

Social, Environmental & Economic Solutions (SOENECS) Ltd

Report for the Chartered Institution of Wastes Management (CIWM)



EU Recycling rate harmonisation project

National Definitions and Accounting Methods – October 2015

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Author:

Dr David Greenfield
Contact: davidg@soeneecs.co.uk
Tel: +447711930988

Managing Director
SOENECS Ltd

Topic specific expert

Dr Ryan Woodard

Senior Research Fellow
University of Brighton



Social, ENvironmental & EConomics Solutions (SOENECS) Ltd provide strategic advice and consultancy to the public and private sectors. SOENECS specialise in the fields of waste management, resource management, circular economy, procurement, renewable deployment, carbon management and partnership delivery

www.soeneecs.co.uk

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Executive Summary

With a revised EU Circular Economy package expected before the end of the year, the debate about the scope and role of any new recycling targets and how EU Member State performance is calculated and compared is more pertinent than ever. CIWM has repeatedly expressed concern about the value, and potential misuse of, comparative statistics and data across Europe.

To establish the extent of the problem and provide underpinning evidence for more robust measurement and reporting under any new targets in the forthcoming package, CIWM commissioned SOENECS Ltd, working with the University of Brighton, to undertake a research project to assess the differences in interpretation of the EU Municipal Solid Waste (MSW) definitions and the impact that different recycling rate calculation methods have on final recycling figures.

This report has been prepared through desktop research, questionnaires, data analysis and the creation of a new comparison tool, the EU Compositional Assessment Tool (EUCAT), by SOENECS. The research has shown that there is, indeed, significant inconsistency in data capture and interpretation of the definition of (MSW). In particular, the materials included in MSW vary from country to country, for example through the inclusion or exclusion of home composting, SME waste and recycled packaging.

In addition, the report highlights the different outcomes that result from the four recycling calculation methods used across Europe as set out by the European Commission. The four methods were applied to data for nine municipalities. The results showed an average variance of 8.6% between the highest and lowest recycling rates calculated for individual municipalities, with the highest variance being 14.9% and the lowest 5.9%. In addition, the research identified a lack of knowledge or implementation of data capture systems and the potential for greater harmonisation along the lines currently being explored by ACR+ with the Regions for Recycling DERC method¹.

Overall, the research shows that the different data parameters, definitions, interpretations and methodologies presently being employed limit the potential for accurate recording and comparison of Member States' recycling performance. Unresolved, this issue undermines the validity of all recycling rates reported.

¹ http://www.regions4recycling.eu/R4R_toolkit/R4R_methodology

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Introduction

The European Environment Agency (EEA) states in its 2013 report; *Managing Municipal Solid Waste* review, that: “Improved waste management is an essential element in efforts to make Europe more resource efficient. If a country is to generate greater economic returns at lower costs to the environment then it must find ways to extract more value from the resources that it takes from nature, while cutting the burden of emissions and waste.”²



European Union (EU) waste statistics have to date been collected on the basis of an Organisation for Economic Co-operation and Development (OECD)/Eurostat joint questionnaire (JQ). Within the JQ, Municipal Solid Waste (MSW) is defined (see Appendix 1) and whilst being detailed, the definition is still open to interpretation by individual countries. One of the key measures for determining the move to resource management is the achievement of the 2020 50% EU recycling target. To date, five countries have achieved this figure: Austria 63%, Germany 62%, Belgium 58%, the Netherlands 51% and Switzerland 51%³. The essential question that this research sets out to answer is whether these figures can be accepted at face value.

The Intergovernmental Panel on Climate Change (IPCC⁴) states in its 2006 IPCC Guidelines for National Greenhouse Gas Inventories: “The availability and quality of data on solid waste generation as well as subsequent treatment also vary significantly from country to country. Statistics on waste generation and treatment have been improved substantially in many countries during the last decade, but at present only a small number of countries have comprehensive waste data covering all waste types and treatment techniques.”⁵

Whilst the statement is nearly a decade old, it is still the case that many commentators, including the CIWM, regard the lack of consistency of data across Europe as a major concern to developing a circular economy. Indeed, CIWM in their September 2015 response to the European Commission's public Circular

² <http://www.eea.europa.eu/publications/managing-municipal-solid-waste>

³ <http://www.eea.europa.eu/media/newsreleases/highest-recycling-rates-in-austria>

⁴ <https://www.gov.uk/government/publications/environmental-permitting-guidance-integrated-pollution-prevention-and-control-ippc-directive-part-a-1-installations-and-part-a-1-mobile-plant>

⁵ http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_2_Ch2_Waste_Data.pdf

Economy consultation expressed the need for “a more consistent and rigorous approach to monitoring, reporting and comparison between Member States and smarter data capture to support future policy development”. This topic has been subject to consultation at a EU level; in response to the 2013 Commission Consultation on the Review of European Waste Management Targets⁶, the UK Government states “changing key definitions, such as household or municipal waste, or extending targets to additional waste streams prior to 2020 would effectively change the Waste Framework Directive targets”. This implies that the UK government sees an inconsistency across Europe.

To understand these issues in more detail, CIWM commissioned SOENECS, working in conjunction with the University of Brighton, to undertake research into definitions and recycling rate calculations across Member States. This report explores the variances in interpretation and application of definitions and recycling rates across Europe and assesses whether the figures as they stand can be deemed to be accurate for the purpose of performance measuring and comparison between Member States.

There were three main sections to the research:

1. The definition of Municipal Solid Waste (MSW) across the EU – this was a desktop review to understand how MSW is defined in member states. This is covered in section 1.
2. Analysis of recycling rate calculations – the European Commission currently offers four different calculation methods for calculating recycling rates. A review was undertaken to understand which method member states had adopted. This is covered in section 2.
3. Analysis of recycling rates using the four EU methods of calculation – the final phase assessed the influence that the four recycling rate calculations could have on the level of reported recycling. Data was collected and modelled for nine municipalities to compare results when using the different approaches. This is covered in section 3.

⁶https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/262960/UK_Government_Response_to_EU_Review-Narrative.pdf

Section 1. The definition of MSW across the EU

To understand how consistently the definition of MSW is applied across Europe, a desktop review was undertaken to explore the nuances between Member States and, in particular, which materials each country includes in its definition of MSW and recycling rate calculations.

Data was collated and analysed to understand which materials are included in the MSW definition for each member state. Table 1 provides a summary of the materials each Member State includes in their definition of MSW and Appendix 4 provides more detail. It should be noted that the data set is from 2012-13, which may mean that some of the responses have been superseded by changes in Member State policy or interpretation of the definition.

Main Material category	Material Sub category	Number of countries that include material in MSW
Residual waste, bulky waste	Reuse	2
	Material recyclables (P&P, glass, metals, textiles, plastics and other recyclables, such as wood waste)	27
	Packaging	21
	Bio waste (food waste and garden waste)	27
	Hazardous household waste	26
Waste from municipal services comprises the following fractions:	Street sweepings	27
	Bio waste (garden and park waste, maintenance of roadsides, cemetery waste)	27
	Kitchen and canteen waste	27
	Ferrous metal recycling from back end of incineration	5 (data difficult to find)
Waste from commerce and trade, small businesses, office buildings and institutions	Collected with household or by the municipality	27
	Collected by private sector	24
Other waste from municipal services	C&D-waste	1
	Waste from municipal sewage network and treatment	2

Table 1: Summary of materials included in definition of MSW by European countries

The research covered many sources including EU waste data⁷, EIMPack - Economic Impact of the Packaging and Packaging Waste Directive⁸, and Municipal waste recycling rates in 32 European countries, 2001 and 2010⁹. An excellent source of information was the *EU Development of a Modelling Tool on*

⁷ http://ec.europa.eu/environment/waste/target_review.htm

⁸ <http://eimpack.ist.utl.pt/outputs.html>

⁹ <http://www.eea.europa.eu/data-and-maps/figures/municipal-waste-recycling-rates-in>

*Waste Generation and Management tool, support to the preparation of the impact assessment - final report and annexes*¹⁰, published in 2013 and written by Eunomia Research & Consulting and the Copenhagen Resource Institute. This document was especially useful due to its comprehensive assessment of management and definitions of MSW by individual European countries (see Appendix 6 for an extract from the profiles of Member States in that report).



1.1. Interpretation

The information contained within Table 1 and Appendix 4 shows that, on the whole, most countries include the same materials in their definitions. However, there are some notable exceptions, particularly with regard to the following.

- The lack of inclusion by six countries (Estonia, Finland, France, Germany, Latvia and Romania) of packaging recycling in MSW as a result of that material being collected by the private sector. It would be fair to suggest that their reported recycling rates could be higher if they included these figures.
- From Appendix 4, the inclusion of home composting by Finland and Ireland under the auspices of reuse.
- The lack of inclusion of privately collected commercial wastes of a similar nature to household waste by, Latvia, Netherlands and Spain, which may be down to difficulty in capturing data.
- The inclusion of municipally collected C&D and sewage sludge wastes by Germany and Romania, although it is understood that this is changing and may no longer be the case.
- With regard to Incinerator Bottom Ash (IBA) and IBA metals, evidence shows that Germany,¹¹ France, Sweden, Scotland¹² and Wales¹³ already count recycled IBA and recovered metal from IBA towards MSW recycling targets. As Wales and Scotland already count recycled IBA and metals towards their recycling rates, the Local Government Association

¹⁰ http://ec.europa.eu/environment/waste/target_review.htm

¹¹ <http://www.local.gov.uk/documents/10180/49956/150501+LGA+Recycling+targets+position+paper.pdf/0b496595-d7fe-4128-afc2-4d51f2eb6249>

¹² <http://www.gov.scot/Publications/2010/05/24145920/2>

¹³ <http://www.letsrecycle.com/news/latest-news/suez-publishes-blueprint-for-meeting-2020-targets/>

(LGA) states that if this material was appropriately verified and counted in England as recycling, it could contribute up to an additional 7 percentage points to the recycling rate by 2020.¹⁴

It is clear from this analysis that there is no consistent interpretation of the definition of MSW across Member States. Indeed, from the detail in Appendix 3, it is clear that some of the interpretations are sufficiently different as to render accurate statistical comparison impossible.

This assessment was made on the main material categories arising; it did not look at many of the interpretations of post treatment materials, for example metals recovery from IBA, Mechanical Biological Treatment (MBT) outputs and water/process losses, additional contamination removal prior to/during reprocessing, and water losses during organic waste treatment processes. Meaningful comparisons would become even more challenging if all these additional factors were taken into account.

¹⁴ Based on an Environmental Services Association estimate of 3 million tonnes of Incinerator Bottom Ash by 2020 and an assumption that overall waste levels remain at approximately the same level as 2013/14

Section 2. Analysis of recycling rate calculations

The second part of the research focussed on the choice of EU recycling rate calculation method adopted by Member States. The Commission Decision of 18 November 2011 establishing rules and calculation methods for verifying compliance with the targets set in Article 11(2) of Directive 2008/98/EC of the European Parliament and of the Council (2011/753/EU), sets out four methods that Member States can use to determine their recycling rate (see Appendix 2 for the full text). It states:

“For the purposes of verifying compliance with the target on municipal waste set in Article 11(2)(a) of Directive 2008/98/EC, Member States shall apply the target to one of the following:

- Method 1: The preparation for reuse and the recycling of paper, metal, plastic and glass household waste;
- Method 2: The preparation for reuse and the recycling of paper, metal, plastic, glass household waste and other single types of household waste or of similar waste from other origins;
- Method 3: The preparation for reuse and the recycling of household waste;
- Method 4: The preparation for reuse and the recycling of municipal waste.”

Various commentators have suggested that these four separate methods complicate comparison even further, especially as three of them use household waste as the calculating figure, which opens the discussion on the definition of MSW even further. In its response to the 2013 Commission Consultation on the Review of European Waste Management Targets¹⁵, the UK Government recommends “that the European Commission should focus on determining the environmental and economic outcomes of a range of options... to ensure ways of improving data comparability across Member States.”

