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Guidance on municipal waste data collection

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Guidance on municipal waste data collection

1. Introduction

The aim of this document is to provide guidance on the scope and coverage of municipal waste for the purpose of the annual data collection on municipal waste generation and treatment. The relevant definitions are reproduced in this document and the most commonly covered waste streams of municipal waste are illustrated.

Municipal waste management in Europe has become more and more complex in the last decade. This complexity is due to some extent to the introduction of additional facilities for pre-treatment of waste, mainly mechanical biological treatment and sorting for recovery. In addition, there are legal requirements for increasing recovery of certain waste streams, resulting also in increasing cross-boundary transports of waste for recovery. Depending on national waste management and waste data collection systems, the approaches for municipal waste data collection established in the Member States vary to a large extent, thus hampering data comparability across countries.

Moreover, municipal waste statistics have gained importance as it is currently one of the options to provide evidence of compliance with the recycling target set by the Waste Framework Directive (WFD)[1].

In the following section on the ***Municipal waste definition***, it will be explained why the definition in the Joint Questionnaire of the OECD and Eurostat shall remain the basis for reporting and how it shall be interpreted in terms of coverage of materials and sources.

Reporting on municipal waste treatment and how to deal with secondary wastes, pre-treatment as well as with imports and exports of municipal waste is addressed in the section on ***Scope and coverage of municipal waste treatment***. At the end of the document, all suggestions are summarised briefly in the section ***Summary of the suggestions for reporting on municipal waste generation and treatment***.

[1] Directive (EC) No 2008/98/EC on waste; Article 11 (2,a)

2. Municipal waste definition

Waste statistics data have been collected in the European Union on the basis of an OECD/Eurostat joint questionnaire (JQ) until the adoption of the Regulation on waste statistics. The data collection on municipal waste (MW), however, continued after 2004 based on a subset of the JQ. The most comprehensive definition for statistics on MW is still the definition of the OECD/Eurostat joint questionnaire:

Municipal waste covers household waste and waste similar in nature and composition to household waste.

This definition has evolved over time by operationalising it along the 3 main dimensions for waste statistics: waste origin, waste materials and waste collectors. These criteria are to be found in Annex I to this document (page 10) and marked in the respective colours.

Coverage of municipal waste

Focusing on the aspect of the similarity of household waste, Eurostat offered an option how the scope of municipal waste could be expressed in terms of European classifications. This option is based on the principle that the scope of municipal waste includes household waste and similar waste types generated by other sources than households, regardless of whether municipalities or private actors are responsible for the collection. Recent experience demonstrates that a relevant number of countries include amounts of mixed municipal waste from all NACE activities in the municipal waste data (see annex 1). Furthermore, one can argue that the overall target is to reduce the unsorted, mixed municipal waste regardless of the origin. If this should be done, it is consistent to cover the separately collected fractions from all origins as well. Therefore, the starting point for the waste types to be included are the waste codes listed in chapter 20 of the European List of Waste (LoW) with some additions from sub-chapter 15 01.

When discarded items are handed over to the waste management system, they are classified as a certain waste type, ideally by 6-digit codes according to LoW or another (national) classification. The weight and the code are usually registered at the weighbridge of a waste management facility. Thus, the key to any definition of Municipal Waste is certainly the material classification of the waste, since this classification best determines the similarity to household waste "in nature and composition". Therefore, municipal waste shall cover the LoW-codes listed (see Annex II, Scope of Municipal Waste based on selected LoW codes, page 11). For countries not using the LoW, an equivalent list of covered materials is also included in Annex II.

The suggestions may be summarised as follows:

The scope of Municipal waste shall be determined on the basis of the LoW codes / materials listed in the Annex: Where the material coverage is not sufficient to cover the desired streams or to exclude undesired waste streams, further information must be taken into account, namely:

i. Type of packaging from the monitoring systems on packaging in order to exclude at least transport packaging;

ii. Source and/or type of WEEE from the monitoring systems on WEEE in order to exclude devices not used in households;

iii. Other waste categories where knowledge of the source is required in order to determine whether the code covers waste similar to household waste or rather production waste (e.g. paper);

3. Scope and coverage of municipal waste treatment

The increasing complexity of waste management affects in particular the reporting on municipal waste treatment. This concerns mainly the way in which pre-treatment is considered in the reporting with effects on the variables recycling and composting. Since the reported amounts of MW recycled must be in line with the recycling definition of the WFD, it is required to make provisions on how to report them. These provisions will be the subject of this chapter.

Recovery and disposal categories

The flow chart below illustrates the usual municipal waste treatment operations. Municipal waste treatment data are broken down into these categories:

- Incineration (separately for with and without energy recovery)
- Landfilling
- Recycling (excluding composting or fermentation)
- Composting/digestion

