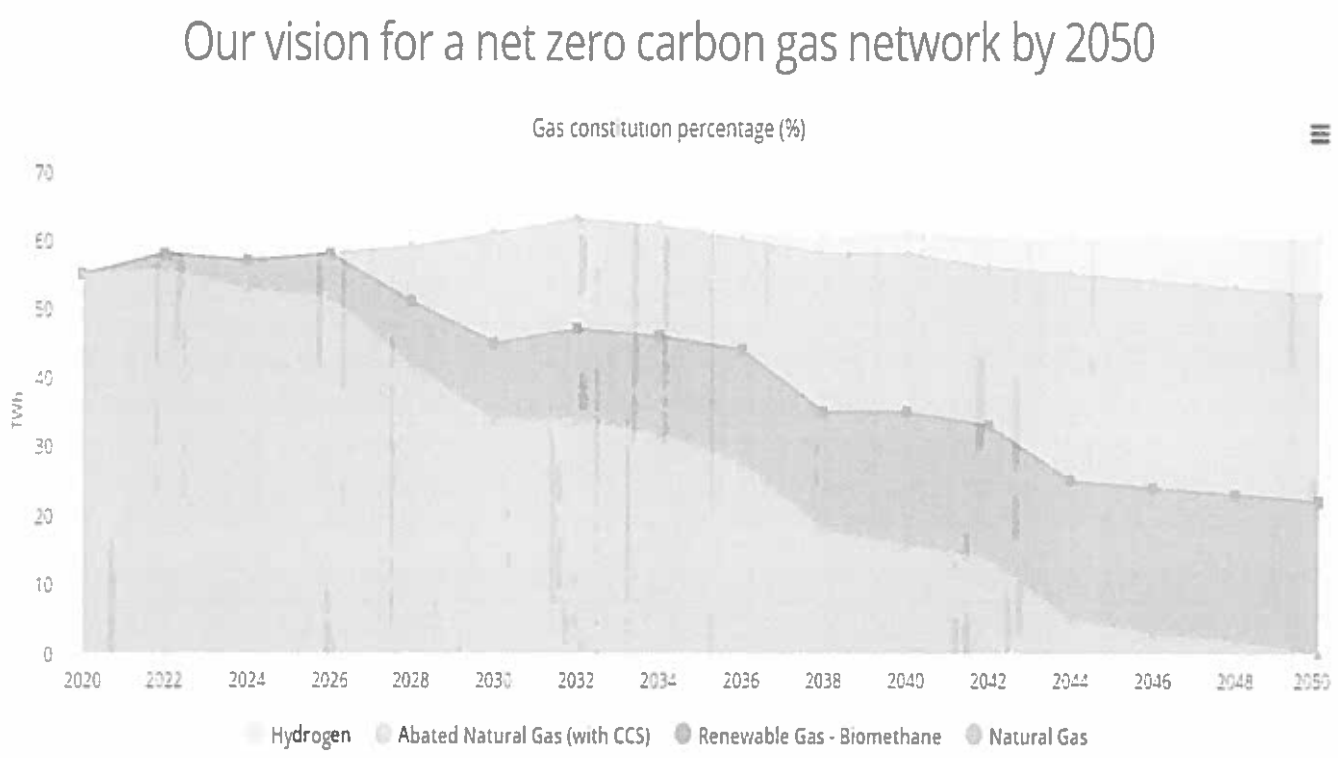
Rank	Country	2016 Household Waste	Population	Household Waste Generation per capita (kg)	MSW Recycling Rate (%)	Residual Waste %	Residual Waste (t)	Residual Household Waste per Capita (kg)
EU (28 countries)		214,700,000	513,000,000	419				
1	Poland	9,534,484	38,430,000	248	44%	56%	5,339,311	139
2	Slovenia	633,790	2,066,000	307	48%	52%	329,571	160
3	Romania	4,098,427	19,640,000	209	15%	85%	3,483,663	177
4	**Ireland**	**1,513,544**	**4,784,000**	**316**	**42%**	**58%**	**877,856**	**183**
5	Finland	1,791,659	5,503,000	326	42%	58%	1,039,162	189
6	Hungary	2,905,569	9,798,000	297	35%	65%	1,888,620	193
7	Lithuania	1,119,278	2,848,000	393	50%	50%	559,639	197
8	Wales	1,329,560	3,170,000	419	50%	50%	664,780	210
9	Germany	37,409,896	82,790,000	452	52%	48%	17,956,750	217
10	Croatia	1,144,199	4,154,000	275	21%	79%	903,917	218
11	Belgium	5,041,207	11,350,000	444	50%	50%	2,520,604	222
12	Czechia	3,579,613	10,580,000	338	34%	66%	2,362,545	223
13	Sweden	4,410,872	9,995,000	441	49%	51%	2,249,545	225
14	Estonia	429,882	1,316,000	327	31%	69%	296,619	225
15	Serbia	1,589,709	7,022,000	226	0%	100%	1,589,709	226
16	United Kingdom	27,300,581	66,040,000	413	44%	56%	15,288,325	232
17	Italy	30,116,606	60,590,000	497	51%	49%	14,757,137	244
18	France	29,193,619	66,990,000	436	42%	58%	16,932,299	253
19	Austria	4,268,278	8,773,000	487	48%	52%	2,219,505	253
20	Netherlands	8,549,762	17,080,000	501	47%	53%	4,531,374	265
21	Slovakia	1,889,523	5,435,000	348	23%	77%	1,454,933	268
22	Bulgaria	2,840,316	7,102,000	400	32%	68%	1,931,415	272
23	Norway	2,444,305	5,258,000	465	38%	62%	1,515,469	288
24	Denmark	3,480,305	5,749,000	605	48%	52%	1,809,759	315
25	Turkey	27,985,092	79,810,000	351	10%	90%	25,186,583	316
26	Latvia	870,177	1,950,000	446	28%	72%	626,527	321
27	Spain	21,689,437	46,720,000	464	30%	70%	15,182,606	325
28	Malta	165,852	460,297	360	8%	92%	152,584	331
29	Portugal	4,897,262	10,310,000	475	30%	70%	3,428,083	333
30	Montenegro	227,055	622,471	365	5%	95%	215,702	347
31	Greece	4,788,304	10,770,000	445	17%	83%	3,974,292	369
32	Cyprus	394,911	854,802	462	19%	81%	319,878	374

Ideally, Ireland should try to reach the future MSW recycling targets without increasing waste generation, but if this proves impossible, collecting additional green waste for recycling may be necessary to avoid EU fines.