Following further research, it was clear that there was no holistic understanding of who was using which method to calculate recycling rates. Indeed, the European Environmental Bureau (EEB), in their response to the EU consultation on waste management targets during 2015, said: “the targets for preparation for reuse and recycling set out in Article 11(2)(a) of the Waste Framework Directive can be met in different ways. The four methods outlined in the Commission Decision on calculation methods (2011/753/EU) are not equivalent.”¹⁶

¹⁵https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/262960/UK_Government_Response_to_EU_Review-Narrative.pdf

¹⁶ <http://www.eeb.org/?LinkServID=5398CF3B-5056-B741-DBD7061B02B51F65&showMeta=0&aa>

2.1. Determining the recycling rate method for each member state

Analysis was carried out on the *EU Development of a Modeling Tool on Waste Generation and Management 2013*¹⁷, news articles¹⁸, government websites^{19, 20} and reports from various bodies, including the EEA²¹, to construct an overview of who was using which method for calculating their recycling rate.

Waste Regulations method of calculating recycling				
1	2	3	4	(blank)
Recycling rate of paper; metal; plastic and glass household waste; in %	Recycling rate of household and similar waste; in %	Recycling rate of household waste in %	Recycling of municipal waste; in %	Currently not signed up to one of the four methods
Ireland	Austria	Bulgaria	Belgium	Norway
Malta	Croatia	Luxembourg	Denmark	Switzerland
	Cyprus	United Kingdom	Finland	Turkey
	Czech Republic		Germany	
	Estonia		Latvia	
	France		Netherlands	
	Greece		Slovenia	
	Hungary		Spain	
	Italy			
	Lithuania			
	Poland			
	Portugal			
	Romania			
	Slovakia			
	Sweden			
2	15	3	8	3

Table 2: Analysis of methods used by European member states to calculate recycling

Table 2 shows which countries are using Methods 1, 2, 3 or 4 for the calculation of their recycling rate. The bulk of the data is from 2012-13 and it should be noted that practices might have changed in some Member States.

2.2. Interpretation of the matrix

The matrix clearly shows that Methods 2 and 4 are most popular, being adopted by 23 of the 31 member states. The reasons why each country chose a particular

¹⁷ http://www.cri.dk/sites/cri.dk/files/cases/eu_waste_model_-_headline_report_v1.0.pdf

¹⁸ <http://www.euwid-recycling.com/news/policy/single/Artikel/european-commission-wants-to-set-up-a-new-method-of-calculating-recycling-rates.html>

¹⁹ <http://www.ademe.fr>

²⁰ <http://www.bmub.bund.de/en/topics/water-waste-soil/waste-management/international-policy/waste-shipments/>

²¹ <http://www.eea.europa.eu/data-and-maps/figures/municipal-waste-recycling-rates-in>

method are unknown, but in many cases there will have been a significant debate about which method to choose. Evidence of this can be seen in Appendix 6, where the commentary shows that Italy would have had a 6% reported difference in recycling rates: 40% using Method 2 and 34% using Method 4. Methods 1 and 3 were not applicable because they require a distinction between household waste and municipal waste from other sources, which Italy does not currently determine. Italy may have chosen Method 2 for a range of reasons, including the higher recycling rate using this method and/or because of data constraints. .

The variation in methods adopted for calculating recycling rate plus the different definitions as set out in Section 1 led to the development of the third phase of this research, which focuses on municipalities to understand how the different calculation methods impact on recycling rate when applied to the same data sets.

Section 3. Analysis of recycling rates using the four EU methods of calculation

Data was captured from 9 UK and European municipalities that responded to a request to take part in the programme. Municipalities were sent a data table, questionnaire and compositional analysis in August 2015 and the questionnaire and data table can be seen in Appendix 2.

3.1. Preparing the dataset.

For each municipality, the base data set requested from each municipality needed to be accurate and in a consistent format to allow for comparison. From the research in sections 1 and 2 of this project, it was clear that data needed to be captured at the primary municipal categories²² (paper & card, metals etc., etc.), rather than sub-categories (e.g. non-recyclable paper, liquid cartons and tetrapaks, board packaging, PET drink bottles), as many municipalities would not have this level of detail.

This data then needed to be broken down into the various management methods, including total material arising, total recycled and total sent to EfW and MBT. In many cases, the municipalities did not have all the data in the required form and so a number of assumptions had to be applied to the data provided.

3.2. Calculating the tonnage of each material arising

Municipalities were asked to provide compositional data for the residual waste stream only. In order to generate a compositional analysis that could be applied to the 2013/14 data, SOENECS calculated the tonnes of each material in the residual stream by applying the residual composition analysis to the residual MSW total tonnage provided and adding this to the actual tonnes of recycling. The resultant tonnages were then re-cast to show total waste materials presented in 2013/14.

Table 3 shows the calculated data table for the total amount of each material stream generated in the MSW stream for municipality 3. The municipality

²² Which are commonly used to classify waste through compositional analysis

provided the residual compositional analysis and for each material the percentage was applied to the 29,372 tonnes of residual waste. The results are the tonnes of each material arising in the MSW residual stream e.g. for WEEE, 1.5% of 29,372 equates to 446.46 tonnes. Once the tonnage of each material in the residual stream was calculated, it was added to the actual tonnage recycled by that municipality, in that year. In the case of WEEE, 446.46 were added to 1,564.7, to calculate that 2011.17 tonnes of WEEE were generated in the total MSW stream.

Material	MSW Residual compositional analysis %	Calculated MSW Residual Tonnes	MSW Recycled 13-14	Total MSW arising
Paper + card	19.0	5,571.89	9,459.6	15,031.53
Plastic film	4.9	1,439.23	84.8	1,524.00
Dense plastic	9.4	2,766.85	1,057.5	3,824.37
Textiles	6.4	1,865.13	959.7	2,824.79
Glass	5.1	1,492.10	4,026.2	5,518.32
Misc. combustible	12.5	3,674.45		3,674.45
Misc. non-combustible	5.2	1,536.16		1,536.16
Ferrous Metal	1.7	484.64	1,887.3	2,371.94
Non-ferrous metal	1.4	417.08		417.08
IBA metals			5,734.2	
Organic non catering	4.4	1,286.50	12,437.1	13,723.64
Food waste	23.7	6,952.38	2,441.2	9,393.53
Fines	4.1	1,189.57		1,189.57
WEEE	1.5	446.46	1,564.7	2,011.17
Hazardous	0.9	249.66	60.8	310.47
Total	100.00	29,372	39,713.1	69,085.2

Table 3: Municipality 3 calculated total material arising 2013-14

The figures in the ‘total arising’ column are, therefore, the calculated total amount of each material in the MSW stream. It should be noted that the IBA-derived metal recycling is not included in the total arising as it is a by-product of the residual tonnage sent to EfW. We believe that that is a common, if not frequently used, method of calculation; as for most data analysis exercises understanding the total MSW arising is not essential.

Once this table had been calculated for each of the municipalities, the second stage calculations, recycling rates, could be undertaken. For each of the four EU methods for calculation, an assessment was made of which materials and subsequent tonnages should be included.

3.3. Calculating the recycling rate for Methods 1 - 4:

To ensure consistency between municipalities, a calculation sheet was developed called the EU Compositional Assessment Tool (EUCAT). EUCAT is a table fed by a series of spreadsheets that uses the total material arising in the MSW stream

and the amount of each material recycled to calculate the recycling rate using all four specified methods. The full table can be seen in Table 5; however, it is useful to demonstrate how one section of EUCAT works before looking at the whole model.

Table 4 shows what material categories and tonnages were included in the calculation of the Method 1 recycling rate as prescribed by the EU Article 11(2)(a) of Directive 2008/98/EC. The calculation for recycling rate is as per the two italic description cells in the top right side of the table. In this example, the equation is:

$$\frac{\textit{Recycled amount of paper; metal; plastic and glass household waste}}{\textit{Total generated amount of paper; metal; plastic and glass household waste}}$$

For each material, all the information provided by the municipality is condensed into the total material arising in the MSW stream and the amount of that stream recycled.

The calculation of the recycling rate for Method 1 is then determined by the description of the equation above. For Method 1, only paper and card²³, plastics, glass and metals are needed. Therefore, all the cells that are greyed out are not included in the calculation. The recycling rate is then calculated for each material; in the case of paper and card 9,460 divided 15,032 equates to a recycling rate of 63%. This calculation is carried out for each material included in that method. In the bottom row of the table, the total arising and recycled tonnages calculated for each material to determine the aggregated recycling rate.

²³Card is included as many municipalities do not have separate data and there is precedent that card is deemed to part of the EU definition of paper)

SOENECS EU Compositional Assessment Tool (EUCAT) -					
Method 1: Recycling rate of paper; metal; plastic and glass household waste; in %			<i>Recycled amount of paper; metal; plastic and glass household waste</i>		
			<i>Total generated amount of paper; metal; plastic and glass household waste</i>		
Material stream	Total (tonnes)	Tonnes recycled	Total	Recycled	Recycling rate
Paper & card	15,032	9,460	15,032	9,460	63%
Plastic Film	1,524	85	1,524	85	6%
Dense plastic	3,824	1,058	3,824	1,058	28%
Textiles	2,825	960			
Misc. combustibles	3,674	-			
Misc. non combustible	1,536	-			
Glass	5,518	4,026	5,518	4,026	73%
Ferrous metal	2,372	1,887	2,372	1,887	80%
Non-ferrous metal	417	-	417	-	0%
Base ash metals		5,734			
Base ash recycling					
Garden waste	13,724	12,437			
Putrescible	9,394	2,441			
Fines	1,190	-			
Hazardous Household waste	310	61			
WEEE	2,011	1,565			
Total	63,351	39,713	28,687	16,515	57.6%

Table 4. EUCAT analysis for method 1 for Municipality 3

Undertaking this calculation for each material allows a figure to be reached for the “Recycling rate of paper; metal; plastic and glass household waste; in %”. In this example,

$$\frac{16,515}{28,687} \times 100$$

giving a recycling rate of 57.6%.

3.4. Using the full EUCAT model

The EUCAT model shown in Table 5 is the blank version and shows all four calculations. It can be seen that the EUCAT is essentially an expansion of Table 4, with the additional three calculation methods added to the right of method 1. For each recycling rate method calculation, the same principle of only using data in white cells is applied. As a result, more materials are included in each calculation as you read the table from left to right, until in Method 4, all material streams are included.



CIWM- SOENECS EU Compositional Assessment Tool (EUCAT) - the 4 methods of calculating recycling			Method 1			Method 2			Method 3			Method 4		
			Recycling rate of paper; metal; plastic and			Recycling rate of household and similar			Recycling rate of household waste in %			Recycling of municipal waste; in %		
			<i>Recycled amount of paper; metal; plastic and glass household waste</i>			<i>Recycled amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste stream</i>			<i>Recycled amount of household waste</i>			<i>Municipal waste recycled</i>		
			<i>Total generated amount of paper; metal; plastic and glass household waste</i>			<i>Total generated amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste</i>			<i>Total household waste amounts excluding certain waste categories</i>			<i>Municipal waste generated</i>		
Material stream	total	tonnes recycled	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate
Paper & card														
Plastic Film														
Dense plastic														
Textiles														
Misc.														
Misc. non														
Glass														
Ferrous metal														
Non-ferrous														
base ash metals														
Base ash recycling														
Garden waste														
Putrescibles														
Fines														
Hazardous Household waste														
WEEE														
Total														

Table 5: Blank EUCAT calculation table

3.5. Assumptions

In the case of the municipalities that responded, the data was of a high quality, although a number of assumptions were made. In particular, for some municipalities a two-year old compositional analysis was applied to 2013-14 data, in another municipality, a generic national compositional analysis had to be applied. The assumptions used are:

- All methods - whilst the EU methods require a distinction between household and municipal wastes, it was not possible to accurately distinguish between the two. Therefore all calculations use the municipality's definition of MSW tonnages as presented in the data table. The impact of extracting the non-household element from the calculation will need to be looked at separately.
- Method 2 – all single stream recycling methods are included in the calculation. It is not clear which materials have been collected by kerbside sort, so it has been assumed that all materials meet the requirements of the WR11 & 12 Necessity Test²⁴.
- Any street sweeping that are recycled are included in the fines category.
- Method 4 – all recycling, including IBA, IBA-derived metals and street sweepings are included in this calculation.

In many cases, it is not clear whether the recycling data is calculated on the basis of the tonnage after the primary sorting and processing stage or the tonnage at the reprocessing stage, which may be less as a result of further sorting and contamination removal activities. From previous work, evidence shows that for some materials, the impact of using reprocessor tonnages could reduce the recycling rate of those materials by up to 24%²⁵. This is an area that needs to be explored further.