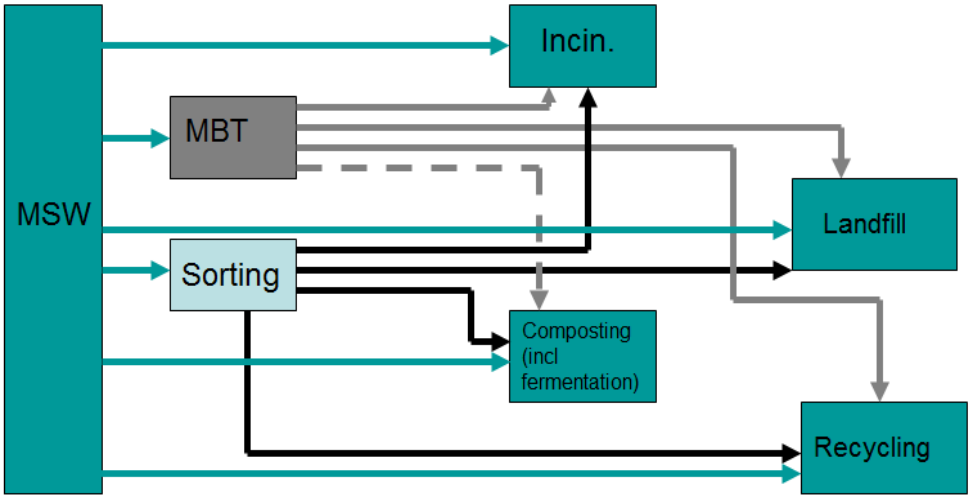

Figure 1: Municipal waste treatment options

Reporting on pre-treatment and secondary waste

Where the *pre-treatment* operations MBT (mechanical-biological treatment) or sorting occurs, their outputs should be allocated to either of the following four treatment operations (see black and grey arrows in Figure 1). The amounts of these outputs may be based on estimation and / or modelling, but shall not contain process and water losses[2] from pre-treatment, but only the secondary waste actually managed. The secondary waste amounts from pre-treatment shall be reported regardless of their codes and linked back to the input of municipal waste in the overall input of the operations (see 'Example for the allocation of secondary waste' below). For the four treatment operations incineration, landfill, recycling and composting, the direct (green arrows) and indirect (black and grey arrows) inputs shall be considered. Secondary wastes from the four treatment operations (incineration, landfill, composting and recycling) should not be reported.

[2] "Losses" in the sense of the above suggestion consist in process and water losses that usually represent the difference between (measured) inputs and outputs of a pre-treatment facility. They are not to be understood in the sense of Article 2 (2) of COM DEC 2011/753/EU where the term "losses" refers to the residues of the operation that are not suitable for recycling, i.e. "lost" in the whole recycling process chain.

In case of recycling and composting/digestion, additional provisions apply, as these processes must be understood in the sense of the definitions below[3]:

- **Composting/digestion**:
  "…the aerobic or anaerobic treatment of biodegradable waste, may be counted as recycled where that treatment generates compost or digestate which, following any further necessary reprocessing, is used as a recycled product, material or substance for land treatment resulting in benefit to agriculture or ecological improvement."[4] Home composting shall be excluded.
- **Recycling**:
  "…means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations."[5] Direct recycling within industrial plants at the place of generation should be excluded.

These descriptions appear to be straightforward, in practice, however, several obstacles exist.

Firstly, the input to the "final" (composting/digestion- or recycling-) processes is often not known. Instead the data collection covers, at least partly, only the inputs and / or outputs of the preparation processes that divert non-recyclable or non-compostable residues from the main stream to be recycled or composted/digested. In composting/digestion facilities, a major sorting / screening step is typically integrated so that it is difficult to directly monitor the amounts actually treated biologically.

Secondly, when the data collection on waste treatment is classified based on the R-codes, this may lead to an overestimation as these concepts are broader than the definition of recycling and composting cited above. Thus, in practice, facilities may be classified as recycling (R2 to R11) or composting (R3) facilities, although they constitute or contain a major sorting / screening step that may generate significant amounts of residues not suitable for material recovery. Moreover, sorting for recycling is, in some countries, performed at landfills or at composting plants, resulting in overestimated amounts allocated to these operations while those for recycling are underestimated.

The following illustrations give examples of operations and their possible classification by R + D codes that occur in practice and how these should be reported in order to overcome the above obstacles and comply with the cited definitions. This output related approach allows using the municipal waste recycling / composting rates directly for compliance reporting of the recycling target pursuant to the WFD. It should be noted that COM DEC 2011/753/EU[6] allows exemptions from this approach in Article 2 (2), where it is stated that the input of the facility can be reported when the amount of residues is not significant.

In the following illustrations, the flows to be reported as composting/digestion- or recycling in compliance with the definitions of the WFD and the JQ are marked in green colour. The red flows (input except for landfill) may only be used when the residues (grey) are insignificant in the sense of the above Article 2(2) from COM DEC 2011/753/EU.

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[3] These definitions, reproduces inter alia from the Waste Framework Directive 2008/98/EC, are in line but more precise than the definitions in the DEF section of JQ:
Composting: "Biological process that submits biodegradable waste to anaerobic or aerobic decomposition, and that results in a product that is recovered."
Recycling: "…any reprocessing of material in a production process that diverts it from the waste stream, except reuse as fuel…"

[4] Commission Decision 2011/753/EU 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, Article 2 (6)