If Ireland collects and recycles an additional 250,000 tonnes of green and garden waste, it would boost the MSW recycling rate to 50%. If half of this additional waste was sourced from households, with the rest from municipal parks and commercial premises/developments, golf courses, sportsgrounds, etc, Irelands household waste generation figure would increase to 343kg per capita, which is still well below the EU average of 419kg per capita. This change would have little impact on the residual waste figures for Ireland, so that performance would still be ranked amongst the best in Europe.

In particular, consideration should be given to the collection of biowastes for the production of biomethane to generate renewable energy. We understand that Gas Networks Ireland has major plans to feed large quantities of biomethane into the national gas network and feedstock will be required for the AD plants that will generate that biogas. The graph below from GNI's website[52] is very informative in that regard and shows a very aggressive plan that will require a strong drive and serious resources.

Figure 5-5 Gas Networks Ireland Plans to Replace Natural Gas with Renewable Gas



Technologies have evolved or been adapted in Ireland that facilitate the breakdown of woody material in anaerobic digestion plants, so garden and parks waste can be used as a feedstock for biogas production. It may be more environmentally sustainable to collect garden and parks waste for this purpose rather than to use productive agricultural land to generate feedstock for the new AD plants that we expect to be developed in response to GNI's initiative.

[52] https://www.gasnetworks.ie/vision-2050/net-zero-carbon/

The cost of collecting or delivering the garden and parks waste to these AD plants will be an important factor and may require subsidisation or some form of incentives. However, two national environmental priorities (recycling and renewable energy) could be advanced by such a move, so it will be in the Government's interest to at least consider this option. It is interesting to note that the collection systems for green and garden waste in Germany are funded by the German climate action funding program, as mentioned earlier in this report.

In 2019, the Irish Parliament declared a Climate Emergency and funding for worthwhile initiatives should follow. Financing the collection and recycling of green/garden waste could be as simple as a fiscal measure that makes biomethane more attractive at its cost of production compared to natural gas, i.e. a tax on natural gas that is used to subsidise biomethane production.

6.0 Conclusions

The main conclusions of this report can be summarised as follows:

1. Ireland is performing well in terms of municipal waste management but has serious challenges ahead to meet the new targets for recycling set by the EU for the 2025 to 2035 period.

2. MSW recycling has stagnated at about 41% to 42% in the last 6 years and new measures are needed in the short term to boost recycling rates.

3. The introduction of a Deposit and Return System for beverage containers to Ireland should have a positive impact on litter prevention and should assist with meeting the recycling targets for beverage containers but would do very little in terms of a contribution to the overall MSW recycling rates.

4. The cost of recycling additional materials using a DRS is estimated at approximately €7,500 per tonne, which is very high compared with approximately €500 per tonne for kerbside recycling and approximately €240 per tonne for recycling at civic amenity sites.

5. If Ireland spent €7,500 per tonne for every additional tonne of recycling needed to meet future EU MSW recycling targets, it would cost the State approximately €168 billion.

6. A DRS could have a very negative impact on the existing kerbside collection system by taking high value materials from MRFs and by impacting on existing REPAK subsidies, with the result that recycling will becomes less incentivised and less attractive commercially. We recommend that MRFs should be allowed to claim deposits for recycled beverage containers if a DRS is introduced to Ireland. This works well elsewhere and protects the existing recycling system.

7. The IWMA is trialling a new system that will better inform and incentivise householders to source segregate their wastes to improve their individual recycling performance. The trials are part funded by REPAK and we expect that this initiative will have a positive impact on MSW recycling rates.

8. A range of other measures to assist with MSW recycling in Ireland have been recommended by the IWMA to the DCCAE and we expect that these will be considered in emerging national waste policy.

9. SLR's review of international best practice in MSW Recycling has found that many of the best performing countries have over-estimated their recycling rates and it now appears that the highest recycling rates in Europe (and probably in the world) are at about 52%, rather than the previously suggested 67%. This makes the future targets for MSW recycling look even more challenging.

10. SLR's review of MSW recycling in Germany and Wales, two of the best performing countries in the world, found that the main difference between Ireland and these two countries related to the recycling of biodegradable garden and park wastes. Ireland could achieve more than 50% MSW recycling if similar quantities per capita of this waste type was collected and recycled.

11. Whilst extra collections of garden and park waste would increase Ireland's waste generation/management figure, it could be an attractive environmental option if the material was used as feedstock to produce biomethane for injection to the national gas grid. Gas Networks Ireland has major plans to decarbonise the gas grid and biomethane injection plays a significant role in those plans. Using garden and park waste as feedstock could be a better environmental option compared with using grass or other vegetation grown specifically as energy crops.

12. **Financing the collection and recycling of green/garden waste could be as simple as a fiscal measure that makes biomethane more attractive at its cost of production compared to natural gas, i.e. a tax on natural gas that is used to subsidise biomethane production.**

7.0 Closure

This report has been prepared by SLR Consulting (Ireland) with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the IWMA and its members; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

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