3.6. The volunteer municipalities

Through the CIWM and SOENECS networks, 10 municipalities across Europe agreed to take part in the trial. It should be noted that each municipality provided their latest recycling and recovery figures, and a material-by-material analysis of what was included in their recycling rate. One municipality was unable to provide a compositional analysis of their residual waste stream; therefore only nine data sets have been used although the data provided was modeled:

²⁴ <http://www.wrap.org.uk/sites/files/wrap/Route%20Map%20Revised%20Dec%202014.pdf>

²⁵ CIWM July 2015 – Causing a commotion p22 (Greenfield et al)

- Ashford Borough Council
- Belfast City Council
- City of Munich
- North London Waste Authority
- Nottinghamshire County Council
- South Hams District Council
- Tonbridge & Malling Borough Council
- Tunbridge Wells Borough Council
- West Devon Borough Council
- Wiltshire Council



3.7. Results

The results from all of the municipalities can be found in Appendix 5. The data has been anonymised but shows the actual data. A summary of the total MSW arising and total recycled is tabulated in Table 6 below. The information shows the tonnage arising and amount recycled with subsequent recycling rate for each method for each municipality. The bottom row shows the variance in calculated recycling rate using the four different methods. The final column shows the total amount of MSW and recycled from all nine municipalities added together. This allows an average set of recycling rates to be calculated.

SOENECs EU Compositional Assessment Tool (EUCAT) Results											
		Municipality 1	Municipality 2	Municipality 3	Municipality 4	Municipality 5	Municipality 6	Municipality 7	Municipality 8	Municipality 9	Average
Method 1	Total MSW	17,655	28,687	20,729	266,929	154,886	14,520	19,945	7,631	104,280	635,262
	Recycled MSW	10,042	16,515	10,949	133,621	68,330	7,873	7,933	4,443	47,267	306,973
	Recycling rate	56.9%	57.6%	52.8%	50.1%	44.1%	54.2%	39.8%	58.2%	45.3%	48.3%
Method 2	Total MSW	34,764	56,640	42,299	472,763	323,708	30,320	44,399	17,529	238,364	1,260,787
	Recycled MSW	15,926	33,918	22,848	230,598	143,400	18,639	21,449	11,162	115,556	613,496
	Recycling rate	45.8%	59.9%	54.0%	48.8%	44.3%	61.5%	48.3%	63.7%	48.5%	48.7%
Method 3	Total MSW	38,579	63,351	48,540	545,593	390,349	35,329	48,650	19,430	258,664	1,448,485
	Recycled MSW	16,211	33,979	22,848	230,598	150,352	18,837	21,449	11,231	122,261	627,768
	Recycling rate	42.0%	53.6%	47.1%	42.3%	38.5%	53.3%	44.1%	57.8%	47.3%	43.3%
Method 4	Total MSW	38,579	63,351	48,540	545,593	390,349	35,329	48,650	19,430	279,055	1,468,877
	Recycled MSW	16,211	39,713	22,848	293,157	191,419	18,837	21,449	11,231	153,973	768,840
	Recycling rate	42.0%	62.7%	47.1%	53.7%	49.0%	53.3%	44.1%	57.8%	55.2%	52.3%
Difference between highest and lowest recycling rates		14.9%	9.1%	5.7%	11.5%	10.5%	8.2%	8.5%	5.9%	9.8%	9.0%

Table 6 EUCAT results

The figure shows that there is an average variance that of 9.0% between the highest and lowest recycling rates calculated for each municipality, with the highest being 14.9% and the lowest 5.9%.

3.7.1. Dry recycling influence

Table 7 consolidates the recycling rates calculated in Table 6 for each municipality; the average figures are calculated from the total recycling and tonnage arising from all nine municipalities. The table should be read horizontally for each municipality using the colour scheme to show the highest and lowest rates, the dark green cell is the highest recycling rate, whilst the red shows that is over a 10% difference between the average highest and the figure in that cell. The purpose of this table is to understand if there are any emerging trends.

	Method 1	Method 2	Method 3	Method 4
Municipality 1	56.9%	45.8%	42.0%	42.0%
Municipality 2	57.6%	59.9%	53.6%	62.7%
Municipality 3	52.8%	54.0%	47.1%	47.1%
Municipality 4	50.1%	48.8%	42.3%	53.7%
Municipality 5	44.1%	44.3%	38.5%	49.0%
Municipality 6	54.2%	61.5%	53.3%	53.3%
Municipality 7	39.8%	48.3%	44.1%	44.1%
Municipality 8	58.2%	63.7%	57.8%	57.8%
Municipality 9	45.3%	48.5%	47.3%	55.2%
Average	48.3%	48.7%	43.3%	52.3%

Table 7: Summary of recycling rates calculated and ranked by colour (red lowest, green highest)

One of the trends that come from looking at each of the recycling rate calculations is that there are some large differences between Method 1 and 2, in particular for Municipality 1. Upon further examination of the raw data (shown in Appendix 5), it is clear that this municipality does well in dry recycling and doesn't collect food.

In the case of Municipalities 6 and 7, there is a significant increase from Method 1 to Method 2, and the raw data shows that these municipalities were prioritising green waste and food collection over dry recycling. These results would also suggest for the majority of the featured municipalities, Method 3 provides the lowest recycling rate, with Method 4 providing the highest average recycling rate. However, as this research was unable to accurately include the non-household element of municipal waste, the data may change significantly as more non-recyclable MSW is subsequently included.

Considering these results from a Member State perspective, for certain countries, the choice of methodology might have been made before systems were developed for significant food and organic waste collection. Hence there is the potential for a much greater skewing of the figures than would originally have been the case when the calculations were developed. More work should be undertaken to explore the impact of using the four methods of calculation and the accurate calculation of MSW and Household Waste.

3.7.2. Influence of IBA on recycling rates

One of the questions explored was whether including recycled IBA and IBA-derived metals significantly increases recycling rates. The EUCAT methodology for addressing this is to include all IBA recycling and IBA-derived metals in Method 4. Four of the municipalities assessed use EfW for treating residual waste and a comparison of these municipalities is shown in Table 8.

SOENECS EU Compositional Assessment Tool (EUCAT)							
Authority	Method 3			Method 4			Difference in recycling rates
	total	recycled	Recycling rate	total	recycled	Recycling rate	
Municipality 2	63,351	33,979	53.6%	63,351	39,713	62.7%	9.1%
Municipality 4	545,593	230,598	42.3%	545,593	293,157	53.7%	11.5%
Municipality 5	390,349	150,352	38.5%	404,297	191,419	47.3%	8.8%
Municipality 9	258,664	122,261	47.3%	279,055	153,973	55.2%	7.9%
Average	1,194,606	503,211	42.1%	1,228,945	638,549	52.0%	9.8%

Table 8: Municipalities that have EfW and the results of including IBA recycling of ash and metals in Method 4

It is clear from Table 8 that the impact of including IBA metals and ash in the recycling rate would have a significant impact in these cases, on average 9.8%. Looking at the figures in more detail, for Municipality 4, there is a ~ 63,000tpa difference in recycling, whereas for Municipality 9 there is only ~ 30,000 tpa difference. The significance of including recycled IBA and derived metals in recycling rates, therefore, entirely depends on how much material is sent to EfW and more importantly whether its is counted as household or municipal waste.

3.7.3. Which Method accurately shows the impact of recycling on the total amount of waste generated by the householder?

Industry commentators have offered many views during this piece of work with a number observing that if those countries using Method 3 were to change to any other method, their recycling rate would increase. The results show that, on average, Method 3 records a recycling rate of a minimum of 5.6% and a maximum of 8.2% less than other methods. This is a significant variance, partially explained by the fact that all material generated by households is included in the denominator. However, as non-household municipal waste data is not consistently captured across Europe, it is difficult to demonstrate that Method 3 would always be lower. More work should be undertaken to explore the impact of using household waste versus municipal waste.

Essentially, however, Method 3 could be seen as the most accurate method of determining how household waste is managed and recycled, but probably not the most reflective of the efforts municipalities undertake to manage all wastes in their area up the hierarchy.

Section 4. Discussion and conclusion

The research undertaken and presented in this report provides significant insight into challenges of comparing recycling rates between Member States. From a purely statistical perspective, the different data parameters, definitions, interpretations and methodologies that are presently being employed limit the potential for accurate recording and comparison of Member States' recycling performance.



This work highlights the need to address a number of issues and knowledge gaps, including:

- The need for further analysis of the interpretation of MSW and household waste definitions to understand the impact of different approaches in Member States. One of the key questions is whether post-treatment fractions are included in the MSW definition and applied to municipal recycling. It is clear, for example, from Table 7 that the impact of including IBA in the recycling rate can have a significant impact on recycling rate.
- The need for further discussion about the point at which recycling is counted; i.e. on the basis of the tonnage after the primary sorting and processing stage or the tonnage at the reprocessing stage, where additional sorting and contamination removal may have taken place.
- The need for a more detailed understanding of the reasoning behind the determination of which method of recycling rate calculation is used by each Member State would be helpful. For example is it due to lack of appropriate data, strategic decisions and lack of understanding of the impact of each method and the implications this has for any future calculation methodologies and data capture frameworks.
- The need to further explore the opportunities to harmonise data capture, building on current work in this area, for example efforts by ACR+ through the Regions for Recycling DERC method ²⁶.
- Assessment of how reuse is calculated and reported.
- Further work to assess how packaging waste of municipal origin can be separated from that of commercial origin and both included in Member States' recycling performance.

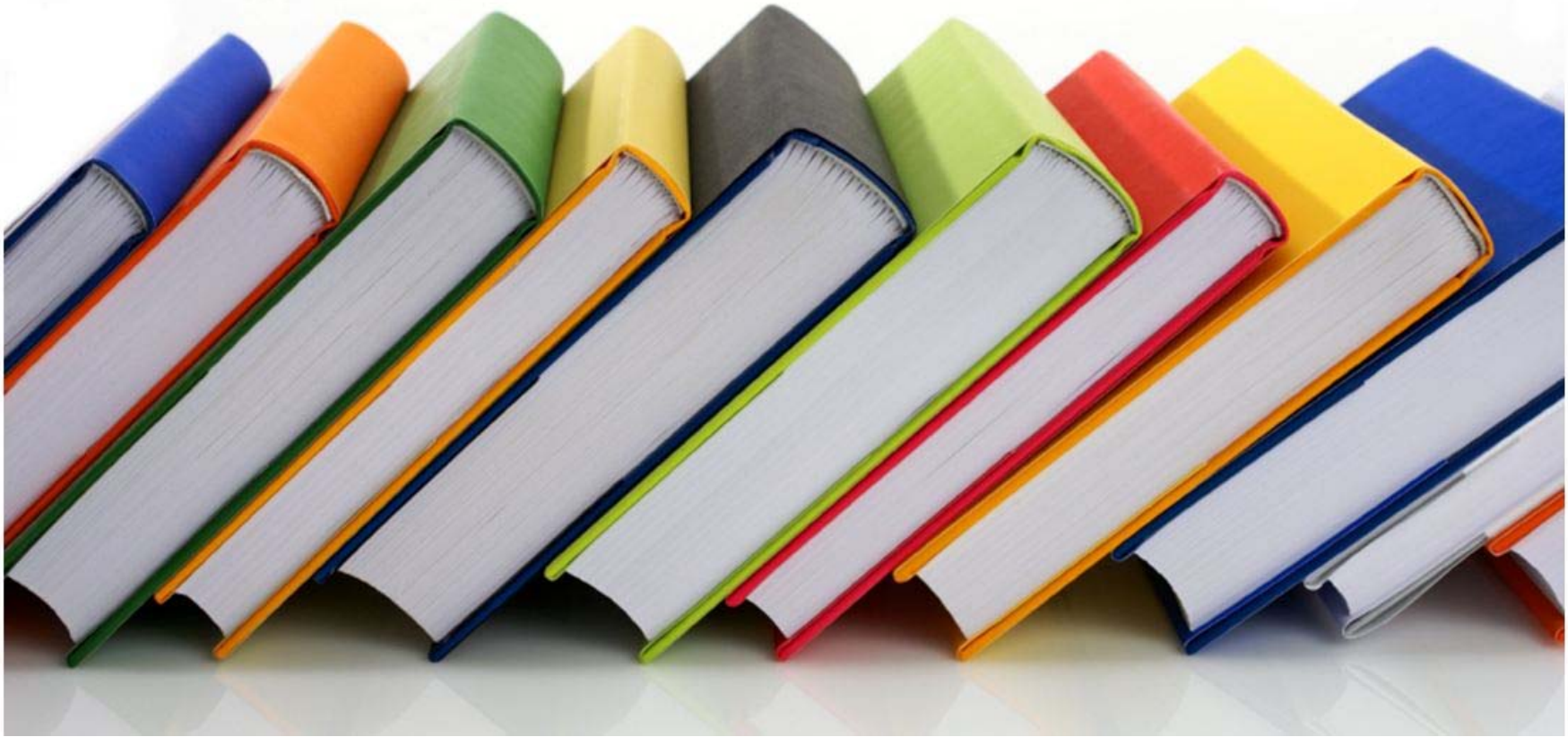
²⁶ http://www.regions4recycling.eu/R4R_toolkit/R4R_methodology

Ultimately, these issues not only impact on the way recycling targets are calculated and reported in the context of the 2020 Waste Framework Directive targets, they also highlight the need for more robust definitions, calculation methodologies and data capture frameworks to underpin any waste targets in the new Circular Economy package. As such, therefore, CIWM should explore with the Department for Environment, Food & Rural Affairs how this work can feed into the UK's position on the new package.