[5] Waste Framework Directive 2008/98/EC, Article 3 (Definitions), No. 17

[6] Commission Decision 2011/753/EU

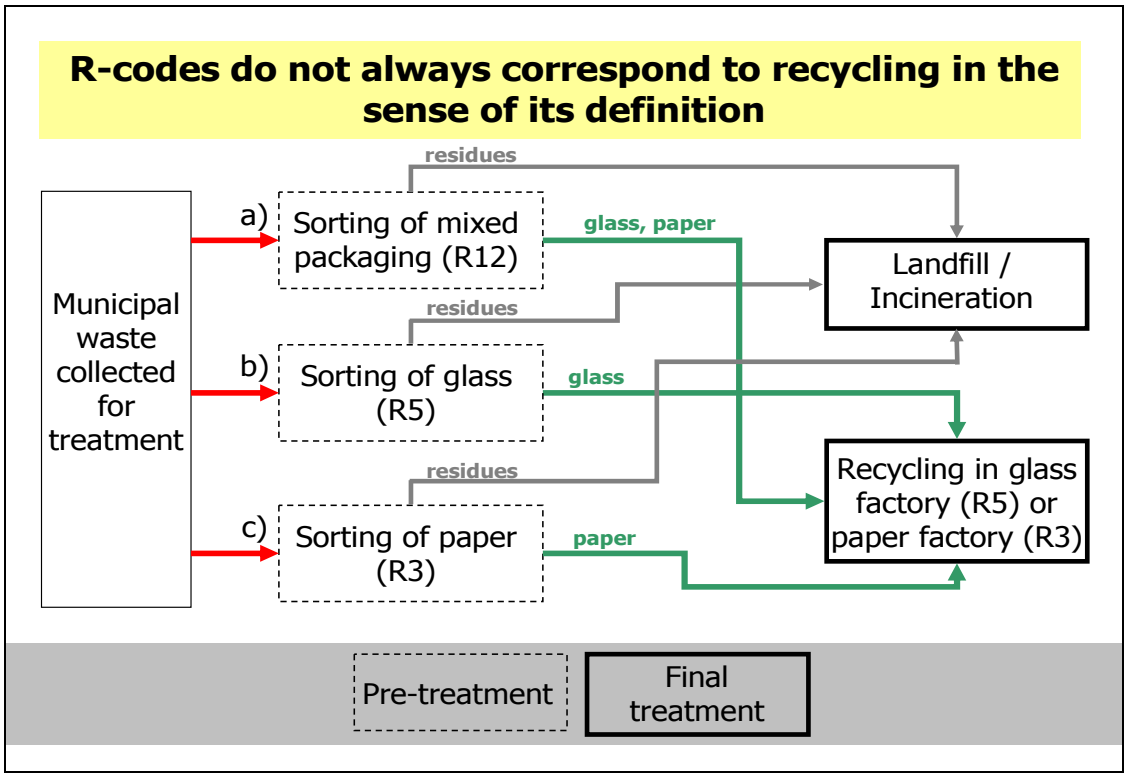

Figure 2: Varying role of sorting in municipal waste treatment classification

Figure 2 shows how sorting should be reported. It can be seen, that case a) is an example of sorting as a specialised pre-treatment operation (R12) that shall not be reported as such but according to the flows of sorted materials to the recycling process and the residues to disposal or energy recovery. In cases b) and c) the reporting should be handled similar to case a), even though these processes may be classified under R2 to R11.

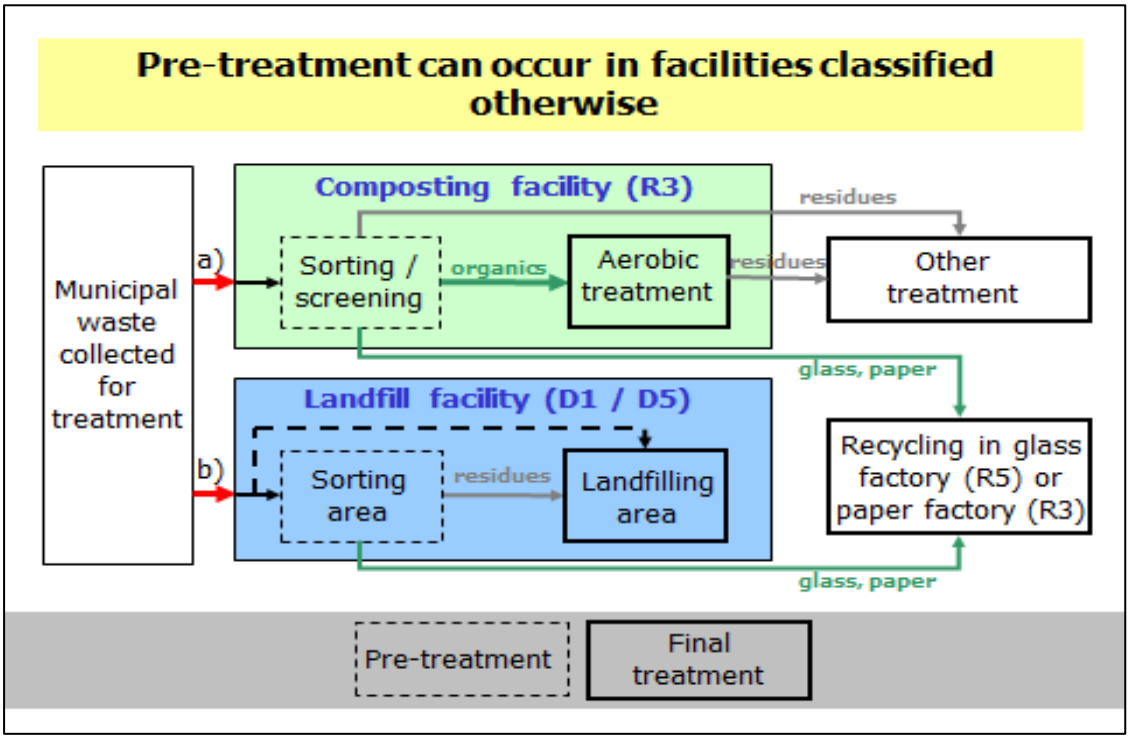

Figure 3: Pre-treatment's integration in facilities classified otherwise

Figure 3 shows that sorting may also occur in facilities that are classified otherwise. In case of composting, this means that only the part of the flow shall be reported that actually ends up in biological treatment which is roughly the difference between input (red array) and the sum of residues treated otherwise (including post-process residues, grey arrays) and materials sent to recycling (green array). For digestion, the provisions are similar (see below). For sorting at landfills it is similar, i.e. the sorted amounts sent to recycling can be reported under recycling while the landfilled amount is represented by the difference of input and the materials sent to recycling.