Section 5. Recommendations

SOENECS suggests the following recommendations for further work to improve understanding and inform the development of appropriate calculation and reporting protocols in the future:

1. Further analysis of what materials are currently included by each Member State in the definition of MSW and household waste.
2. Research to determine at what point different Member States count recycling i.e. after the primary sorting and processing stage or at the reprocessing stage.
3. Exploration of the link between high recycling in individual countries and the method of calculation.
4. Further analysis of definitions to determine the prevalence and impact of including post-treatment fractions in the definition of MSW.
5. An extension of the EUCAT approach to more municipalities and EU countries, including Wales and Scotland to facilitate a clearer picture of differences across the UK.



Appendices

Appendix 1: European Union OECD/Eurostat joint questionnaire (JQ) definition of Municipal Solid waste

Municipal waste includes household and similar wastes, including

- *Bulky waste (e.g. white goods, old furniture, mattresses); and*
- *Garden waste, leaves, grass clippings, street sweepings, the content of litter containers, and market cleansing waste, if managed as waste.*

It includes waste originating from:

- *Households,*
- *Commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes:*
- *Waste from selected municipal services, i.e. waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste), if managed as waste.*

It includes collected waste from these sources:

- *Door-to-door through traditional collection (mixed household waste), and*
- *Fractions collected separately for recovery operations (through door-to-door collection and/or through voluntary deposits).*

The definition also includes waste from the same sources & similar in nature and composition which:

- *Are collected directly by the private sector (business or private non-profit institutions) not on behalf of municipalities (mainly separate collection for recovery purposes),*
- *Originate from rural areas not served by a regular waste service, even if they are disposed by the generator.*

The definition excludes:

- *- Waste from municipal sewage network and treatment,*
- *- Municipal construction and demolition waste.*

Appendix 2: Methods for calculating recycling the EU from COMMISSION DECISION of 18 November 2011 - establishing rules and calculation methods for verifying compliance with the targets set in Article 11(2) of Directive 2008/98/EC of the European Parliament and of the Council:

METHODS FOR THE CALCULATION OF THE TARGET ON MUNICIPAL WASTE PURSUANT TO ARTICLE 3(3) OF THIS DECISION

Option referred to in Article 3(1) of this Decision	Calculation method	Specific requirements for Member State implementation reports
Preparation for reuse and recycling of paper, metal, plastic and glass household waste	<p>Calculation method 1</p> <p>Recycling rate of paper, metal, plastic and glass household waste, in % =</p> $\frac{\text{Recycled amount of paper, metal, plastic and glass household waste}}{\text{Total generated amount of paper, metal, plastic and glass household waste}}$	Member States shall use national data. Data from other waste reporting obligations can be used and adapted to national conditions. Member States shall submit, together with the data, a report explaining how the amounts generated and recycled have been calculated and how these amounts relate to the data on household waste to be reported under Regulation (EC) No 2150/2002.
Preparation for reuse and recycling of paper, metal, plastic, glass household waste and other single types of household waste or similar waste	<p>Calculation method 2</p> <p>Recycling rate of household and similar waste, in % =</p> $\frac{\text{Recycled amount of paper, metal, plastic, glass waste and other single waste streams from households or similar waste stream}}{\text{Total generated amount of paper, metal, plastic, glass waste and other single waste streams from households or similar waste}}$	<p>Member States shall use national data. Data from other waste reporting obligations can be used and adapted to national conditions. Member States shall submit, together with the data, a report explaining which materials are covered, from which activities they result by marking the relevant cells in the table in Annex II to this Decision and how the amounts generated and recycled have been calculated. Where a Member State includes home-composted waste in the calculation it shall explain how the amounts generated and recycled have been calculated.</p> <p>The report shall also explain how these amounts relate to the data on household waste and other economic activities to be reported under Regulation (EC) No 2150/2002.</p>
Preparation for reuse and recycling of household waste	<p>Calculation method 3</p> <p>Recycling rate of household waste in % =</p> $\frac{\text{Recycled amount of household waste}}{\text{Total household waste amounts excluding certain waste categories}}$	<p>Member States shall use national data to report on the recycled amount of household waste. They shall submit, together with the data, a report explaining which materials are covered by marking the relevant cells in the table in Annex II to this Decision and how the amounts recycled have been calculated.</p> <p>The report shall also explain how these amounts relate to the data on household waste and other economic activities to be reported under Regulation (EC) No 2150/2002.</p> <p>The total amounts of household waste shall be taken from the data to be reported according to point 1.2 of Section 8 of Annex I to Regulation (EC) No 2150/2002.</p> <p>Waste of the following waste codes shall be excluded from the calculation:</p> <p>08.1. - Discarded vehicles</p> <p>11-13 - Sludges and mineral wastes</p>
Preparation for reuse and recycling of municipal waste	<p>Calculation method 4</p> <p>Recycling of municipal waste, in % =</p> $\frac{\text{Municipal waste recycled}}{\text{Municipal waste generated}}$	Member States shall rely on the statistical data on municipal waste reported annually to the Commission (Eurostat).

Appendix 3: Questionnaire and data table sent to municipalities

CIWM- SOENECES EU Compositional Assessment Tool (EUCAT)		
<p>Thank you for agreeing to complete this questionnaire to allow CIWM and SOENECES to compare definitions that are used in Europe and methods for calculation of recycling rates then to explore the impact applying these methods has on reported performance and progression towards achievement of EU targets.</p> <p>Would you be kind enough to fill in the cells that are coloured in light yellow on both this sheet and the data sheet.</p>		
Please state your authority name		
Please state your name and position		
Please state email address		
Please state your telephone number		
Please show your method for calculating your authorities recycling rate.		
Material categories (upper and lower)	Does your authority count this materials as a contribution to your MSW recycling rate?	
	household waste Y	non household MSW N
Example		
Paper		
Newspapers, magazines, brochures & catalogues.		
Junk mail, office paper, envelopes		
Yellow & white directories		
Shredded paper		
Non recyclable paper		
Books		
Card		
Tetrapak cartons		
Corrugated cardboard		
Thin card		
Non recyclable card		
Plastic Film		
Packaging film		
Carrier bags		
Other forms of non packaging wrap and film		
Refuse / recycling sacks		
Dense plastic		
Plastic bottles		
Polystyrene		
Plastic pots, tubs and trays		
Other plastic packaging		
Other dense plastic		
Textiles		
Clothing		
Handbags, belts & accessories		
Pairs of shoes		
Non clothing textiles		
Misc. combustibles		
Disposable nappies		
Other sanitary		
Wood		
Carpet, underlay & flooring		
DIY waste (roof felt, lagging etc.)		
Animal waste / pet litter		
Multilayer packaging		
Other		
Misc. non combustible		
DIY rubble & ceramics		
Plasterboard		
Other		
Glass		
Green glass		
Brown, blue, red glass		
Clear bottles		
Clear jars		
Other non packaging glass		
Ferrous metal		
Food and drinks cans and tins		
Aerosols		
metals recycled post incineration		
Other ferrous packaging		
Other ferrous items		
Non-ferrous metal		
Food and drinks cans and tins		
Aerosols		
metals recycled post incineration		
Alu foil and trays		
Other non-ferrous		
Garden waste		
Garden clippings & pruning's		
Soil & turf		
digetate post AD		
Compost like output following IVC/composting		
Putrescibles		
Home compostable food waste		
Non home compostable food waste		
Consumable liquids		
Inseparable inc straw / sawdust pet bedding		
Fines		
Sweepings <10mm		
Sweepings >10mm		
Hazardous Household waste		
Batteries		
Clinical waste		
Paint/varnish		
Oil		
Garden herbicides & pesticides		
WEEE		
White goods		
Large electronic goods (excluding CRT TVs and monitors)		
Other WEEE		



CIWM - SOENECS EUCAT Data capture form	Minimisation	Recycling				MBT				Organic treatment			Energy Recovery/Incineration						Landfill	
	The amount of materials diverted through waste minimisation	The amount of materials sent for recycling	The amount of material actually Recycled	Where is the amount of recycling calculated	Destination of non-recyclate	Materials sent to MBT	Sent to AD/composting from MBT	Sent to incineration from MBT	Sent to landfill	Tonnes composted	Tonnes sent for AD	tonnes of digestate	Sent to EFW	Base ash Recycling from EFW	Metal Recycling from EFW	Sent to EFW with CHP	Base ash Recycling from EFW	Metal Recycling from EFW	Sent to landfill from other processors	Sent directly to landfill
Metric	tonnes	tonnes	tonnes	destination plastics reprocessor	technology EFW (non CHP)	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes
example	540	8,745	8,657			18,645	4,658	5,784	8,203	16,452	4,658	1,658	63,547	12,651	1,247	-	-	-	2,647	18,947
<i>Total MSW</i>	-	#REF!	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
paper and cardboard (P&C)																				
o packaging																				
o non-packaging																				
metal																				
o packaging																				
o non-packaging																				
glass																				
o packaging																				
o non-packaging																				
plastic																				
o packaging																				
o non-packaging																				
multilayer packaging																				
o beverage cartons																				
o other																				
bio-waste																				
o green waste (including pruning wood)																				
o kitchen waste																				
wood (excluding pruning wood which is considered as green waste)																				
textiles																				
tyres																				
used cooking oils																				
mineral oils																				
WEEE																				
batteries																				
o from cars																				
o from households and similar																				
residual (inc street sweepings)																				
other rec (Cd's, specs, furniture, mobile phones, Printer cartridges, plasterboard, rubble and soil)																				



Appendix 4: The SOENECS MSW definition matrix – which materials are included by which countries.

CIWM SOENECS: Materials included in the national definition of Municipal waste (Y: included, N: not included)														
Country	Residual waste, bulky waste					Waste from municipal services comprises the following fractions:				Waste from commerce and trade, small businesses, office buildings and institutions		Other waste from municipal services		Notes
	Reuse	Material recyclables (P&P, glass, metals, textiles, plastics and other recyclables, such as wood waste)	Packaging	Bio waste (food waste and garden waste)	Hazardous household waste	Street sweepings	Biowaste (garden and park waste, maintenance of roadsides, cemetery waste)	Kitchen and canteen waste (excluded for reporting to OECD)	Ferrous metal recycling from back end of incineration	collected with household or by the municipality	collected by private sector	C&D-waste and	waste from municipal sewage network and treatment	
Austria	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	
Belgium	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Three definitions for Brussels, Flanders and Wallonia
Bulgaria	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	
Croatia	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	
Cyprus	N	Y	Y	Y	N	Y	Y	Y	unknown	Y	Y	N	N	It excludes waste from municipal sewage network and treatment, contaminated waste from hospitals, hazardous waste, construction and demolition waste.
Czech Republic	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unknown	n/a	n/a	n/a	n/a	no data
Denmark	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	
Estonia	N	Y	N	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Estonia does not include the codes 15 01 from the European List of Waste
Finland	Y	Y	N	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Finnish MSW data include packaging waste from the commerce, service and retailer sectors
France	N	Y	N	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition
Germany	N	Y	N	Y	Y	Y	Y	Y	unknown	Y	Y	N	Y	
Greece	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition
Hungary	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition
Ireland	Y	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition with reuse
Italy	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition
Latvia	N	Y	N	Y	Y	Y	Y	Y	unknown	Y	N	N	N	packaging and commercial recycling not included
Lithuania	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition
Luxembourg	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition
Malta	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition
Netherlands	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	N	N	N	Landfill directive definition
Poland	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition
Portugal	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition
Romania	N	Y	N	Y	Y	Y	Y	Y	unknown	Y	Y	Y	Y	essentially anything managed by the municipalities inc C&D and sewage
Slovakia	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition - but it appears there is double counting of packaging
Slovenia	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition
Spain	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N	N	
Sweden	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	All wastes HW and similar
United Kingdom	N	Y	Y	Y	Y	Y	Y	Y	unknown	Y	Y	N	N	Landfill directive definition

Appendix 5: LA results sheets



Municipality 1

CIWM- SOENECs EU Compositional Assessment Tool (EUCAT) - the 4 methods of calculating recycling			Method 1			Method 2			Method 3			Method 4		
			Recycling rate of paper; metal; plastic and			Recycling rate of household and similar			Recycling rate of household waste in %			Recycling of municipal waste; in %		
			Recycled amount of paper; metal; plastic and glass household waste			Recycled amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste stream			Recycled amount of household waste			Municipal waste recycled		
			Total generated amount of paper; metal; plastic and glass household waste			Total generated amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste			Total household waste amounts excluding certain waste categories			Municipal waste generated		
Material stream	total	tonnes recycled	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate
Paper & card	9,017	7,401	9,017	7,401	82%	9,017	7,401	82%	9,017	7,401	45%	9,017	7,401	45%
Plastic Film	1,478	-	1,478	-	0%	1,478	-	0%	1,478	-	0%	1,478	-	0%
Dense plastic	2,093	1,213	2,093	1,213	58%	2,093	1,213	58%	2,093	1,213	37%	2,093	1,213	37%
Textiles	1,041	-				1,041	-	0%	1,041	-	0%	1,041	-	0%
Misc. combustibles	2,868	263							2,868	263	8%	2,868	263	8%
Misc. non combustible	376	-							376	-	0%	376	-	0%
Glass	3,860	995	3,860	995	26%	3,860	995	26%	3,860	995	20%	3,860	995	20%
Ferrous metal	838	328	838	328	39%	838	328	39%	838	328	28%	838	328	28%
Non-ferrous metal	369	105	369	105	28%	369	105	28%	369	105	22%	369	105	22%
Garden waste	15,453	5,884				15,453	5,884	38%	15,453	5,884	28%	15,453	5,884	28%
Fines	615	-				615	-	0%	615	-	0%	615	-	0%
WEEE	530	23							530	23	4%	530	23	4%
Hazardous Household waste	42	-							42	-	0%	42	-	0%
Total	38,579	16,211	17,655	10,042	56.9%	34,764	15,926	45.8%	38,579	16,211	29.6%	38,579	16,211	29.6%



Municipality 2

CIWM- SOENECs EU Compositional Assessment Tool (EUCAT) - the 4 methods of calculating recycling			Method 1			Method 2			Method 3			Method 4		
			Recycling rate of paper; metal; plastic and			Recycling rate of household and similar			Recycling rate of household waste in %			Recycling of municipal waste; in %		
			Recycled amount of paper; metal; plastic and glass household waste			Recycled amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste stream			Recycled amount of household waste			Municipal waste recycled		
			Total generated amount of paper; metal; plastic and glass household waste			Total generated amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste			Total household waste amounts excluding certain waste categories			Municipal waste generated		
Material stream	total	tonnes recycled	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate
Paper & card	15,032	9,460	15,032	9,460	63%	15,032	9,460	63%	15,032	9,460	39%	15,032	9,460	39%
Plastic Film	1,524	85	1,524	85	6%	1,524	85	6%	1,524	85	5%	1,524	85	5%
Dense plastic	3,824	1,058	3,824	1,058	28%	3,824	1,058	28%	3,824	1,058	22%	3,824	1,058	22%
Textiles	2,825	960				2,825	960	34%	2,825	960	25%	2,825	960	25%
Misc. combustibles	3,674	-							3,674	-	0%	3,674	-	0%
Misc. non combustible	1,536	-							1,536	-	0%	1,536	-	0%
Glass	5,518	4,026	5,518	4,026	73%	5,518	4,026	73%	5,518	4,026	42%	5,518	4,026	42%
Ferrous metal	2,372	1,887	2,372	1,887	80%	2,372	1,887	80%	2,372	1,887	44%	2,372	1,887	44%
Non-ferrous metal	417	-	417	-	0%	417	-	0%	417	-	0%	417	-	0%
base ash metals		5,734											5,734	100%
Garden waste	13,724	12,437				13,724	12,437	91%	13,724	12,437	48%	13,724	12,437	48%
Putrescibles	9,394	2,441				9,394	2,441	26%	9,394	2,441	21%	9,394	2,441	21%
Fines	1,190	-							1,190	-	0%	1,190	-	0%
Hazardous Household waste	310	61							310	61	16%	310	61	16%
WEEE	2,011	1,565				2,011	1,565	44%	2,011	1,565	44%	2,011	1,565	44%
Total	63,351	39,713	28,687	16,515	36.5%	56,640	33,918	37.5%	63,351	33,979	34.9%	63,351	39,713	38.5%



Municipality 3

CIWM- SOENECs EU Compositional Assessment Tool (EUCAT) - the 4 methods of calculating recycling			Method 1			Method 2			Method 3			Method 4		
			Recycling rate of paper; metal; plastic and			Recycling rate of household and similar			Recycling rate of household waste in %			Recycling of municipal waste; in %		
			<i>Recycled amount of paper; metal; plastic and glass household waste</i>			<i>Recycled amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste stream</i>			<i>Recycled amount of household waste</i>			<i>Municipal waste recycled</i>		
			<i>Total generated amount of paper; metal; plastic and glass household waste</i>			<i>Total generated amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste</i>			<i>Total household waste amounts excluding certain waste categories</i>			<i>Municipal waste generated</i>		
Material stream	total	tonnes recycled	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate
Paper & card	10,411	6,710	10,411	6,710	64%	10,411	6,710	64%	10,411	6,710	64%	10,411	6,710	64%
Plastic Film	1,637	-	1,637	-		1,637	-		1,637	-	0%	1,637	-	0%
Dense plastic	3,373	495	3,373	495	15%	3,373	495	15%	3,373	495	15%	3,373	495	15%
Textiles	904	75				904	75	8%	904	75	8%	904	75	8%
Misc. combustibles	2,495	-							2,495	-	0%	2,495	-	0%
Misc. non combustible	938	-							938	-	0%	938	-	0%
Glass	3,945	2,432	3,945	2,432	62%	3,945	2,432	62%	3,945	2,432	62%	3,945	2,432	62%
Metals	1,364	1,311	1,364	1,311	96%	1,364	1,311	96%	1,364	1,311	96%	1,364	1,311	96%
Garden waste	8,625	8,257				8,625	8,257	96%	8,625	8,257	96%	8,625	8,257	96%
Putrescibles	11,614	3,539				11,614	3,539	30%	11,614	3,539	30%	11,614	3,539	30%
Fines	841	-							841	-	0%	841	-	0%
Hazardous Household waste	1,966	-							1,966	-	0%	1,966	-	0%
WEEE	428	29				428	29	6%	428	29	7%	428	29	7%
Total	48,540	22,848	20,729	10,949	52.8%	42,299	22,848	54.0%	48,540	22,848	47.1%	48,540	22,848	47.1%



Municipality 4

CIWM- SOENECs EU Compositional Assessment Tool (EUCAT) - the 4 methods of calculating recycling			Method 1			Method 2			Method 3			Method 4		
			Recycling rate of paper; metal; plastic and			Recycling rate of household and similar			Recycling rate of household waste in %			Recycling of municipal waste; in %		
			<i>Recycled amount of paper; metal; plastic and glass household waste</i>			<i>Recycled amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste stream</i>			<i>Recycled amount of household waste</i>			<i>Municipal waste recycled</i>		
			<i>Total generated amount of paper; metal; plastic and glass household waste</i>			<i>Total generated amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste</i>			<i>Total household waste amounts excluding certain waste categories</i>			<i>Municipal waste generated</i>		
Material stream	total	tonnes recycled	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate
Paper & card	155,881	94,857	155,881	94,857	61%	155,881	94,857	61%	155,881	94,857	38%	155,881	94,857	38%
Plastic Film	15,763	-	15,763	-	0%	15,763	-	0%	15,763	-	0%	15,763	-	0%
Dense plastic	37,458	7,155	37,458	7,155	19%	37,458	7,155	19%	37,458	7,155	16%	37,458	7,155	16%
Textiles	24,806	4,379				24,806	4,379	18%	24,806	4,379	15%	24,806	4,379	15%
Misc.	40,243	-				40,243	-	0%	40,243	-	0%	40,243	-	0%
Misc. non	16,824	-				16,824	-	0%	16,824	-	0%	16,824	-	0%
Glass	42,072	25,730	42,072	25,730	61%	42,072	25,730	61%	42,072	25,730	38%	42,072	25,730	38%
Ferrous metal	11,187	5,879	11,187	5,879	53%	11,187	5,879	53%	11,187	5,879	34%	11,187	5,879	34%
Non-ferrous	4,568	-	4,568	-	0%	4,568	-	0%	4,568	-	0%	4,568	-	0%
base ash metals	6,694	6,694				6,694	6,694	100%	6,694	6,694	100%	6,694	6,694	50%
base ash	-	62,559										-	62,559	100%
Garden waste	67,215	53,125				67,215	53,125	79%	67,215	53,125	44%	67,215	53,125	44%
Putrescibles	101,144	25,000				101,144	25,000	25%	101,144	25,000	20%	101,144	25,000	20%
Fines	13,028	-							13,028	-	0%	13,028	-	0%
Hazardous Household	2,734	-							2,734	-	0%	2,734	-	0%
WEEE	12,669	7,779				12,669	7,779	38%	12,669	7,779	38%	12,669	7,779	38%
Total	552,287	293,157	266,929	133,621	33.4%	479,457	230,598	32.5%	552,287	230,598	29.5%	552,287	293,157	34.7%



Municipality 5

CIWM- SOENECS EU Compositional Assessment Tool (EUCAT) - the 4 methods of calculating recycling			Method 1			Method 2			Method 3			Method 4			
			Recycling rate of paper; metal; plastic and glass household waste; in %			Recycling rate of household and similar waste; in %			Recycling rate of household waste in %			Recycling of municipal waste; in %			
			<i>Recycled amount of paper; metal; plastic and glass household waste</i>			<i>Recycled amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste stream</i>			<i>Recycled amount of household waste</i>			<i>Municipal waste recycled</i>			
<i>Total generated amount of paper; metal; plastic and glass household waste</i>			<i>Total generated amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste</i>			<i>Total household waste amounts excluding certain waste categories</i>			<i>Municipal waste generated</i>						
Material stream	tonnes of residual	tonnes recycled	residual	recycled	Recycling rate	residual	recycled	Recycling rate	residual	recycled	Recycling rate	residual	recycled	Recycling rate	
Paper & card	30,229	41,343	71,571	41,343	58%	71,571	41,343	58%	71,571	41,343	58%	71,571	41,343	58%	
Plastic Film	18,967	457	19,424	457	2%	19,424	457	2%	19,424	457	2%	19,424	457	2%	
Dense plastic	15,923	4,327	20,251	4,327	21%	20,251	4,327	21%	20,251	4,327	21%	20,251	4,327	21%	
Textiles	1,384	1,195				2,579	1,195	46%	2,579	1,195	46%	2,579	1,195	46%	
Misc.	24,481	5,304							29,785	5,304	18%	29,785	5,304	18%	
Misc. non	2,767	1,386							4,154	1,386	33%	4,154	1,386	33%	
Glass	13,965	13,749	27,714	13,749	50%	27,714	13,749	50%	27,714	13,749	50%	27,714	13,749	50%	
Ferrous metal	4,662	7,750	12,412	7,750	62%	12,412	7,750	62%	12,412	7,750	62%	12,412	7,750	62%	
Non-ferrous	2,810	704	3,514	704	20%	3,514	704	20%	3,514	704	20%	3,514	704	20%	
base ash metals		1,066											1,066	1,066	100%
base ash		12,882											12,882	12,882	100%
Garden waste	18,584	56,917				75,501	56,917	75%	75,501	56,917	75%	75,501	56,917	75%	
Putrescibles	70,420	13,694				84,114	13,694	16%	84,114	13,694	16%	84,114	13,694	16%	
Fines	5,194	27,119							32,313	-	0%	32,313	27,119	84%	
Hazardous Household	128	262							390	262	67%	390	262	67%	
WEEE	3,363	3,264				6,627	3,264	49%	6,627	3,264	49%	6,627	3,264	49%	
Total	212,878	177,471	154,886	68,330	44.1%	323,708	143,400	44.3%	390,349	150,352	38.5%	404,297	191,419	47.3%	