Treatment by anaerobic digestion as final treatment or as component of MBT

Similar to composting, anaerobic digestion can also be reported as final treatment or as a component of MBT operations (see Annex III). It shall be clarified that the provisions for the reporting of anaerobic digestions are the same as for composting. According to the BREF document on waste treatment[7], anaerobic digestion has the following major outputs and typical usage (amounts produced in relation to input):

- *Biogas: The most common biogas use is combined heat and power (CHP) generation to produce both heat and power. Heat is most effectively used on site or locally whereas power can be used on site or connected to the main electricity grid. Alternatively, biogas can be upgraded, which requires the removal of carbon dioxide and other contaminant gases, in order to generate bio-methane. Bio-methane can be injected into the natural gas distribution network* (118 kg per ton).
- *Digestate: A clean biodegradable feedstock will increase the quality of the digestate, which can be used as an organic fertiliser or soil improver in agriculture, either in a liquid form (about 5–15 % dry matter) like manure, in a semi-solid form (10–30 %) like peat, or be further upgraded, e.g. by composting, drying and/or pelletising in landscaping and horticulture as well as in private gardens. In the event that the content of heavy metals is too high to allow a land application, the compost/sludge may be used for daily covering at landfills* (100-500 kg per ton).
- *Solid waste to be used as fuel: The solid fuel prepared is a pre-sorted mixture of paper and plastics. Washing of the digestion product yields two additional streams: a residue and a wood-like fraction, with a residual calorific value that allows thermal treatment* (100-500 kg per ton).

It can be seen from the description of the BREF document that the main usage of the outputs are either energy recovery or, in case of the digestate, the use as fertiliser, further composting or landfilling.

These outputs shall be reported as landfilled and/or energy recovery depending on the final treatment, if the process is a component of an MBT (usually fed with mixed wastes). It is suggested to neglect the biogas output stream, if a quantification of this stream is not possible or to use an appropriate estimate.

If the process is fed with separately collected organic waste, it shall be similar to composting of separately collected organic waste. It is regarded as final treatment and the input to the biological process shall be reported under composting/digestion except for the amounts of residues treated otherwise (see Figure 3 - composting)..

In practice municipal waste is often mixed with other waste types during pre-treatment, making the allocation of outputs to the municipal waste input difficult. However, possible ways to overcome this problem, e.g. by estimations and modelling, are shown in an example below. [8]

Example for the allocation of secondary waste

Secondary waste streams from pre-treatment operations where the input is known to consist of significant shares of MW, must be covered in order to provide the amounts of final treatment,

[7] Chapter 4.3 Anaerobic treatment (or Anaerobic Digestion – AD) from December 2015 draft BREF on waste treatment (currently under revision). Link: http://eippcb.jrc.ec.europa.eu/reference/BREF/WTbref_1812.pdf

[8] For more information see the following document which summarises findings of a workshop related to Municipal waste of 2012: https://circabc.europa.eu/w/browse/799df21c-d5c8-425d-905f-2cd94b88d911

particularly for recycling. During pre-treatment, there is a code change and many countries claim that the out-coming amounts are not recorded as MW any more. However, since the outputs are linked to inputs of municipal waste reporting should be possible regardless of the change of the code.

If fractions of MW are sorted, the outputs of the sorting operations are often allocated to chapter 19 codes, e.g. covering the residues from "mechanical" treatment of waste. A key issue is that the residues are linked back (and also the "purified" fractions for recycling) of treatments to the "original" waste and that this has to be done for municipal waste as a whole in just the same manner as it has successfully been done, for instance, for packaging (LoW 1501). The small calculation below shows how the amounts and destinations of the output shall be linked back to municipal waste inputs, when also other types of waste were delivered to the facility (the example can, in principle, be extended to the entire national inputs and outputs of the same type of operation). All basic input and output figures are based on real shares from the national figures of a Member State shown in the Annex (the amounts in tonnes are fictional as to simplify the calculation).

Table 1: Illustration of input- and output-flows through MBTs and the way how the allocation of the output to the input of municipal waste can be estimated (assumption: 'equal treatment')

Input			**Output**			**Allocation of amounts**	
Waste	Amount (tonnes)	Share (%)	Treatment / loss	Amount (tonnes)	Share (%)	Municipal waste	Other wastes
Municipal waste	7500	75%	Landfill	2700	27%	2025	675
			Energy recovery	5500	55%	4125	1375
Other wastes*	2500	25%	Recycling	400	4%	300	100
			Loss	1400	14%	1050	350
total	**10000**	**100%**		**10000**	**100%**	**7500**	**2500**

* Details on the LoW chapters are shown in the Annex

The assumption is that the inputs 'municipal waste' and 'other waste' are treated 'equally'. For example, if 2700 tonnes of the overall output is landfilled and it is known that input 'municipal waste' was 7500 tonnes and 'other waste' was 2500 tonnes, this results in 27% (2700/10000 tonnes) of the input that was landfilled. It is then assumed that equally 27% of 'municipal waste' (= 2025 tonnes) and 'other waste' (=675 tonnes) were landfilled, respectively. This calculation can be repeated for the other outputs as shown in table 1.

Different from that rather "simple" assumption outputs may also be linked back to the inputs more ambitiously by making assumptions as to how the different (!) main streams entering a plant are actually treated. This means, if it is known that the stream 'other waste' is 'purer' than the stream 'municipal waste', then the 27% output to landfill comes to a larger extend from stream 'municipal waste', e.g. by 30%. This would then result in (0,30 x 7500 =) 2250 tonnes from stream 'municipal waste' while only the remaining (2700 – 2250 =) 450 tonnes or (450 / 2700 =) 18% from stream 'other waste' go to landfill.