Municipality 6

CIWM- SOENECS EU Compositional Assessment Tool (EUCAT) - the 4 methods of calculating recycling			Method 1			Method 2			Method 3			Method 4		
			Recycling rate of paper; metal; plastic and			Recycling rate of household and similar			Recycling rate of household waste in %			Recycling of municipal waste; in %		
			<i>Recycled amount of paper; metal; plastic and glass household waste</i>			<i>Recycled amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste stream</i>			<i>Recycled amount of household waste</i>			<i>Municipal waste recycled</i>		
			<i>Total generated amount of paper; metal; plastic and glass household waste</i>			<i>Total generated amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste</i>			<i>Total household waste amounts excluding certain waste categories</i>			<i>Municipal waste generated</i>		
Material stream	total	tonnes recycled	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate
Paper & card	7,187	4,755	7,187	4,755	66%	7,187	4,755	66%	7,187	4,755	40%	7,187	4,755	40%
Plastic Film	284	15	284	15	5%	284	15	5%	284	15	5%	284	15	5%
Dense plastic	2,740	287	2,740	287	10%	2,740	287	10%	2,740	287	9%	2,740	287	9%
Textiles	965	180				965	180	19%	965	180	16%	965	180	16%
Misc.	2,256	144							2,256	144	6%	2,256	144	6%
Misc. non									-	-	#DIV/0!	-	-	#DIV/0!
Glass	3,387	2,285	3,387	2,285	67%	3,387	2,285	67%	3,387	2,285	40%	3,387	2,285	40%
Ferrous metal	923	532	923	532	58%	923	532	58%	923	532	37%	923	532	37%
Non-ferrous			-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!	-	-	#DIV/0!
Garden waste	5,706	5,273				5,706	5,273	92%	5,706	5,273	48%	5,706	5,273	48%
Putrescibles	8,940	5,273				8,940	5,273	59%	8,940	5,273	37%	8,940	5,273	37%
Fines									-	-	#DIV/0!	-	-	#DIV/0!
Hazardous Household	2,752	55							2,752	55	2%	2,752	55	2%
WEEE	190	41				190	41	18%	190	41	18%	190	41	18%
Total	35,329	18,837	14,520	7,873	35.2%	30,320	18,639	38.1%	35,329	18,837	34.8%	35,329	18,837	34.8%



Municipality 7

CIWM- SOENECS EU Compositional Assessment Tool (EUCAT) - the 4 methods of calculating recycling			Method 1			Method 2			Method 3			Method 4		
			Recycling rate of paper; metal; plastic and			Recycling rate of household and similar			Recycling rate of household waste in %			Recycling of municipal waste; in %		
			Recycled amount of paper; metal; plastic and glass household waste			Recycled amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste stream			Recycled amount of household waste			Municipal waste recycled		
			Total generated amount of paper; metal; plastic and glass household waste			Total generated amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste			Total household waste amounts excluding certain waste categories			Municipal waste generated		
Material stream	total	tonnes recycled	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate
Paper & card	10,042	4,814	10,042	4,814	48%	10,042	4,814	48%	10,042	4,814	32%	10,042	4,814	32%
Plastic Film			-	-		-	-		-	-		-	-	
Dense plastic	4,079	335	4,079	335	8%	4,079	335	8%	4,079	335	8%	4,079	335	8%
Textiles	1,025	176				1,025	176	17%	1,025	176	15%	1,025	176	15%
Misc.	505	-							505	-	0%	505	-	0%
Misc. non	468	-							468	-	0%	468	-	0%
Glass	4,367	2,431	4,367	2,431	56%	4,367	2,431	56%	4,367	2,431	36%	4,367	2,431	36%
Ferrous metal	1,457	352	1,457	352	24%	1,457	352	24%	1,457	352	19%	1,457	352	19%
Non-ferrous			-	-		-	-		-	-		-	-	
Garden waste	11,787	10,204				11,787	10,204	87%	11,787	10,204	46%	11,787	10,204	46%
Putrescibles	11,283	2,916				11,283	2,916	26%	11,283	2,916	21%	11,283	2,916	21%
Fines	481	-							481	-	0%	481	-	0%
Hazardous Household	2,795	-							2,795	-	0%	2,795	-	0%
WEEE	359	221				359	221	38%	359	221	38%	359	221	38%
Total	48,650	21,449	19,945	7,933	28.5%	44,399	21,449	32.6%	48,650	21,449	30.6%	48,650	21,449	30.6%



Municipality 8

CIWM- SOENECs EU Compositional Assessment Tool (EUCAT) - the 4 methods of calculating recycling			Method 1			Method 2			Method 3			Method 4		
			Recycling rate of paper; metal; plastic and			Recycling rate of household and similar			Recycling rate of household waste in %			Recycling of municipal waste; in %		
			Recycled amount of paper; metal; plastic and glass household waste			Recycled amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste stream			Recycled amount of household waste			Municipal waste recycled		
			Total generated amount of paper; metal; plastic and glass household waste			Total generated amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste			Total household waste amounts excluding certain waste categories			Municipal waste generated		
Material stream	total	tonnes recycled	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate
Paper & card	3,532	2,223	3,532	2,223	63%	3,532	2,223	63%	3,532	2,223	39%	3,532	2,223	39%
Plastic Film			-	-		-	-		-	-		-	-	
Dense plastic	1,619	288	1,619	288	18%	1,619	288	18%	1,619	288	15%	1,619	288	15%
Textiles	440	84				440	84	19%	440	84	16%	440	84	16%
Misc.	643	20				643	20	3%	643	20	3%	643	20	3%
Misc. non														
Glass	2,051	1,743	2,051	1,743	85%	2,051	1,743	85%	2,051	1,743	46%	2,051	1,743	46%
Ferrous metal	430	189	430	189	44%	430	189	44%	430	189	31%	430	189	31%
Non-ferrous			-	-		-	-		-	-		-	-	
Garden waste	5,934	4,980				5,934	4,980	84%	5,934	4,980	46%	5,934	4,980	46%
Putrescibles	3,424	1,648				3,424	1,648	48%	3,424	1,648	32%	3,424	1,648	32%
Fines														
Hazardous Household	1,258	50							1,258	50	4%	1,258	50	4%
WEEE	99	6				99	6	6%	99	6	6%	99	6	6%
Total	19,430	11,231	7,631	4,443	36.8%	17,529	11,162	38.9%	19,430	11,231	36.6%	19,430	11,231	36.6%



Municipality 9

CIWM- SOENECS EU Compositional Assessment Tool (EUCAT) - the 4 methods of calculating recycling			Method 1			Method 2			Method 3			Method 4		
			Recycling rate of paper; metal; plastic and			Recycling rate of household and similar			Recycling rate of household waste in %			Recycling of municipal waste; in %		
			<i>Recycled amount of paper; metal; plastic and glass household waste</i>			<i>Recycled amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste stream</i>			<i>Recycled amount of household waste</i>			<i>Municipal waste recycled</i>		
			<i>Total generated amount of paper; metal; plastic and glass household waste</i>			<i>Total generated amount of paper; metal; plastic; glass waste and other single waste streams from households or similar waste</i>			<i>Total household waste amounts excluding certain waste categories</i>			<i>Municipal waste generated</i>		
Material stream	total	tonnes recycled	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate	total	recycled	Recycling rate
Paper & card	49,692	25,081	49,692	25,081	50%	49,692	25,081	50%	49,692	25,081	50%	49,692	25,081	50%
Plastic Film	13,995	-	13,995	-	0%	13,995	-	0%	13,995	-	0%	13,995	-	0%
Dense plastic	15,191	3,733	15,191	3,733	25%	15,191	3,733	25%	15,191	3,733	25%	15,191	3,733	25%
Textiles	9,888	1,036				9,888	1,036	10%	9,888	1,036	10%	9,888	1,036	10%
Misc. combustibles	9,332	2,631							9,332	2,631	28%	9,332	2,631	28%
Misc. non combustible	2,895	-							2,895	-		2,895	-	0%
Glass	18,287	13,172	18,287	13,172	72%	18,287	13,172	72%	18,287	13,172	72%	18,287	13,172	72%
Metals	7,116	5,282	7,116	5,282	74%	7,116	5,282	74%	7,116	5,282	74%	7,116	5,282	74%
base ash metals	-	-												
base ash recycling	-	11,321											11,321	
Rubble	20,391	20,391										20,391	20,391	92%
Garden waste	50,146	45,996				50,146	45,996	92%	50,146	45,996	92%	50,146	45,996	92%
Putrescibles	73,364	20,832				73,364	20,832	28%	73,364	20,832	28%	73,364	20,832	28%
Fines	3,461	-							3,461	-		3,461	-	0%
Hazardous Household waste	4,612	4,074							4,612	4,074		4,612	4,074	88%
WEEE	687	425				687	425	62%	687	425	62%	687	425	62%
Total	291,851	153,973	104,280	47,267	45.3%	238,364	115,556	48.5%	258,664	122,261	47.3%	279,055	153,973	55.2%

Appendix 6: Summary of Member State Definitions of MSW and accounting methods

The following individual country definitions and calculations are direct extractions from the Baseline Report Final Report for the European Commission DG Environment under Framework Contract No ENV.C.2/FRA/2011/0020 written by Eunomia Consulting and Copenhagen Resource Institute. All comments are therefore from the authors of that report.

1. Austria:

Definition of Municipal Waste

For the purpose of reporting to Eurostat and OECD the following definition is used:

Municipal waste consists of household waste (and similar waste) and waste from municipal services.

Household waste comprises the following fractions:

- _ Residual waste, bulky waste
- _ Material recyclables (P&P, glass, metals, textiles, plastics and other recyclables, such as wood waste)
- _ Bio waste (food waste and garden waste)
- _ Hazardous household waste

Waste from municipal services comprises the following fractions:

- _ Street sweepings
- _ Biowaste (garden and park waste, maintenance of roadsides, cemetery waste)
- _ Kitchen and canteen waste (excluded for reporting to OECD)

Other waste from municipal services, such as municipal C&D-waste and waste from municipal sewage network and treatment is excluded. Waste from commerce and trade, small businesses, office buildings and institutions is included, as long as it is collected together with the municipal waste collection system.

Accounting Methodologies Affecting Performance Against Targets

Of the four Methods for reporting the Waste Framework Directive 50% recycling target, Eunomia were informed that Method 2 will be applied by Austria. This was confirmed in Austria's submission of their Directive 2008/98/EC Implementation Report to the European Commission in September 2013.

Due to the ban on landfilling of organic, biodegradable waste since January 1, 2009, this type of waste has not been landfilled in Austria.

Output streams of MBT facilities are considered to be not biodegradable, as stringent limit values for respirometric activity, which are deemed to render the material 'no longer biodegradable', must be met in order for waste to be landfilled.

2. Belgium

Definition of Municipal Waste

In Flanders, municipal waste is defined as all the waste generated by households (regardless of who collects it) plus the non-household waste collected by, or on behalf of, the municipalities, plus non-household WEEE and batteries similar in nature and composition to WEEE and batteries generated by households, collected by or on behalf of accredited bodies.

Wallonia defines municipal waste as household and similar waste, excluding construction and demolition waste and sludge from sewage plants. In the Brussels region, municipal waste encompasses all the waste collected by the inter-municipality (who carry out door-to-door collection, street cleaning, and operate some civic amenity sites), the third sector, plus other waste from the municipalities and EPR schemes.

Accounting Methodologies Affecting Performance against Targets

Flanders will use calculation Method 4 (i.e. municipal waste recycled/municipal waste generated) to report on the Waste Framework Directive 50% recycling target. The Brussels region will use calculation Method 3 (i.e. amount of household waste recycled/total household waste amounts excluding vehicles, sludges and mineral wastes). No information was provided as to the Method that Wallonia intends to use. It is also not yet clear what Method will be used by the country as a whole with regards to reporting to Eurostat.¹⁸ For the purposes of the model it was assumed that Belgium would use Method 4.

3. Bulgaria

Definition of Municipal Waste

Municipal waste in Bulgaria is defined as waste produced primarily by a household or a commercial, industrial, or institutional entity. Specifically, where the waste stream is of the same type as that normally generated by a household as well as being collected and disposed of with other municipal solid waste. The collection and disposal is a part of normal municipal solid waste collection services.

Accounting Methodologies Affecting Performance against Targets

Bulgaria will be using calculation Method 3 to report against the Waste Framework Directive Article 11(2)a target.

4. Croatia

Definition of Municipal Waste

The definition is the same as used by Eurostat. Municipal waste is both household and household like commercial waste, e.g. from shops and offices. This is based on

NACE activities, (offices, stores, hotels and restaurants).

The definition includes household like waste from offices but when it comes to reporting, not all waste companies report waste from offices as municipal waste.

Accounting Methodologies Affecting Performance against Targets

Regarding the Waste Framework Directive, Croatia has made the decision to use

Method 2, where the recycled amount of paper, metals, plastic, glass waste and other single waste streams from households, or similar waste stream is divided by the total amount of paper, metals, plastic, glass waste and other single waste streams from households, or similar waste stream. This information was provided as part of our investigations and could not be confirmed through the submission of their Directive

2008/98/EC Implementation Report to the European Commission.

5. Cyprus

Definition of Municipal Waste

The definition of municipal waste is reportedly based on category 20 of the European

List of Waste and includes waste collected by or on behalf of municipalities. It is likely that MSW also includes, category 14 of the LoW. It includes household waste and similar waste as well as waste originating from commerce, trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes: bulky waste and yard waste, leaves, grass clippings, street sweepings, the content of litter containers, and market cleansing waste, if managed as waste. It also includes waste similar in nature and composition which: 1) is collected directly by the private sector (business or private non-profit institutions), not on behalf of municipalities (mainly separate collection for recovery purposes), and 2) originates from rural areas not served by a regular waste service. It excludes waste from municipal sewage network and treatment, contaminated waste from hospitals, hazardous waste, construction and demolition waste.

Accounting Methodologies Affecting Performance against Targets

The country confirmed that it would use calculation Method 2 in their Directive 2008/98/EC Implementation Report which was submitted to the Commission in late 2013.

6. Czech Republic

Definition of Municipal Waste

Clarification was asked on the definition used but no response was received.

Accounting Methodologies Affecting Performance against Targets

It has been reported that the Czech Republic will be using calculation Method 2 for reporting against the Waste Framework Directive municipal recycling target.⁴⁸ Under this Method it was stated that the country was already meeting the 50% target.

7. Denmark

Definition of Municipal Waste

MSW is defined as all waste from households collected by a municipal collection scheme and similar waste from 'institutions, commerce and offices', also collected by a municipal scheme in Denmark.

Accounting Methodologies Affecting Performance

It has been reported that Denmark will be using calculation Method 4 for reporting against the Waste Framework Directive municipal recycling target.²⁷

8. Estonia

Definition of Municipal Waste

The definition of municipal waste used in Estonia follows the EU definition, as this is provided in Commission Decision 2011/753/EU.

Concerning the collection of data related to the definition of MSW, Estonia does not include the codes 15 01 from the European List of Waste. As a result, the figures of recycling of MSW are systematically underestimated, when reported to Eurostat.

Accounting Methodologies Affecting Performance against Targets

Regarding the Waste Framework Directive, Estonia will follow the calculation Method 2, with the preparation for reuse and recycling of paper, metal, plastic, glass household waste and other single types of household waste or similar waste. There is already legislation in place prescribing the calculation Methodologies that will be used.

9. Finland

Definition of Municipal Waste

Municipal waste refers to waste generated in households and waste comparable to household waste generated in production, especially in the service industries. The general common feature of municipal waste is that it is generated in the consumption of final products in communities and is covered by municipal waste management systems.

Finland follows the EU definition as a starting point, but Finland has included about

²⁷ This was reported in the Denmark's Directive 2008/98/EC Implementation Report which was issued to the European Commission in September 2013.

54,000 tonnes of home-composting from households (2000 data) and a small waste amount incinerated in households. For packaging waste the MSW data include all packaging waste, but from these amounts are then deducted all packaging waste from the industrial and the energy sectors. i.e. the Finnish MSW data include packaging waste from the commerce, service and retailer sectors.

Accounting Methodologies Affecting Performance against Targets

Finland has decided to use Method 4.

10. France

Definition of Municipal Waste

As laid down in Article 4 of the Waste Regulations 2011 (L.N. 184 of 2011), France defines MSW as “waste from households, as well as other commercial, industrial and institutional wastes, which, because of its nature or composition, is similar to waste from households”. Data for municipal waste is obtained from authorised waste facilities permitted for wastes falling under Chapter 15 (EWC 15 01 06 mixed packaging from households (dry recyclables from kerbside collection)) and Chapter

20 (this includes all material from bring sites) of the European Waste List (Decision 2000/532/EC).

Accounting Methodologies Affecting Performance against Targets

Of the four methods for reporting the Waste Framework Directive, regarding the 50% recycling target, it was reported that Method 2 has been chosen. This information was provided as part of our investigations and could not be confirmed through the submission of the country’s Directive 2008/98/EC Implementation Report to the European Commission.

11. Germany

Definition of Municipal Waste

According to the definition followed in Germany, municipal waste (Siedlungsabfälle) includes all waste from chapter 20 of the European List of Wastes, excluding ELVs. In other words the definition includes household waste, bulky waste, market waste and commercial waste, similar to household waste.

Accounting Methodologies Affecting Performance against Targets

Germany will be using calculation Method 4 for reporting against the Waste Framework Directive 50% recycling target. This was confirmed through the submission of Germany’s Directive 2008/98/EC Implementation Report to the European Commission.

12. Greece

Definition of Municipal Waste

Municipal Waste is defined in Greek legislation according to the definition included in the

Landfill Directive.

Accounting Methodologies Affecting Performance against Targets

Regarding the Waste Framework Directive Greece has chosen Method 2 to report compliance with the 50% MSW recycling target.²⁸

13. Hungary

Definition of Municipal Waste

The definition of MSW includes waste from households and similar (i.e. institutions).

New definitions to be applied from 2013 received from Hungarian authorities, to be applied under new Waste Management Act. The new definitions mainly concern the difference between mixed waste and source separation, but the streams included are the same.

- Municipal waste: solid waste from households and waste similar to household waste (the terminology is 'Municipal Waste', but refers to solid waste).
- Household waste: mixed, separately collected and bulky waste generated by households, including flats, real estates, recreational areas and commonly used areas of real estates.
- Waste similar to household waste: waste similar to household waste, generated outside households

Accounting Methodologies Affecting Performance against Targets

Regarding the Waste Framework Directive Hungary has chosen Method 2.²⁹ Hungary has a clear target in meeting the EU-targets, including the 50% target from the Waste Framework Directive.

14. Ireland

Definition of Municipal Waste

Municipal waste in Ireland is similar to that used in the Waste Framework Directive.

The concept is defined in Section 5 of the Waste Management Act 1996 which states that municipal waste is "household waste as well as commercial and other waste which, because of its nature or composition, is similar to household waste". The EPA's definition of municipal waste follows Eurostat's suggested definition for municipal waste, which is presented in the Joint Questionnaire – the EPA uses this suggested definition when

²⁸ See Greece's Directive 2008/98/EC Implementation Report which was submitted to the Commission in late 2013.

²⁹ This was confirmed through the submission of Hungary's Directive 2008/98/EC Implementation Report to the European Commission.

categorising municipal waste for the purposes of statistical reporting.³⁰

In practice, waste streams which are counted as municipal waste include household waste, street cleansing waste (i.e. street sweepings, litter bins, as well as wastes from maintenance operations at municipal parks and cemeteries), and commercial/ industrial non-process waste (i.e. the fraction collected from canteens and administrative offices of industrial installations) that, because of its nature or composition, is similar to household waste. In Ireland municipal waste explicitly excludes municipal sludge's and effluents, and construction and demolition waste.

Ireland also includes an estimate of the amount of biowaste that is treated through home composting in its national recycling target. In 2011 it was estimated that a total of 37,545 tonnes of garden waste was composted by households.

Accounting Methodologies Affecting Performance against Targets

In terms of reporting against the Waste Framework Directive target Ireland has chosen to use calculation Method 1 as set out in Annex I of the Commission Decision on Calculation Methods 2011/753/EU.

15. Italy

Definition of Municipal Waste

MSW is defined by article 184 paragraph 2³¹ as:

- “a) household waste, bulky waste included;
- b) non-hazardous waste from premises and sites used for purposes other than those referred to in point a), similar to municipal waste for quality 'and quantity',
- c) street-cleaning residues;
- d) waste of any kind or origin, lying on the streets and public areas or on private roads and areas still subject to public use or on the beaches sea and lake and on the banks of rivers;

³⁰ Eurostat (2012) Guidance on Municipal Waste Data Collection, November 2012

³¹ Information sources are:

- Regional and provincial environmental protection agencies;
- Regional and provincial authorities
- Regional and provincial observatories on waste
- Modello Unico di Dichiarazione (MUD) (Environmental Declaration Form)

e) garden and park wastes (including cemetery waste)”

Accounting Methodologies Affecting Performance against Targets

It was confirmed in Italy’s Directive 2008/98/EC Implementation Report which they submitted to the European Commission that they would use calculation Method 2 for the purposes of reporting against the 50% Waste Framework Directive target:

- _ For Method 2 (with the 4 priority materials) the calculated recycling rate at present is 40%.
- _ For Method 4 it is 34 %.
- _ Methods 1 and 3 are not applicable because they require a distinction between household waste and municipal waste from other sources.

Italy has no derogations to directive targets

16. Latvia

Data on Municipal Waste Generation and Management

The 2010 MSW waste statistics data from the questionnaire return is reproduced in

Table 16-2. The questionnaire stated that it was not possible to divide the data between household and other municipal wastes. These statistics are however significantly lower than the total MSW arising’s given in the new NWMP so this statistic is compared in the bottom row of the table. It would appear that the NWMP has attempted to account for waste not included in the Eurostat data, so the higher values for waste generation (826 thousand tonnes for 2010 and 983 thousand for

2011) may be the more appropriate figures to use for the national modeling.

Data given in the NWMP however supports the statistics in Table 16-2 for recycling.

The data reproduced in Table 16-3. Discussions with the statistics contact at the LEGMC during and after the member state visit indicated that packaging recycling was not included in the national data. Comparing the data from Table 16-2 and Table 16-3 would indicate that this is the case:

_ Packaging recycling (from commercial and household sources) is missing from Table 16-2; and

_ Commercial recycling (packaging and non-packaging) is missing from Table 16-2 and Table 16-3

Email communication with the LEGMC indicated that around 40,000 tonnes of packaging recycling was not being included in the reported municipal recycling data.

This needs to be added to the data in Table 16-2 to give a total recycling tonnage of around 114,000 tonnes for 2010. It is likely that the higher figure for municipal waste generation from the 2013 NWMP does include packaging placed onto the market, so this leads to a

2010 recycling rate of 13.9% plus 0.4% composting.

Accounting Methodologies Affecting Performance against Targets

The Latvian Government intends to use the 4th Method of accounting according to the Commission Decision 2011/753/EU. This was reported to us as part of the country questionnaire/visit and could not be confirmed through Lithuania's Directive

2008/98/EC Implementation Report. This report was due to be submitted to the Commission in September 2013, but had still not been received at the time of writing.

17. Lithuania

Definition of Municipal Waste

The definition of Municipal Waste used in Lithuania is taken from the Waste Framework Directive.