In both cases the output to landfill is 2700 tonnes (or overall 27% related to the input of 10000 tonnes), but the allocation to the incoming streams is different. If the second approach is applied, an explanation and sufficient evidence for the different allocation by streams has to be provided in the quality report.

Concluding remarks on the reporting of composting/digestion versus MBT

Many countries have reported the biological treatment of mixed municipal wastes under composting/digestion, partly even including the loss of water in the figures. It shall be clarified that the input to the biological process of MBTs, based on an overall input of mixed wastes, shall not be reported under composting/digestion, but shall be reported according to the provisions above for MBT, i.e. based on the whereabouts of the outputs of these processes. According to the extract of the BREF

document on waste treatment[9] - section on MBT (see Annex III), the resulting product from the biological treatment of mixed waste is not suitable for usage as a recycled product for land treatment. Due to the usually unacceptable level of contamination this does not result in a benefit to agriculture. Therefore, unless otherwise clearly proved, biological treatment of mixed wastes, even after mechanical separation steps shall not be reported as composting. Only the biological treatment of separately collected organics shall be reported under composting.

Member States are asked to provide the input and output-flows of materials treated via MBT in the quality reports. These data are required as input to the European Waste Model by DG Environment and the European Environmental Agency. Furthermore, these data are required by Eurostat to verify the amounts reported for final treatment, particularly landfilling and incineration.

Imports and exports of municipal waste

Data on municipal waste treatment should relate to the municipal waste generated in the country. Accordingly, exports of municipal waste for treatment should be included in the reporting, while imports should be excluded, not only concerning recycling but all treatment operations. This convention would however require that data sources are available and that the affected amounts are significant.

Preparatory operations/temporary storage

Preparatory operations include preparatory activities prior to any recovery or disposal operation, such as blending, mixing, repackaging, temporary storage, etc. that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery. These operations are not reported. Instead, the Member States with significant amounts of wastes temporarily stored are asked to report the amounts in storage at the 31st December of the reference year in the quality report. The treatment of these stored wastes shall be reported under the respective operation in the year of treatment.

A consolidated guidance for all four treatment categories is provided in the Annex.

[9] Best Available Techniques (BAT) Reference Document for Waste Treatment: http://eippcb.jrc.ec.europa.eu/reference/BREF/WTbref_1812.pdf

4. Summary of the suggestions for reporting on municipal waste generation and treatment

The suggestions covered in this document may be summarised as follows:

a. Municipal waste shall be understood on the basis of the definition taken from the OECD/Eurostat Joint Questionnaire on waste and shall be interpreted on the basis of the LoW codes/material streams listed in the Annex, regardless of the type of collection;

b. The coverage by origin shall be considered for waste materials where the LoW code/material allows no distinction between production waste and waste from municipal sources (as listed in the definition in the Annex in green);

c. Municipal waste shall also cover packaging waste; it is suggested to cover packaging waste even if a clear distinction between commercial and private household origin is not possible because of the collection system;

d. Municipal waste treatment shall be broken down by the four categories landfill, incineration, recycling and composting/digestion as shown in Figure 1;

e. For sorting and MBT, the outputs shall be allocated to these four above treatment categories. For MBT, the annual input of municipal waste shall be reported in the quality report in kilo-tonnes;

f. For composting/digestion, only separately collected organics are accepted for reporting. Biological treatment of mixed waste shall be excluded from the composting figures and shall be regarded and reported as treated in MBT, i.e. shall be allocated as residues to incineration or landfilling;

g. Secondary wastes from the above four treatment operations shall not be considered, except for the cases where the classification for recycling and composting used for data collection deviates from their definitions;

h. In the cases of recycling and composting, the provisions of chapter 3 have to be taken into account, as shown in Figure 2 and Figure 3 and the related explanation, unless the residues are insignificant;

i. For all treatment operations, exports shall be included in the reporting while imports shall be excluded, enabling the relation of treatment data to those for waste generation;

j. For temporary storage, the amounts in storage at 31 December of the covered reference year shall be reported in the respective quality report.

Depending on the available data and the feedback of the countries to the suggestions above, further refinement may be necessary.

ANNEX I – Eurostat/OECD Definition of municipal waste

Wording from the Definition-Section of the Joint Questionnaire

Municipal waste includes household waste and similar waste.

It also includes:

- bulky waste (e.g. white goods, old furniture, mattresses), and
- yard 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 waste from these sources collected:

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

For the purpose of this questionnaire municipal waste refers to waste defined as above, collected by or on behalf of municipalities.

The definition also includes waste from the same sources and 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.

Annex II - Scope of Municipal Waste based on selected LoW codes

Chapter 20: Municipal wastes (Household waste and similar commercial, industrial and institutional wastes) including separately collected fractions

20 01 separately collected fractions (except 15 01)

20 01 01	paper and cardboard
20 01 02	glass
20 01 08	biodegradable kitchen and canteen waste
20 01 10	clothes
20 01 11	textiles
20 01 13*	solvents
20 01 14*	acids
20 01 15*	alkalines
20 01 17*	photochemicals
20 01 19*	pesticides
20 01 21*	fluorescent tubes and other mercury-containing waste
20 01 23*	discarded equipment containing chlorofluorocarbons
20 01 25	edible oil and fat
20 01 26*	oil and fat other than those mentioned in 20 01 25
20 01 27*	paint, inks, adhesives and resins containing dangerous substances
20 01 28	paint, inks, adhesives and resins other than those mentioned in 20 01 27
20 01 29*	detergents containing dangerous substances
20 01 30	detergents other than those mentioned in 20 01 29
20 01 31*	cytotoxic and cytostatic medicines
20 01 32	medicines other than those mentioned in 20 01 31
20 01 33*	batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries
20 01 34	batteries and accumulators other than those mentioned in 20 01 33
20 01 35*	discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components
20 01 36	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35
20 01 37*	wood containing dangerous substances
20 01 38	wood other than that mentioned in 20 01 37
20 01 39	plastics
20 01 40	metals
20 01 41	wastes from chimney sweeping
20 01 99	other fractions not otherwise specified

20 02 garden and park wastes (including cemetery waste)

20 02 01	biodegradable waste
20 02 03	other non-biodegradable wastes

20 03 other municipal wastes

20 03 01	mixed municipal waste
20 03 02	waste from markets
20 03 03	street-cleaning residues
20 03 07	bulky waste
20 03 99	municipal wastes not otherwise specified

Chapter 15 Waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified

15 01 packaging (including separately collected municipal packaging waste)

15 01 01	paper and cardboard packaging
15 01 02	plastic packaging
15 01 03	wooden packaging
15 01 04	metallic packaging
15 01 05	composite packaging
15 01 06	mixed packaging
15 01 07	glass packaging
15 01 09	textile packaging
15 01 10*	packaging containing residues of or contaminated by dangerous substances
15 01 11*	metallic packaging containing a dangerous solid porous matrix (for example asbestos), including empty pressure containers

Any waste marked with an asterisk (*) is considered as a hazardous waste

Comments to the selection of LoW codes

The heading of chapter 20 is: 'Municipal waste (household waste and similar commercial, industrial and institutional wastes) including separately collected wastes'. This implies that if a waste type is generated by households and the same waste type is also generated by commercial, industrial and institutional companies, this waste will be allocated to the same code. For example, when a household generates kitchen waste or when a canteen belonging to an office or manufacturing activity

generates kitchen waste, and the waste is separately collected, this waste has the same code according to the European List of Waste (Biodegradable kitchen and canteen waste - 20 01 08). It will also have the same code if the generated kitchen waste is not separately collected but is a part of the mixed municipal waste bin (code 20 03 01). However, if a company generates waste as a part of processing meat and other foods, this waste is not similar in its nature to household waste and will be allocated a code belonging to chapter 2 of the LoW (Wastes from agriculture, horticulture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing).
However, not all waste types included in chapter 20 of the LoW are covered by the definition of Municipal Waste. The following codes are excluded:

- 20 03 04 - 'Septic tank sludge',
- 20 03 06 - 'Waste from sewage cleaning', and
- 20 02 02 - 'Soil and stones'.

Packaging waste, including packaging waste from households, is not covered by chapter 20 of the LoW. Packaging waste is covered by chapter 15 01 'Packaging (including separately collected municipal packaging waste)' and therefore, this chapter has to be included in the definition of what is included in Municipal Waste. Chapter 15 01 covers wastes of both sales packaging and transport packaging. It could be argued that transport packaging waste is in its nature and composition not similar to household waste and should therefore not be included in Municipal waste. However, from a collection and data reporting perspective it is often very difficult or impossible to say whether the packaging is sales or transport packaging. The EU Packaging Directive does not include any obligation to differentiate in the reporting between sales and transport packaging. In order not to introduce extra administrative burdens on the private and public actors, it is therefore suggested to accept that all packaging waste is covered by the definition of Municipal Waste.

Scope of Municipal Waste based on materials

Municipal waste consists of the following materials - packaging waste of the individual fractions is included:

Separately collected waste from households:

- Paper and cardboard
  Consists of packaging paper and cardboard as well as graphic paper
- Textiles
  Consists of clothes and other textiles, e.g. carpets
- Plastics
  Consists of plastic packaging and plastic products
- Glass
  Consists of container glass as packaging waste and of other glass, e.g. flat glass, lamps or dishes
  Comprises clear glass and stained glass
- Metals
  Consists of metal packaging, e.g. cans, and metal scrap from households
  Comprises ferrous and non-ferrous metals
- Organic materials from HH:
  Kitchen waste (food leftovers, etc.), garden waste (grass clippings, leaves, etc.)
  Home composting is not considered .
- Hazardous household waste [Eurostat 2012a]: Spent solvents, acids, alkalines, photochemicals, pesticides, used oils, paints, inks, adhesives and resins (partly haz.), WEEE (partly haz.), batteries and accumulators (partly haz.), detergents (haz. Parts), hazardous medicines
- Other waste: Edible oil and fat, rubber waste, ceramics, etc.
- Bulky waste
  Waste that due to its bulky character needs special considerations for its management. It includes bulky wood waste and other bulky materials, which are mentioned in above fractions, e.g. bulky metal products.

Residual waste:

Mixed waste from households and similar institutions with the exception of separately collected fractions.

Waste from municipal services:

- Organic materials from municipality services:
  Garden and park waste from municipalities, waste from maintenance of roadsides, if managed as waste. Grass clippings, which are left on the ground, are excluded.
  Kitchen and canteen waste
- Waste from public bins and street sweepings
- Market cleansing waste
- Cemetery waste

Other waste from municipal services, such as municipal construction and demolition waste and waste from municipal sewage network and treatment are excluded.

Annex III - MBT - extract from the BREF document on waste treatment[10]

Purpose

Mechanical biological treatment (MBT) is usually designed to recover materials for one or more purposes and to stabilise the organic fraction of the residual waste. The practical advantages of MBT plants are, above all, the reduction of:

- the volumes of waste;
- the organic matter content of the waste, which are sent to final disposal (landfill or incineration).

Another purpose of MBT is to break down the material for further processing (e.g. preparation of solid waste fuels). Biological digestion is intended to reduce the weight, and to render inert any biologically active organic materials (typically called 'stabilised residue'). Typical values for the combined loss of water and biodegradable materials may be in the range of between 20 % and 35 %, mainly depending on the duration of treatment. Further reductions of the waste volume sent to landfill may be achieved by mechanical separation of the output and can be even higher than 60 %.

Users

Mechanical biological treatment is a tool for pre-treating wastes prior to landfilling or for preparing solid wastes (typically municipal solid waste) to be used as fuels.

Principle of operation

MBT plants significantly reduce humidity by extracting, reducing and stabilising the organic content in the waste. These treatments involve a mechanical separation of the waste, biological treatment (anaerobic and/or aerobic digestion) of the organic fraction, and a further mechanical separation if required.

The biological steps of the mechanical biological residual waste treatment process are for the most part identical to those employed for the composting and anaerobic digestion of separately collected organic waste. However, MBT has tougher requirements with regards to mechanical treatment and some biological treatment machinery due to its broader input spectrum and more heterogeneous feedstock. MBT also necessitates more mechanical effort to extract a significant amount of material which does not endure biological treatment, for example the high calorific coarse fraction, and ferrous and non-ferrous metals. Where possible, the coarse fraction undergoes additional processing and differentiation. Residual waste also normally tends to have a much higher potential risk from spots of contamination and a significantly higher level of contaminants than separately collected organic waste.

Output streams

The output from MBT plants is greatly reduced in weight and stabilised (emission releases from the output compared with the untreated material could be reduced approximately 90–98 % under landfill conditions). Such figures are very variable and greatly depend on how the reduction of emissions is calculated (e.g. gas generation and respiration activity) and can typically have significant variations in quality. In some countries, the output may be used as landfill cover if contamination is low enough, or it may be landfilled. The quality of the output is generally not acceptable for widespread use because of the contaminants related to both the inert content (glass, plastic, etc.) and also to the heavy metals content arising from other wastes entering the stream (batteries, etc.). Other outputs are combustible fractions and recyclable materials (e.g. metals, plastic).

According to table 4.31 of the BREF document, the following different process configurations concerning the biological treatment exist:

- Aerobic biodrying
- Aerobic biostabilisation
- Aerobic biostabilisation producing an RDF
- Anaerobic Digestion

[10] Chapter 4.4 Mechanical biological treatment from December 2015 draft BREF on waste treatment (currently under revision). Link: http://eippcb.jrc.ec.europa.eu/reference/BREF/WTbref_1812.pdf

MBT – typical national inputs and outputs to all facilities taken from one 6-digit data by LoW of one Member State

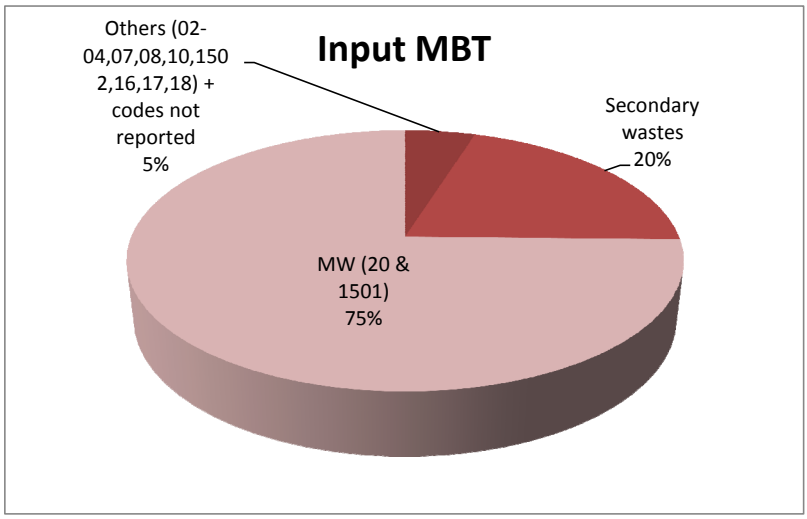

Figure 4: Input to MBTs by waste types

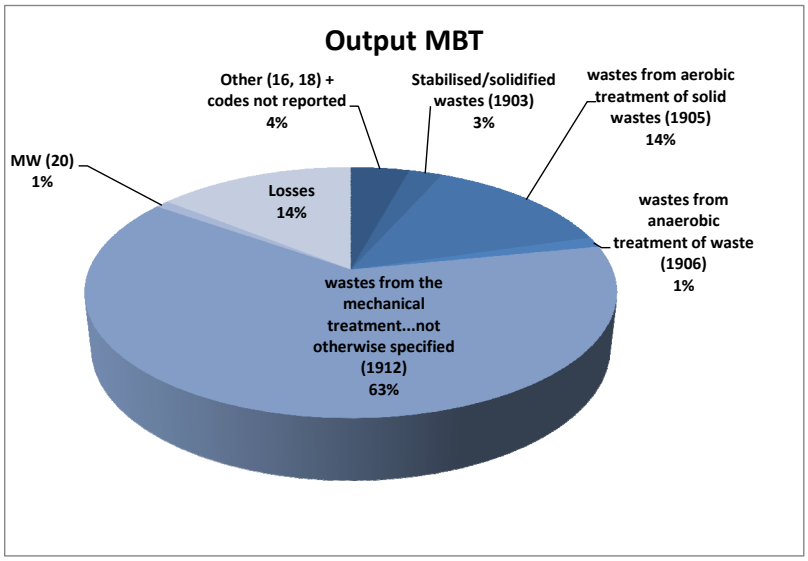

Figure 5: Output from MBTs by waste types

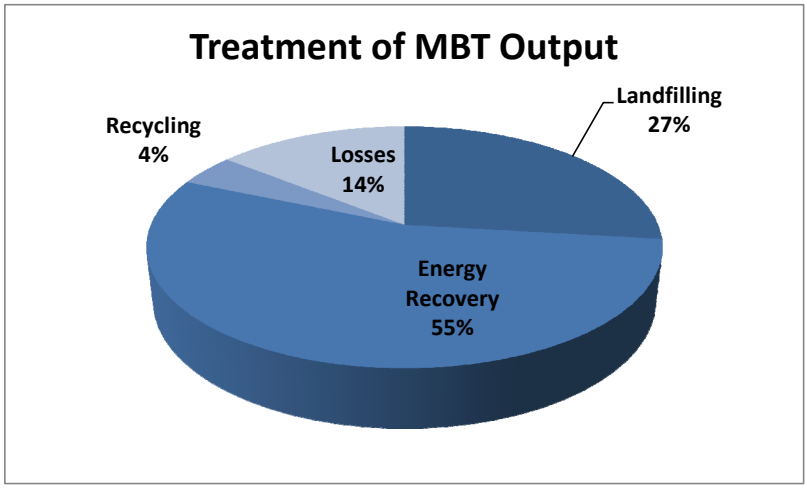

Figure 6: Output from MBTs by final treatment

Annex IV - Consolidated guidance on all MW treatment categories

Parameter: Municipal waste landfilled

Landfill is defined as deposit of waste into or onto land, including specially engineered landfill, and temporary storage of over one year on permanent sites. The definition covers both landfill in internal sites (i.e. where a generator of waste is carrying out its own waste disposal at the place of generation) and in external sites.

Municipal waste can either be landfilled directly or after pre-treatment operations.

Residues from the other recovery / disposal operations recycling, composting / fermentation and incineration, which are going to landfills (e.g. ashes from incineration) are not reported (with the exception described in chapter 3). Only those quantities have to be reported, which are really landfilled. If a sorting step before landfilling takes place at the area of the landfill, the outputs of the sorting have to be assigned to the respective recovery/disposal operations.

Parameter: Municipal waste recycled (excl. composting)

Recycling means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes [WFD 2008/98/EC, Art. 3, No. 17]. Thus, the waste material is diverted from the waste stream. Direct recycling within industrial plants at the place of generation should be excluded.

For the present reporting exercise recycling does not include the following operations, because they are covered by other treatment categories:

- the reprocessing of organic material by aerobic or anaerobic methods (composting / digestion)
- energy recovery and the reprocessing into materials that are to be used as fuels

Municipal waste can either be recycled directly or after pre-treatment operations.

Residues from the other recovery / disposal operations composting/fermentation and incineration, which are going to recycling (e.g. metals from incineration ashes) are not reported.

The calculation can be based on amounts collected for recycling purposes, and adjusted according to amounts not actually recycled (e.g. sorting residues).

Parameter: Municipal waste composted or fermented

Composting / digestion are the biological processes that submit biodegradable waste to aerobic / anaerobic decomposition.

The products of these processes are compost or digestate which, following any further necessary reprocessing, is used as a recycled product, material or substance for land treatment resulting in benefit to agriculture or ecological improvement. [Com. Dec. 2011/753/EU, Article 2 (6)]

Municipal waste can either be composted / digested directly or after pre-treatment operations.

The biological treatment of residual waste in an MBT cannot be regarded as composting, when the product of that treatment is subsequently landfilled, incinerated or otherwise not used for the purpose mentioned above. The calculation can be based on amounts collected for the purpose of composting / digestion, and adjusted according to amounts not actually composted /digested (e.g. sorting residues).

Parameter: Municipal waste incinerated / Total incineration (including energy recovery)

Incineration means thermal treatment of waste in an incineration plant as defined in Article 3(4) or a co-incineration plant as defined in Article 3(5) of the Incineration Directive 2000/76/EC.

Municipal waste can either be incinerated directly or after pre-treatment operations. The latter refers especially to secondary fuel produced of waste.

Energy recovery

Energy recovery is defined as the incineration that fulfils the energy efficiency criteria laid down in the Waste Framework Directive (2008/98/EC), Annex II (recovery operation R1).

Since the transposition of the WFD into national legislation the energy efficiency criterion (according to Annex II of WFD) allows a better distinction between incineration with and without energy recovery. In this case, the treatment operation "energy recovery" covers the incineration of waste in accordance with the energy efficiency criterion mentioned as well as the co-incineration of waste in power stations or industrial facilities such as cement kilns so that the resultant energy can be used to generate heat or electricity.

Annex V - Legal acts and other relevant documents cited in the document

Citation	Full reference	Link
JQ	OECD/Eurostat joint questionnaire on waste	
WFD	Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3)	http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098
COM DEC 2011/753	Commission Decision 2011/753 establishing rules and calculation methods for verifying compliance with the targets set in the Waste Framework Directive (OJ L 310, 25.11.2011, p. 11)	http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32011D0753=CELEX:32011D0753
WStatR	Regulation 2150/2002/EC of the European Parliament and of the Council of 25 November 2002 on waste statistics (OJ L 332, 9.12.2002, p. 1)	http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32002R2150
List of waste / LoW	2014/955/EU : Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council (OJ L 370/44, 30.12.2014, p. 44).	http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014D0955