Accounting Methodologies Affecting Performance against Targets

Of the four Methods for reporting the Waste Framework Directive 50% recycling target, it was reported that Lithuania would be using Method 2 (that is recycling of paper, plastic, metal and glass from household and similar waste, divided by the total amount of these materials arising in these waste streams). This was confirmed in Lithuania's Directive 2008/98/EC Implementation Report which was issued to the European Commission in the autumn of 2013.

18. Luxemburg

Definition of Municipal Waste

The current definition of municipal waste can be found in the «Loi du 21 mars 2012 relative aux déchets»: déchets municipaux = les déchets ménagers et les déchets assimilés (municipal waste = household waste and similar waste). Based on this definition, municipal waste in Luxembourg includes household waste and similar waste, meaning waste in nature and composition comparable to household waste, since very often it's impossible to separate those different waste streams in order to get specific data.

Accounting Methodologies Affecting Performance Against Targets

Method 3 will be used for reporting the Waste Framework Directive 50% recycling target. This was confirmed through the submission of Luxemburg's Directive

2008/98/EC Implementation Report, which was issued to the European Commission in the autumn of 2013.

19. Malta

Definition of Municipal Waste

As laid down in Article 4 of the Waste Regulations 2011 (L.N. 184 of 2011), Malta defines MSW as “waste from households, as well as other commercial, industrial and institutional wastes which, because of its nature or composition, is similar to waste from households”. Data for municipal waste is obtained from authorised waste facilities permitted for wastes falling under Chapter 15 (EWC 15 01 06 mixed packaging from households (dry recyclables from kerbside collection)) and Chapter 20 (this includes all material from bring sites) of the European Waste List (Decision 2000/532/EC).

The Maltese definition of MSW, and inclusion of specific waste sources, matches the current EU intended definition of MSW and hence we do not expect to need to adjust the total MSW data.

Accounting Methodologies Affecting Performance against Targets

Of the four Methods for reporting the Waste Framework Directive 50% recycling target, we were informed as part of the country visit that Method 1 (that is recycling of paper, plastic, metal and glass from household waste) was the most likely option to be chosen. This was confirmed when Malta submitted their Directive 2008/98/EC Implementation Report in late 2013.

20. Netherlands

Definition of Municipal Waste

In the Netherlands MSW is taken to mean all of the waste collected by or on behalf of municipalities. In the Netherlands municipalities are legally responsible for the management of household waste and waste arising in public spaces (e.g. in parks and streets). A very limited number of municipalities collect commercial waste from small and medium sized enterprises and these arising's are also counted as municipal waste. However, the amount of waste collected from businesses is very small relative to other sources of municipal waste – approximately 9 million tonnes (89%) of household waste and 1 million tonnes of public spaces waste (10%) is collected annually, whilst only about 0.1 million tonnes (1%) of commercial waste is collected

Accounting Methodologies Affecting Performance against Targets

At the time the information was gathered for this baseline report the Netherlands had not decided on the final calculation Method for reporting the Waste Framework Directive 50% recycling target. At the time of writing the Netherlands had also not confirmed which calculation Method they would use in their Directive 2008/98/EC Implementation Report, which was due to be submitted to the Commission in September 2013. For the purposes of the model it was assumed that they would use Method 4.

21. Poland

Definition of Municipal Waste

Municipal Waste is defined in Polish legislation in accordance to EU definitions.

Accounting Methodologies Affecting Performance against Targets

Regarding the Waste Framework Directive, Poland will follow the calculation Method 2,

with the preparation for reuse and recycling of paper, metal, plastic, glass household waste and other single types of household waste or similar waste. Poland has decided only to include paper, metal, plastic and glass from household and similar sources. There is already legislation in place prescribing the calculation methodologies that will be used and this was confirmed in Poland's Directive

2008/98/EC Implementation Report, which was submitted to the European Commission in the autumn of 2013.

22. Portugal

Definition of Municipal Waste

The definition of municipal waste used in Portugal follows the EU definition, as this is provided in Commission Decision 2011/753/EU.

Concerning the collection of data related to the definition of MSW, Portugal includes the codes 20 and 15 01 from the European List of Waste.

The producers of MSW which generate more than 1,100 L/day may choose whether to use the municipal services or some other private operator. If they choose the latter, the management of that waste is no longer responsibility of the municipality, but those amounts are included in MSW statistics. Unfortunately, it proves to be difficult in the registration system to cross-check the information reported by those individual operators and those that use the municipal services. APA is working to find the solution to this inconsistency.

Waste collected by the municipalities (e.g. park waste, street sweepings, etc.) which are more than 1,100 L/day are included in the MSW data reported to Eurostat.

Accounting Methodologies Affecting Performance against Targets

Regarding the Waste Framework Directive, Portugal has decided to apply Method 2, with the preparation for reuse and recycling of paper, metal, plastic, glass household waste and other single types of household, or similar, waste. This was confirmed as part of the country's Directive 2008/98/EC Implementation Report which was submitted to the European Commission in the autumn of 2013.

23. Romania

Definition of Municipal Waste

According to Romania's national waste management plan the definition of municipal waste includes: household and similar waste, waste from public services including street cleansing, parks and gardens and market waste. The SOE2011 report³² states:

³² Ministry of Environment and Sustainable Development (2007) Sectoral Operational Programme

“Municipal waste represents the total amount of waste generated in the urban and rural areas from households, institutions, commercial units, economical units (household and assimilated waste), street waste collected from public spaces, streets, parks, green areas, waste from constructions demolitions and sludge from municipal used water treatment.”

_ Omissions from municipal waste include:

- Packaging recycling: Currently only sanitation companies (collectors engaged by local authorities) report on collected recycling. Recycling via other economic operators (producer responsibility organisations and collection points authorised to purchase materials from the informal sector) is not currently included in the national MSW total. Data is not currently available for these material streams; we are informed that data sources are undergoing a validation process.
- For the annual report on municipal waste indicators for Eurostat the uncollected waste (1.25m tpa for 2010 or higher in previous years) is not included in the municipal data
- Recycling from residual waste treatments is not currently included in the recycling figures.

Accounting Methodologies Affecting Performance against Targets

Concerning the Waste Framework Directive recycling target, Romania has not yet formally selected its calculation Methodology, although the indications from meetings during the Member State visit were that it would select calculation Method 2 since this would be the most easy to achieve. Romania has derogation from the Waste Framework Directive 50% recycling target until 2025.

24. Slovakia

Definition of Municipal Waste

Definition reported by the country in the questionnaire:

“Municipal waste shall mean household waste generated in a municipality by activities of residents and waste of a similar nature and composition generated by activities of legal entities or individuals – entrepreneurs, with the exception of wastes generated by immediate performance of activities representing the subject of business or activities of legal entities or individuals – entrepreneurs; household wastes shall be also wastes from personal estate (property) serving to the individuals to individual recreation, e.g. from gardens, huts, cottages, or for parking or storing of vehicle used for household purposes, mainly from garages, garage stands or parking stands.

Municipal wastes are also all waste generated by the activities of the municipality while cleaning public roads and areas administered by the same, and by the maintenance of public vegetation including parks and cemeteries and other greenness on grounds of legal entities, individuals or civil associations.”

Accounting Methodologies Affecting Performance against Targets

Slovakia has reported to the Commission that they will use calculation Method 2 for reporting on the Waste Framework Directive target. This was confirmed Slovakia’s

Directive 2008/98/EC Implementation Report which was issued to the European Commission in the autumn of 2013. Mis-use of code 15 / 20. It was reported that there is

uncertainty about whether to use code 15 or code 20 for packaging materials, and so the data is reported in different ways from municipality to municipality.

Feedback from the Centre of Waste Management and Environmental Management suggested that there is significant double counting of the amount of packaging that is recycled in Slovakia. These overestimates arise because some municipalities sell their 'recycling evidence' to more than one obligated company. For example, if a municipality separately collects 100 kg of waste paper packaging and delivers this to a reprocessor, they will be issued with an invoice to confirm that the material has been recycled. The municipality then sends a 'confirmation'/'recycling evidence' for

100 kg to Recycling Fund in order to receive some compensation for the costs of collecting the material. Some municipalities, however, also sell the same 'confirmation' to one or more obliged packaging companies to help them meet their targets under the Packaging Directive. The obliged company then uses the confirmation for lowering their contribution to the Recycling Fund as well as for reporting to the Ministry of Environment. In this way the collection of 100 kg of material can be reported a number of times by different organisations, leading to a significant overestimate of the actual amount of packaging that is actually recycled.

25. Slovenia

Definition of Municipal Waste

According to Environmental Protection Act municipal waste shall mean any waste from households or waste similar to household waste in nature or composition produced in manufacturing, commercial, service or other industries. Data are obtained on the basis of annual reports persons involved in waste management (also public environmental protection services).

Accounting Methodologies Affecting Performance against Targets

At the time the questionnaire was set out Slovenia had not yet decided on how to report the WFD 50% recycling target. It was reported that Government was due to take the decision at the end of August 2013. The most likely approach was reported to be calculation Method 4. The choice of Method 4 was confirmed in September 2013 when Slovenia submitted its Directive 2008/98/EC Implementation Report to the European Commission.

No information was provided about how the amount biodegradable municipal waste going to landfill is calculated for the purposes of reporting against the Landfill Directive target.

26. Spain

Definition of Municipal Waste

The Autonomous Communities (regions) of Spain have slightly different definitions for municipal waste but nationally the definition comes closer to that of Eurostat. It includes household waste, and commercial waste, similar to household waste.

Commercial waste that is managed privately is excluded from MSW but if municipalities decide to undertake the collection and management, then this waste amount is included in MSW (it depends on municipalities and regions). Ferrous metal recycling from back end of

incineration is excluded from the recycling reporting as recommended by the Eurostat guidance.

Accounting Methodologies Affecting Performance Against Targets

Regarding the Waste Framework Directive Spain will use Method 4 for calculating its recycling rates. This information was provided as part of our investigations for this project and was also confirmed through the submission of their Directive 2008/98/EC Implementation Report to the European Commission in late 2013.

27. Sweden

Definition of Municipal Waste

The concept “municipal waste” is not defined in Sweden legislation. According to praxis “municipal waste” is equal to household waste, as defined in the Environmental Code.³³

“Household waste is waste generated by households, and similar wastes from other business and enterprises.”

The governmental bill, introducing the environmental code explained that “similar wastes” are wastes from industries, enterprises and other business that are generated as a direct consequence of that people, no matter of the purpose or activity are staying within a premise or room. Examples would be waste from staff dining room, restaurant wastes and toilet wastes.

Accounting Methodologies Affecting Performance against Targets

Regarding the Waste Framework Directive recycling targets, Sweden has chosen

Method 2, where the recycled amount of paper, metal, plastic, glass waste and other single waste streams from households or similar waste stream divided by the total amount of paper, metal, plastic, glass waste and other single waste streams from households or similar waste stream. This was confirmed through Sweden’s Directive 2008/98/EC Implementation Report, which was issued to the European Commission in the autumn of 2013.

28. United Kingdom

Definition of Municipal Waste

The definition of municipal waste used by DEFRA is the same as that in the Waste Framework Directive (i.e. “household and similar waste”). “Household” waste is taken to mean any waste generated by households and “similar waste” means waste in nature and composition that is comparable to household waste, excluding production waste and waste

³³ www.notisum.se/rnp/sls/lag/19980808.HTM (in Swedish)

from agriculture and forestry.³⁴

Historically, DEFRA used to use a definition based on the old definition in the Joint Questionnaire, which was ‘waste collected by, or on behalf of, local authorities’. This is no longer considered appropriate following a letter from the Commission. Today, the definition of municipal waste covers all waste collected by local authorities, with some minor exceptions, as well as wastes similar to household waste collected from commercial businesses, or the administrative side of industrial companies (irrespective of who collects the waste).

Accounting Methodologies Affecting Performance against Targets

In terms of reporting against the Waste Framework Directive target the UK has chosen to use calculation Method 3 as set out in Annex I of the Commission Decision on Calculation Methods 2011/753/EU. However, DEFRA reports that this may change in the future. The UK reported in their Directive 2008/98/EC Implementation Report to the European Commission that Method 3 would be used.

³⁴ Department for Environment, Food & Rural Affairs, United Kingdom (2013) Local Authority Collected Waste – Definitions of Terms , Date Accessed: 22 October 2013, Available at: