

eurostat 

**Manual for the
Implementation
of Regulation (EC)
No 2150/2002 on
Waste Statistics**

2024 edition

 **MANUALS AND
GUIDELINES**



**Manual for the
Implementation
of Regulation (EC)
No 2150/2002 on
Waste Statistics**

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List of abbreviations

Abbreviation	Description
CASC	Computational Aspects of Statistical Confidentiality
C&D	Construction and demolition
CEI	Circular Economy Indicators
CircaBC	Communication and Information Resource Centre for Administrations, Businesses and Citizens
CN	Combined Nomenclature
DG ENV	Directorate General Environment
DSP_I	Disposal - Waste incineration (D10)
DSP_L	Disposal - Landfilling (D1, D5, D12)
DSP_OTH	Other disposal (D2, D3, D4, D6, D7)
EAP	Environment Action Programme
ECAS	European Commission Authentication Service
eDAMIS	Electronic Data files Administration and Management Information System
EEA	European Economic Area
EEE	Electrical and Electronic Equipment
EIONET	European Environment Information and Observation Network
ELV	End-of-Life Vehicles
WSTARSI	ESS Standard for Quality Reports Structure
ESSC	European Statistical System Committee
ESS-MH	European Statistical System Metadata Handler
ETC/WMGE	European Topic Centre on Waste and Materials in a Green Economy
EWG-Stat	European Waste Classification for Statistics
FAC	Treatment Infrastructure (No./capacity of recovery/disposal facilities)
FSS	Farm Structure Survey
GEN	Generation
GHG	Greenhouse Gases
HAZ	hazardous
HS	Harmonised Commodity Description and Coding System

IPPC	Integrated Pollution Prevention and Control
ITGS	International Trade in Goods Statistics
JRC	Joint Research Centre
KAU	Kind-of-activity unit
LKAU	Local-kind-of-activity unit
LoW	European List of Waste
LU	Local Unit
MBT	Mechanical Biological Treatment
MT	Mechanical Treatment
NACE	Statistical Classification of Economic Activities in the European Community (French: Nomenclature statistique des Activités économiques dans la Communauté Européenne)
NHAZ	non-hazardous
NSI	National Statistical Institute
NUTS	Nomenclature of Territorial Units for Statistics (French: Nomenclature des unités territoriales statistiques)
PCB	Polychlorinated Biphenyl
POP	Persistent Organic Pollutants
PRIM	Primary waste
PRT	Pre-treatment
QR	Quality Report
RCV_B	Recovery - Backfilling
RCV_E	Energy recovery (R1)
RCV_R	Recovery - Recycling (R2 – R11)
R&D	Recovery and Disposal
REI	Resource Efficiency Indicators
SDGs	Sustainable Development Goals
SDMX	Statistical Data and Metadata eXchange
SDMX-ML	Statistical Data and Metadata eXchange-Markup Language
SEC	Secondary waste
SIMS	Single Integrated Metadata Structure
SVR	Standard Validation Rules
TRT	Treatment
WCO	World Customs Organisation
WEEE	Waste of Electrical and Electronic Equipment
WFD	Waste Framework Directive
WSR	Waste Shipment Regulation
WStatR	Waste Statistics Regulation

Foreword

Waste statistics are essential for understanding modern economies transitioning to a circular economy. These statistics play a crucial role to measure the impact of human activities on the environment, guiding policy decisions, and monitoring progress towards sustainable development goals.

The Eurostat manual on waste statistics is a key resource to produce these data. Focused on harmonization and quality, the manual aims to ensure that Member States produce high-quality, comparable data in line with the Waste Statistics Regulation. The manual is primarily aimed at national experts in the field of waste statistics. Furthermore, it encourages experts to question their methods and provide feedback for its improvement.

The Eurostat manual evolved through regular updates. The first edition of this Manual dates from 2006. An updated version was published in 2013, following the substantial revision of the Waste Statistics Regulation in 2010. This new edition takes stock of legal and statistical changes occurred since 2013.

The main changes in the legislation are the following:

- The revision of Directive 2008/98/EC on waste (Waste Framework Directive – WFD);
- The revisions and updates of other waste-related legal acts;

- Changes of statistical legislation, e.g. Regulation (EU) 2019/2152 on European business statistics;
- Adoption of the EU's Circular Economy Action Plan.

Further aspects that were considered in the revision of the Manual include:

- Guidance on the new data set 4 module to link the data on waste generation and on waste treatment;
- The change from webform-based reporting to Excel questionnaires;
- Developments in data validation;
- Use of the ESS Metadata Handler for submission of quality reports;
- Integration of results from discussions at the meetings of the Working Group on Waste;
- Additional guidance requested by countries.

Correspondingly, this edition of the Manual has chapters 2.6 and 3.3 extended, covering also the new voluntary questionnaire module developed in 2023.

All these changes will improve the Manual clarity and support compilers of waste statistics to improve data coherence and comparability across European countries.

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Introduction

1.1. Aim of the manual

The primary goal of the manual is to guide and assist the Member States in their efforts to produce high-quality, harmonised and efficient waste statistics in accordance with the Waste Statistics Regulation (Waste Statistics Regulation - WStatR) ⁽¹⁾. In particular, the manual focuses on aspects of harmonisation and quality. The manual is a guidance document that intends to complement the legal text with explanations, recommendations and examples, although it is not legally binding, nor does it overrule the Regulation.

The manual is mainly aimed at national experts involved in the production of national waste statistics and is designed as a “handbook” for them. However, experts should not only use and apply the manual, but also provide comments on it so that it can be amended and supplemented. The relationship between the (primary) users of the manual and the manual itself is a complex and dynamic one: the manual will be updated periodically, on the basis of hopefully numerous remarks and comments from those with practical experience in the field.

In addition to the primary users of the manual, i.e. the national experts involved in the production of waste statistics, the end-users of waste statistics (scientists, members of the public and politicians) should also find the manual useful, as it will provide them with additional content-related information.

1.2. User needs

1.2.1. General situation regarding waste reporting

Despite efforts at EU and national level, the amount of waste generated in the EU is not going down. EU policies are now aiming at a significant reduction in the amount of waste generated: through new waste prevention initiatives, better use of resources, and encouraging a shift to more sustainable consumption and production patterns. Within the general framework of the Sustainable Development Goals (SDGs) and the European Green Deal, this is translated into thematic strategies and measures under the 7th and 8th Environment Action Programme (EAP).

The SDGs set out a single, coherent strategy on how the EU will more effectively live up to its long-standing commitment to meet the challenges of sustainable development. It recognises the need to gradually change our current unsustainable consumption and production patterns, and move towards a better integrated approach to policy-making. A direct relation to waste generation and resource use is present in SDGs 11 ‘Sustainable cities and communities’ and 12 ‘Responsible consumption and production’.

Under the 7th EAP, the European Commission adopted a number of new strategic initiatives, notably the new Circular Economy Action Plan for a clean and competitive Europe ⁽²⁾, which includes a number of measures on

⁽¹⁾ Regulation (EC) No 2150/2002 of the European Parliament and of the Council of 25 November 2002 on waste statistics (OJ L 332, 9.12.2002, p.1)

⁽²⁾ COM (2020) 98 final

specific waste streams (e.g. the EU plastics strategy) and an update of the monitoring Framework for the Circular Economy.

The 8th EAP aims at accelerating the transition to a climate-neutral, resource-efficient, clean and circular economy in a just and inclusive way, and endorses the environmental and climate objectives of the European Green Deal and its initiatives. One of the key actions included in the 8th EAP is a new monitoring framework to measure the EU's and its Member States' progress on the implementation of the programme's priority objectives. This shall be based on existing data, monitoring and reporting tools like the Circular Economy Monitoring Framework.

In order to monitor the progress made towards the goals set in the EAPs and related strategies, reliable data are needed throughout the years from the different countries on the amount of waste generated, treated or shipped.

Since the 1980s (and until the reference year 2003), the Joint Questionnaire Eurostat/OECD was an important source of data for waste. It particularly provided good quality data on some waste related issues such as municipal waste. However, it proved to be unsatisfactory to offer quality waste data by economic sectors and waste categories. The level of detail was indeed not sufficient, the waste categories were not based on the European list of waste and the data were supplied based on a gentlemen's agreement. Apart from being incomplete, the data sets presented enormous differences among countries due to little harmonization in data collection methodologies.

All this led to a European Union approach on waste statistics. Starting with 2004 as first reference year, the Waste Statistics Regulation created a new framework for collecting and reporting waste data.

After the first data delivery, an intensive data validation was carried out and several revisions were made. First steps towards comprehensive and valuable data sets on waste in Europe were taken. Considerable work is still being done both by countries and Eurostat to improve data quality and harmonize methodologies over the years. Thanks to the work of numerous experts, data quality increases every new reporting year.

1.2.2. Waste management indicators

One of the challenges of collecting more reliable statistics on waste generation and treatment is to produce reliable indicators that supply information, support policy

development and priority settings or monitor the effect of policy responses.

Several indicators on waste have already been defined and used in international contexts (e.g. the OECD, the UN) but new indicators are being developed by EUROSTAT on the basis of data collected using the Regulation on waste statistics.

EUROSTAT currently distinguishes two types of indicators: Sustainable Development Goals indicators, and Circular Economy Indicators.

The data collected with the Regulation on waste statistics are already used for the indicator sets mentioned above. However, further indicators will be needed to monitor the political targets in the coming years.

1.3. Legal basis for Community waste statistics

The Waste Statistics Regulation was adopted by the European Parliament and the Council of the European Union on 25 November 2002 and revised in 2010. Since 2002, several implementation measures have been adopted:

- Commission Regulation (EC) No 574/2004 of 23 February 2004 amending Annexes I and III to Regulation (EC) No 2150/2002 on waste statistics (OJ L 90, 27.3.2004, p.15).
- Commission Regulation (EC) No 782/2005 of 24 May 2005 setting out the format for the transmission of results on waste statistics (OJ L 131, 25.5.2005, p. 26).
- Commission Regulation (EC) No 783/2005 of 24 May 2005 amending Annex II to Regulation (EC) No 2150/2002 on waste statistics (OJ L 131, 25.5.2005, p. 38).
- Commission Regulation (EC) No 1445/2005 of 5 September 2005 defining the proper quality evaluation criteria and the contents of the quality reports for waste statistics for the purposes of Regulation (EC) No 2150/2002 of the European Parliament and of the Council (OJ L 229, 6.9.2005, p. 6).
- Commission Regulation (EU) No 849/2010 of 27 September 2010 amending Regulation (EC) No 2150/2002 of the European Parliament and of the Council on waste statistics (OJ L 253, 28.9.2010, p 2-41).

The Regulation consists of a general part and three Annexes. The Annexes deal with the generation of waste (Annex I), the treatment of waste (Annex II) and the waste classification (Annex III) which should be used for observation and registration. The Regulation starts with the usual "whereas" phrases, giving the reasons and

considerations which motivated and led to the creation of the Waste Statistics Regulation in the form in which it was adopted.

1.3.1. General part of the Regulation – the Articles

The Waste Statistics Regulation contains nine Articles. These Articles focus on Objectives (Article 1), Definitions (2), Data collection (3), Transitional period (4), Import and export of waste (5), Implementation measures (6), Committee procedure (7), Report (8) and the Entry into force of the Regulation (9). From a technical point of view, Articles 3 and 6 are the most important. The other Articles largely provide the usual statistical framework.

Article 3 specifies both the conditions and options for data collection.

Conditions for data collection and further handling of results:

- To reduce response burdens, the national authorities and the Commission shall have access to administrative data sources, subject to relevant restrictions and conditions (Article 3(1)).
- Enterprises with fewer than 10 employees shall be excluded from surveys, unless they contribute significantly to the generation of waste (Article 3(2)); the exclusions must be consistent with the coverage and quality criteria (Article 3(4))⁽²⁾.
- Member States must produce statistical results following the breakdown set out in Annexes I and II (Article 3(3)), and transmit the statistics to Eurostat in time, in an appropriate format (Article 3(5)) and in accordance with existing Community provisions on statistical confidentiality (Article 3(6)).

Options for data collection:

Article 3(1) specifies the data collection methods. There are four types of methods which can be applied:

- surveys,
- administrative or other sources,

- statistical estimations,
- or a combination of these methods.

Chapter 3 of this manual reviews the different data collection methods in detail.

Article 6 lays down, in seven paragraphs, the measures which are necessary for the implementation of the Regulation. The measures are to be adopted in accordance with the Committee procedure laid down in Article 7:

- adjustment to economic and technical developments,
- adaptation of the specifications listed in Annexes I, II and III, which set out the specific data requirements and the classifications to be used,
- allowance for nation-specific reduction in the scope of reporting (reduction of level of detail),
- definition of quality criteria and the content of the quality report,
- setting out the appropriate formats for the transmission of results,
- compilation of a list of transitional periods and derogations in accordance with Article 4,
- implementation of the results of the pilot studies on agriculture and fisheries (Article 4(3)) and import and export of waste (Article 5).

1.3.2. Specific parts of the Regulation – the Annexes

Annex I deals with the generation of waste. The statistics which have to be produced are defined in Sections 2, 3 and 8 of the Annex. Section 2 defines the types of waste which have to be differentiated (51 waste types) and Section 8 the sources (economic activities and households) which have to be surveyed and specified. Section 3 specifies the characteristics to be surveyed (waste quantities generated and population served by a collection scheme). The table which has to be produced is explained in Chapter 2 and also documented in the Annex of this manual. The Table 1 below outlines the remaining sections of Annex I which stipulate the conditions for the production of waste statistics.

⁽²⁾ If small companies are excluded from the surveys, other means (e.g. data from waste collectors or estimates) shall be used to ensure that the waste generation is fully reflected in the reported data.

TABLE 1

Sections in Annex I stipulating “how” statistics should be compiled

Section	Subject	Rules
1	Coverage	Total economy and all wastes
2	Waste categories	Item numbers, codes of waste, description, and hazardousness of the different waste categories to be reported are described
3	Characteristics	The quantity of waste generated for each waste category reported in section 2, should be provided together with the percentage of population served by a collection scheme for mixed household and similar waste.
4	Reporting unit	Tonnes of normal wet waste; for selected waste categories consisting of sludges, the dry matter should be produced (also tonnes); for the coverage of the collection scheme, the reporting unit should be the percentage of the population
5	1st reference year and periodicity	2004 and every second year thereafter
6	Transmission of results to Eurostat	Within 18 months of the end of the reference year
7	Report on the coverage and quality of statistics	Report on the coverage and quality of statistics; indication of degree of precision for collected data
8 (1)	Production of results	Description of activities for which statistics on waste generation have to be produced
8(2)	Statistical units relating to economic activities	Local units or kind-of-activity units in accordance with Regulation (EEC) No 696/93

Annex II deals with the recovery and disposal of waste. The statistics which have to be produced are set out in Sections 2, 3 and 8 of the Annex. Section 2 lists the waste categories for which statistics are to be produced. Until reference 2008, between 12 and 18 categories depending on the treatment type, had to be reported. As of 2010, treatment will have to be reported for the 51 waste categories defined in Annex I. Section 8 lists the waste treatment operations which have

to be surveyed and specified. Section 3 specifies the characteristics to be surveyed (number of facilities and their capacity at NUTS 2 level and total quantities of treated wastes at national level). The tables which have to be produced are explained in Chapter 2 and are also documented in the Annex of this manual. The Table 2 below sets out the remaining sections of Annex II which define the conditions for waste statistics production.

TABLE 2

Sections in Annex II defining “how” statistics should be compiled

Section	Subject	Rules
1	Coverage	All recovery and disposal facilities carrying out one of the operations referred to in Section 8(12), excluding internal recycling facilities
2 same as Annex I	Waste categories	...
3	Characteristics	Regional: number of facilities and their capacity at NUTS 2 level National: total quantities of treated wastes specified by waste types and types of waste treatment facilities
4 – 7 same as Annex I	Reporting unit	...
	1st reference year and periodicity	...
	Transmission of results to Eurostat	...
	Report on the coverage and quality of statistics	...
8(2)	Production of results	List of recovery and disposal operations for which statistics have to be compiled

Annex III provides the table of equivalence for EWC-Stat Ver. 4 (substance-oriented waste statistical nomenclature) and the European List of Waste (LoW) established by Commission Decision 2000/532/EC ⁽⁴⁾.

1.4. Content of the manual

The manual explains how the formal requirements laid down in the Regulation should be met in practice, and outlines the entire process, including the definition of concepts, data collection and processing procedures, and quality criteria. The manual has six chapters.

The **Introduction** (Chapter 1) provides an overview of the historical and political background and structure of the Waste Statistics Regulation. It is followed by a chapter on definitions and principles.

Chapter 2 defines key concepts as implemented in practice, such as household waste and internal recycling. These definitions should serve as a basis for the development of harmonised waste statistics. This Chapter also sets out principles concerning statistical coverage (exclusion or inclusion of units) and source attachment (who generates the waste?). These general principles

should help to guide the Member States when they are faced with situations which are unclear and should ensure that statistics are more consistent. Finally, Chapter 2 classifies and explains the EWC-Stat categories to be used in the reporting process with a view to facilitate their application in the Member States. Finally, the chapter contains an additional section that describes the concept and design of the new questionnaire module for linking the data between waste generation and treatment (data set 4).

Chapter 3, which deals with data collection and data processing, explains the various methods which can be used in this area. This Chapter focuses on the conditions for the application of the various methods and the points which must be taken into consideration. It serves as a basis for explaining the quality requirements dealt with in Chapter 4. In addition, the chapter contains a section that describes methods to complete the new questionnaire module (data set 4).

The Waste Statistics Regulation not only requires data to be collected, but also calls for a report to be drawn up on data quality. **Chapter 4** provides guidance on the drafting of the quality report. The report describes the methods used in the production of waste statistics. It also assesses the quality of statistics based on the statistical quality elements.

⁽⁴⁾ Decision 2000/532/EC concerning the list of wastes (OJ L 226, 6.9.2000, p.3)

Chapter 5 explains and sets out the requirements concerning the transmission of data from the Member States to Eurostat. Guidance is provided on the transmission tools and on the transmission formats.

Finally, **Chapter 6** deals with quality control within Eurostat and the dissemination of results. This Chapter explains the methods and tools to be used for the quality control of data and of the quality report received by Eurostat from the Member States. It also outlines the dissemination strategy.

2

Waste generation and treatment: specification of concepts

This chapter is structured in line with the Waste Statistics Regulation. The following sections give a presentation of the definition of waste according to European legislation, then explanations on the kind of data that are required in waste generation and waste treatment. These explanations are given for waste generation, waste treatment and waste treatment facilities separately.

2.1. Waste definition and overview of the Regulation

2.1.1. Waste definition

“Waste” is defined by EU legislation in the Waste Framework Directive ⁽⁵⁾ as any substance or object which the holder discards or intends or is required to discard. Six general exclusions have been made to the scope of the Waste Framework Directive (Table 3).

TABLE 3

Waste excluded from the scope of Directive 2008/98/EC (Article 2)

(a)	Gaseous effluent emitted into the atmosphere
(b)	Land (in situ) including unexcavated contaminated soil and buildings permanently connected with land
(c)	Uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated
(d)	Radioactive waste
(e)	Decommissioned explosive
(f)	Faecal matter, straw and other natural non-hazardous agricultural or forestry material used in farming, forestry or for the production of energy from such biomass through processes or methods which do not harm the environment or endanger human health.

⁽⁵⁾ Directive 2008/98/EC on waste and repealing certain Directives (OJ 312, 22.11.2008, p. 3), replacing Directive 2006/12/EC on waste as of 12 Dec. 2010

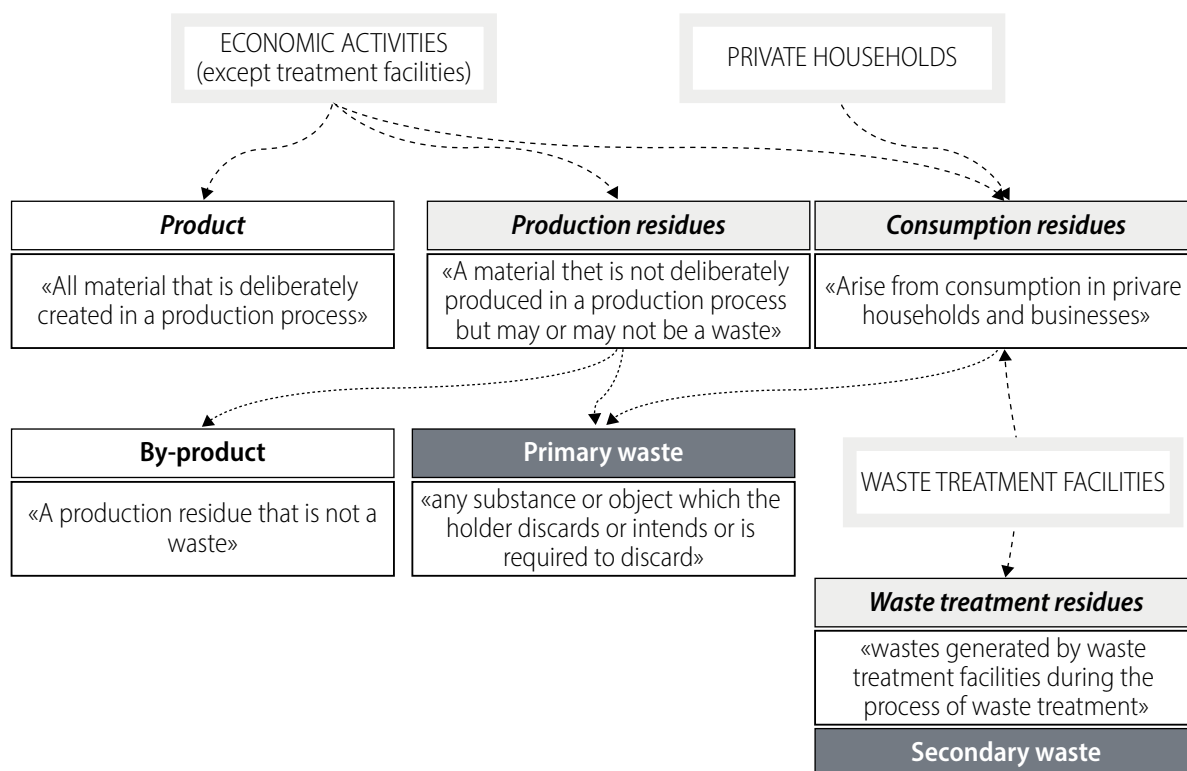
Substances and materials which are residues of production or consumption processes are not necessarily waste, and a distinction between residue and waste should be made.

As Figure 1 overleaf illustrates, three different types of residues currently exist: production residues, consumption

residues and waste treatment residues. Waste arising from consumption residues and production residues are classified as primary waste and waste from waste treatment residues as secondary waste.

FIGURE 1

Definition of waste



“**Production residues**” are materials that are not deliberately produced in a production process but may or may not be waste. Boundaries between waste and by-product are clarified in Article 5(1) of the Waste Framework Directive 2008/98/EC, which defines four conditions for production residues to be considered as by-products ⁽⁶⁾.

“(.) a substance or object, resulting from a production process, the primary aim of which is not the production of that item, may be regarded as not being waste but as being a by-product only if the following conditions are met:

a. Further use of the substance or object is certain;

- b. The substance or object can be used directly without any further processing other than normal industrial practice;
- c. The substance or object is produced as an integral part of a production process; and
- d. Further use is lawful, i.e. the substance or object fulfils all relevant product, environmental and health protection requirements for the specific purpose and will not lead to overall adverse environmental or human health impacts.”

Using this four steps definition, one can for instance define ‘blast furnace slags’ as by-products and ‘de-sulphurisation slags’ as waste. Both production residues occur during the production of iron steel. Blast furnace slag is produced in parallel with hot iron and the production process of iron is

⁽⁶⁾ Please note that ‘by-products’ as defined in Article 5(1) WFD must not be confused with the term ‘animal by-products’ defined in Article 3(1) of Regulation (EC) No 1069/2009 of 21 October 2009. For more detail please refer to the box on page 20f.

adapted to ensure that the slag has the requisite technical qualities. Use of slag is moreover certain in a number of clearly defined end uses and blast furnace slag do not need further processing that is not an integral part of the production process. In contrast, de-sulphurisation slag is produced due to the need to remove sulphur prior to the processing of iron into steel. The resulting slag is rich in sulphur and cannot be used or recycled.

More examples and a decision making tree can be found in COM(2007)95 on the interpretative communication on waste and by-products ⁽⁷⁾.

“Consumption residues” are primary wastes that arise from consumption in private households and businesses and are for instance food residuals, packaging material, paper, glass and plastic.

“Waste treatment residues” are secondary wastes generated by waste treatment facilities during the processing of waste. This includes waste for disposal and for recovery. In Article 6(1), the Waste Framework Directive provides conditions that determine the point at which a given waste ceases to be waste when it has undergone a recovery, including recycling, operation. These conditions are:

- The substance or object is commonly used for specific purposes;
- A market or demand exists for such a substance or object;
- The substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and
- The use of the substance or object will not lead to overall adverse environmental or human health impacts.

In order to provide for the uniform application of the defined conditions, the Commission laid down a set of end-of-waste criteria for the following waste streams:

- iron, steel and aluminium scrap (see [Council Regulation \(EU\) N° 333/2011](#))
- glass cullet (see [Commission Regulation \(EU\) N° 1179/2012](#))

- copper scrap (see [Commission Regulation \(EU\) N° 715/2013](#))

Where criteria have not been set at EU level, Member States may establish national criteria on the application of the conditions defined in the Waste Framework Directive. In case national end-of-waste criteria exist and have an impact on waste statistics, this should be explained in the quality report.

2.1.2. Scope of the Waste Statistics Regulation

The Waste Statistics Regulation covers substances and materials which are defined as wastes in accordance with the EU legislation, and which are covered by the Waste Framework Directive as described above.

2.1.2.1. Reporting obligations

As mentioned earlier, statistics should be compiled on both waste generation and waste treatment. Reporting obligations on waste generation are described in Annex I of the Regulation and reporting obligations on waste treatment in Annex II. In addition, countries should also deliver information on the treatment infrastructure and on the waste collection scheme for mixed household and similar waste. Concretely, reporting has to be performed by delivering three different data sets. The first data set contains statistics on waste generation, data set 2 contains statistics on waste treatment and data set 3 contains data on treatment infrastructure and coverage of the waste collection scheme. Table 4 shortly describes the structure and the level of detail of the data sets to be delivered. The right side of the table shows the structure that applies as of reference year 2010. ⁽⁸⁾

This chapter will first present how statistics on waste generation should be compiled (data set 1), then statistics on waste treatment (data set 2) and finally how statistics on treatment infrastructure (data set 3) and on the coverage of collection scheme should be presented.

⁽⁷⁾ Communication from the Commission to the Council and the European Parliament on the Interpretative communication on waste and by-products, COM(2007) 59 final, 21.2.2007

⁽⁸⁾ The structure of the data sets has been changed with the WStatR Revision in 2010. The structure that applied until reference year 2008 is shown in Annex III of this document.

TABLE 4

Data sets according to the Waste Statistics Regulation

Structure of data sets as of reference year 2010			
Data set		Description and breakdown	Regional level
1 GEN	Generation	Waste generation by: – 19 waste producing activities: 18 industries, households – 51 waste categories	National
2 TRT	Treatment	Waste treatment by: – 6 treatment types – 51 waste categories	National
3 FAC	Treatment Infrastructure	No./capacity of recovery/disposal facilities by: – 4 treatment types	NUTS 2
Quality Report	Coverage of the collection scheme	Percentage of population covered by a collection scheme for household and similar waste.	National

2.1.2.2. Waste included

The Waste Statistics Regulation makes a clear distinction between “waste generation” and “waste treatment”. Waste generation includes all wastes generated by economic activities and by households. Because economic activity includes activities of treatment facilities, waste generated by these facilities (secondary wastes) should also be reported in the generation. This includes both residues of waste treatment and consumption residues that are produced by these facilities.

Waste treatment includes all waste entering treatment facilities for final treatment in the country, i.e. it includes the treatment of imported waste and excludes the treatment of exported waste. Waste treatment furthermore includes both public facilities and businesses having their own waste disposal or recovery facilities, other than internal recycling at the place of production.

Please note: The different concepts of the WStatR for the handling of secondary wastes in Annex I (waste generation) and Annex II (waste treatment) have consequences with regards to the double-counting of waste:

- Data on waste generation shall cover all waste (primary and secondary waste) generated by the statistical units which means that multiple-counting of waste is part of the concept when secondary wastes are generated in the course of preparatory treatment.

- Data on waste treatment refer to the final treatment; treated waste should thus be counted only once. An exception is the double-counting of combustion residues from waste incineration and energy recovery.⁽⁹⁾

The Waste Framework Directive excludes in Article 2(2) some waste and substances “to the extent that they are covered by other Community legislation”. Despite this provision, the following wastes shall be reported under the WStatR:

- animal carcasses and animal by-products⁽¹⁰⁾ covered by Regulation (EC) No 1069/2009;
- waste resulting from prospecting, extraction, treatment and storage of mineral resources and the working of quarries covered by Directive 2006/21/EC.

With regard to these wastes, the scope of the WStatR is broader than the scope of the Waste Framework Directive.

2.1.2.3. Waste excluded

Some waste streams are however not covered by the Regulation. These are:

- Substances, materials and wastes that are generally excluded from the scope of the Waste Framework Directive in WFD Article 2(1) (see Table 3);
- The following substances and wastes that are excluded from the scope of the Waste Framework Directive in

⁽⁹⁾ For more detailed information on the treatment operations that are covered please refer to chapter 2.3.1

⁽¹⁰⁾ Please note that ‘animal by-products’ defined in Article 3(1) of Regulation (EC) No 1069/2009 of 21 October 2009 must not be confused with the term ‘by-products’ as defined in Article 5(1) WFD. For more detail please refer to the box on page 20f

Article 2(2) to the extent that they are covered by other Community legislation:

- waste waters
- substances that are destined for use as feed materials as defined in point (g) of Article 3(2) of Regulation (EC) No 767/2009 of the European Parliament and of the Council ⁽¹⁾ and that do not consist of or contain animal by-products
- Non-hazardous sediments that are relocated inside surface waters for the purpose of managing waters and waterways or of preventing floods or mitigating the effects of floods and droughts or land reclamation (WFD Article 2(3))
- Wastes that are internally recycled.

For waste treatment, only waste entering facilities for final treatment should be reported, excluding waste pre-treatment. More details on the definitions of internal recycling and final treatment will be provided in section 2.3 on waste treatment.

As indicated above, waste waters are excluded from the Waste Framework Directive to the extent that they are covered by other Community legislation. The treatment of waste waters is covered at EU level by Council Directive of 21 May 1991 concerning urban waste water treatment (91/271/EEC) ⁽²⁾ which regulates the collection and treatment of domestic and industrial waste water. Liquid wastes that are discharged into sewerage systems and urban waste water treatment plants in accordance with the legal provisions are considered as waste water and therefore not subject to waste legislation. Liquid wastes whose discharge to the sewerage system and urban waste water treatment plants is prohibited due to their material properties or composition have to be either pre-treated in industrial waste water treatment plants (on-site effluent treatment plants) before being discharged to the sewer or they have to be treated by appropriate waste treatment processes (e.g. chemico-physical treatment, biogas plants, etc). When treated on-site in industrial waste water treatment plants, the produced sludges will be subject to waste legislation and waste statistics whereas the cleaned water that is discharged to the sewer is waste water that is out of scope.

'BY-PRODUCTS' VERSUS 'ANIMAL BY-PRODUCTS'

Please note that 'by-products' as defined in Article 5(1) of Directive 2008/98/EC must not be confused with the term 'animal by-products' defined in Article 3(1) of Regulation (EC) No 1069/2009 of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption.

The concept of 'by-products' in the meaning of Directive 2008/98/EC was introduced to the Waste Framework Directive to clarify the distinction between waste and non-waste for production residues by defining conditions under which production residues are considered as by-products. By-products are regarded by definition as non-wastes and therefore not subject to waste legislation.

'Animal by-products' are defined in Article 3(1) of Regulation (EC) No 1069/2009 (ABP Regulation) "*as entire bodies or parts of animals, products of animal origin or other products obtained from animals, which are not intended for human consumption*". Regulation (EC) No 1069/2009 aims "*to prevent and minimise risks to public and animal health arising from animal by-products, and in particular, to protect the safety of the food and feed chain*". Animal by-products are classified according to their risk in three categories, i.e. in category 1 (very high risk material), category 2 (high risk material) and category 3 (low risk material)". Animal by-products are excluded from the scope of Directive 2008/98/EC where special treatment is required to avoid risks to public and animal health from such material.

2.1.2.4. Reporting periodicity

Statistics have to be reported every second year starting from 2006. The delay for data transmission is 18 months

⁽¹⁾ Regulation (EC) No 767/2009 of the European Parliament and of the Council of 13 July 2009 on the placing on the market and use of feed, amending European Parliament and Council Regulation (EC) No 1831/2003 and repealing Council Directive 79/373/EEC, Commission Directive 80/511/EEC, Council Directives 82/471/EEC, 83/228/EEC, 93/74/EEC, 93/113/EC and 96/25/EC and Commission Decision 2004/217/EC (OJ L 229, 1.9.2009, p. 1, last amended by OJ L 310, 6.12.2018, p. 22)

⁽²⁾ OJ L 135, 30.5.1991, p. 40, last amended by OJ L 353, 28.12.2013, p. 8)

after the end of the reference year which means for instance that statistics for reference year 2008 will be delivered in June 2010. Countries which are able to produce their data earlier are encouraged to transmit the data as soon as they are available (preferably 15 months after the end of the reference year).

2.2. Waste generation: data set 1

2.2.1. Required variables

Data on waste generation should be reported as total amount of waste generated by all economic sectors and households. As already mentioned, this includes waste produced by treatment facilities, i.e. residues of waste treated in the treatment facilities (secondary waste) and

other waste generated by these facilities as a result of their activities (e.g. consumption residues from offices).

Because residues from waste treatment need to be reported, it is important to determine in which cases this leads to undesired double counting and in which case it does not. As a general rule, it has been decided that treatment residues should only be reported when the treatment did result in a considerable change in the chemical and/or physical structure of the waste. There are, for example, some types of pre-treatment which do not change the structure of the waste; this includes for instance re-packaging (D14) and temporary storage (R13, D15) (Table 5). The inclusion of waste from these pre-treatment operations would result in double counting of the same unaltered waste. Facilities performing such operations should therefore not report waste originating from such operations but only waste generated as a result of other activities (e.g. consumption residues).

TABLE 5

Pre-treatment not changing the physical or chemical nature of the waste

Code	Types of recovery and disposal operations
Disposal operation	
D14	Repackaging prior to submission to any of the operations numbered D 1 to D 13
D15	Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where it is produced)
Recovery operation	
R13	Storage of wastes pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where it is produced)

2.2.1.1. Reporting units

The reporting unit to be used for all waste categories is tonnes of normal wet weight, without decimals ⁽¹³⁾. For the "sludge" categories, i.e. categories 03.2 (industrial effluent sludges both non-hazardous and hazardous); 03.3 (sludges and liquid wastes from waste treatment),¹¹ (common sludges, non-hazardous) and 12.7 (dredging spoils both non-hazardous and hazardous), this would seriously reduce the comparability as these waste streams could contain very different fractions of water. For this reason, the "sludge"

categories have to be reported in dry weight. Countries that have data on sludges in both dry and wet weight are asked to report both figures (dry weight in the data set; wet weight in the quality reports). This would allow Eurostat to compile conversion factors and allow countries that only have data on wet weight to report on dry matter.

Please note: Where sludges are included in other EWC-Stat categories than those mentioned above (for instance in EWC-Stat 01.2 'acids, alkaline or saline wastes' or in 03.1 'chemical deposits and residues'), the sludges shall be reported in their original wet weight.

⁽¹³⁾ Section 4 of Annexes I and II specifies the reporting units which must be used when reporting quantities of waste.

2.2.1.2. Reference period

Waste should be reported the year it has been generated. This could be in some situations difficult to estimate and the year waste has been handed over to waste collectors or special containers can be easier to use.

There can however be great discrepancies between the date of waste generation and the date of handover for some waste categories. For instance, mining waste and construction and demolition waste can be handed over one year after their generation. In such cases, an explanation must be provided in the quality report.

Some enterprises can have special tanks where sludge is stored (e. g. in the case of galvanic processes). These tanks are emptied on demand (but not necessarily every year). If waste generation data are recorded when the tank is emptied, the figures produced can result in rather irregular waste production pattern. In such cases, an explanation must be provided in the quality report.

2.2.1.3. Regional level

Waste generation should be reported at the national level.

2.2.2. Breakdown in sources: Economic Activities and households

2.2.2.1. Definition of NACE classification

Waste generation need to be broken down according to the source (businesses or households) that generated them. Waste generated by businesses is broken down by economic activity in 18 categories based on the statistical classification of economic activities (NACE Rev. 2 for 2008 and thereafter, Statistical Classification of Economic Activities in the European Community) ⁽¹⁴⁾. Households are the 19th category (Table 6).

TABLE 6

Sources for waste generation to be specified in accordance with Section 8 of Annex I on waste generation

Item No	NACE Rev.2 divisions	Code Description
Section A: Agriculture, forestry and fishing		
1	01+02+03	Agriculture, hunting and forestry; Fishing and aquaculture
Section B: Mining and quarrying		
2	04 to 09	Mining and quarrying
Section C: Manufacturing		
3	10+11+12	Manufacture of food products + beverage + tobacco
4	13+14+15	Manufacture of textiles + wearing apparel + leather and related products
5	16	Manufacture of wood and wood products
6	17+18	Manufacture of pulp, paper and paper products + printing and reproduction or recorded media
7	19	Manufacture of coke, refined petroleum products
8	20+21+22	Manufacture of chemicals, chemical products + basic pharmaceutical products and preparations + rubber and plastic products
9	23	Manufacture of other non-metallic mineral products
10	24+25	Manufacture of basic metals + fabricated metal products

⁽¹⁴⁾ The list of NACE sectors can be found on http://ec.europa.eu/eurostat/ramon/index.cfm?TargetUrl=DSP_PUB_WELC

Item No	NACE Rev.2 divisions	Code Description
11	26+27+28+29+30	Manufacture of computer, electronic and optical products + electrical equipment + machinery and equipment + motor vehicles, trailers and semi-trailers + other transport equipment
12	31+32+33	Manufacture of furniture + other manufacturing + repair and installation of machinery and equipment
Section D: Electricity, gas, steam and air conditioning supply		
13	34+35	Electricity, gas, steam and air conditioning supply
Section E: Water supply, sewerage, waste management and remediation activities		
14	36+37+39	Water collection, treatment and supply + Sewerage + Remediation activities and other waste management services
15	38	Waste collection, treatment and disposal activities; materials recovery
Section F: Construction		
16	41+42+43	Construction
Section G to U: Services activities		
17	Sections G - U Excluded 46.77	Wholesale and retail trade; Repair of motor vehicles, motor cycles + Transportation and storage + Accommodation and food service activities + Information and communication + Financial and insurance activities + Real estate activities + Professional, scientific and technical activities + Administrative and support service activities + Public administration and defence; compulsory social security + Education + Human health and social work activities + Arts, entertainment and recreation + Other service activities + Activities of households as employers; undifferentiated goods – and services –producing activities of households for own use + Activities of extraterritorial organisations and bodies
18	46.77	Wholesale of waste and scrap

- As of reference year 2008 NACE Rev. 2 replaces NACE Rev. 1.1. A synopsis of the categories according to NACE Rev. 1.1 and NACE Rev. 2 is shown in Annex III.
- Until reference year 2008, the NACE divisions 01/02 'Agriculture, hunting and forestry' and division 03 'Fishery and aquaculture' were reported separately. As of reference year 2010, these divisions are summarised under one item.

The purpose of the breakdown of waste generation according to sources is to relate the production of waste to business and household activities. The principal activity of a statistical unit (e.g. an enterprise) is defined as the one that contributes most to its value added. ⁽¹⁵⁾ This means that generally the creation of value added is the criterion for the

allocation of any measure, such as waste generation in this case, to NACE activities. Therefore, in order to assign the generated waste to the correct NACE activity, the unit to be considered should be the unit that actually generates the value added and that also causes the waste rather than the unit of the customer. For instance, waste arising from the construction of a building should be assigned to the activity of the construction company itself (NACE F) rather than to the activity of the future building owner (e.g. services)

Recommendations for breakdown: statistical unit

As already mentioned, the waste should be attributed to the economic activity which generates it and hands it over to the waste management sector or takes it directly to a dump or treatment site. The allocation of waste to the 18

⁽¹⁵⁾ See NACE Rev. 2 handbook, chapter 3.1 on classification rules

categories of economic activities therefore depends on the definition of the statistical unit and how these statistical units are linked to economic activities. Annex II, section 8 point 2 requires the attribution to activities on the basis of kind-of-activity units (KAU) and local units (LU). These units are described in Annex I sections D and F of [Council Regulation \(EEC\) No 696/93](#).

Kind-of-activity unit (KAU)

The *kind-of-activity unit* (KAU) groups all the parts of an enterprise contributing to the performance of an activity at class level (four digits) of NACE and corresponds to one or more operational subdivisions of the enterprise.

The KAU was devised as an observation unit in order to improve the homogeneity of the results of statistical surveys by activity and hence the international comparability of these results, since at the level of the enterprise different types of horizontal and vertical integration can be observed at both national and international level.

An entity which only carries out ancillary activities (e.g. bookkeeping, administration) for the enterprise to which it belongs cannot be considered as a separate KAU. A KAU can produce products outside the homogeneous group, on account of secondary activities connected with them, which cannot be separately identified from available accounting documents. Conversely, the KAUs classified under a particular heading in the classification system on the basis of a principal activity do not produce the entire output of homogeneous groups of specific products because the same products can be produced in secondary activities of KAUs falling under some other classification heading

Local unit (LU)

The *local unit* is an enterprise or part thereof (e.g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place. At or from this place economic activity is carried out for which – save for certain exceptions – one or more persons work (even if only part-time) for one and the same enterprise.

With regard to work carried out at different places (maintenance, construction and demolition, etc.), the LU is taken to be the place from which instructions emanate or from where the work is organised.

If a person works in more than one place (waste collection or shipment) or at home, the local unit is taken to be place from which instructions emanate or from where the work is

organized. It must be possible to specify the employment attached to any local unit. However, all legal units that serve as the legal basis for an enterprise or a part thereof must have a local unit which is the registered office, even if nobody works there. Moreover, a local unit can comprise only ancillary activities.

A geographically identified place must be interpreted on a strict basis: two units belonging to the same enterprise at different locations (even within the smallest administrative unit of the Member State) must be regarded as two local units. However, a single local unit may be spread over several adjacent administrative areas, in which case, by convention, the postal address is the determining factor.

The boundaries of the unit are determined by the boundaries of the site, which means for example that a public highway running through does not interrupt the continuity of the boundaries.

Combustion facilities may serve as an illustrative example for the impact of the statistical unit on the attribution of waste to the generating economic activity: Many power plants, waste incinerators and other combustion facilities are directly attached to specific enterprises, such as chemical plants, hospitals, public defence and transport enterprises. However, if KAUs are used as statistical units in these enterprises, then the integrated combustion plants must be separated from the enterprises to which they are physically attached and must be allocated to Section D or Division 38. If LUs are used as statistical units, then integrated combustion plants cannot be separated and their waste must be “spread” over the economy instead of being allocated only to Section D and Division 38.

Recommendations for waste statistics

It makes sense to choose the KAU for the waste generation data. This is the only table which has an activity breakdown. The waste facilities table has a breakdown to regions and, hence, requires to attribute by local units.

In the majority of the cases the equation “Legal unit = local unit = KAU = enterprise” holds. However, big enterprises may consist of more than one legal unit and, hence, also their KAU and their local units. Big enterprises generate more waste than small enterprises and they are more often also responsible for its treatment themselves. Therefore, it is important to put emphasis on a correct reporting in this area. The data may be reported by the legal unit that does the administration of the enterprise, but the data has to be reported for KAU and local units, no matter which unit does the reporting.

For enterprises the KAU may be an abstract concept, moreover, in most countries' business registers the KAU may only be delineated for a small share of enterprises. In case the classification of the waste generating activity cannot be attributed by the KAU it may be approximated by the local unit.

The purpose of the breakdown of waste generation according to sources is to relate the production of waste to business and household activities. Most harmonised business statistics use the enterprise or the kind-of-activity unit (KAU) as the statistical unit. For the sake of consistency, it is recommended that preference should be given to the KAU rather than the LU.

Consistency with business statistics for the delineation of statistical units and the coding of economic activity (NACE) is guaranteed by using the statistical business register. The business register can be used directly as a sampling frame; it can also be used indirectly by matching the waste data collected from administrative sources to the statistical units in the business register. If it is impossible to use the business register in either way, the delineation of statistical units should still adhere as closely as possible to business register practice. The local unit should only be used as a last option.

In either cases, the quality report provided by Member States should give a description of how the chosen statistical unit affects the groupings of NACE Rev. 2 so that statistics comparability is ensured as much as possible among countries.

A problem arises when both KAUs and LUs are used as statistical units and different outcomes are obtained as a result. In order to obtain results which are consistent, all the Member States should be restricted to using one type of statistical unit or an agreement should be reached on the handling of such cases.

2.2.3. Breakdown in waste categories: EWC-Stat classification

2.2.3.1. Definition of EWC-Stat classification

Waste categories are defined on the basis of the Statistical European Waste Classification (EWC-Stat), which is a

substance-oriented nomenclature and which has been specially created for EU waste statistics. The EWC-Stat builds on the European List of waste (LoW) by grouping the LoW entries according to material character. The 51 EWC-Stat categories that must be reported in waste generation include 21 hazardous waste categories and 30 non-hazardous waste categories. The latest version of the EWC-Stat (version 4) is established by Commission Regulation (EU) No 849/2010 ⁽¹⁶⁾.

Countries which use the European List of Waste (LoW) for collecting data on waste generation and treatment can use the table of equivalence that has been established between the LoW and the EWC in order to convert their statistics in EWC categories. This transposition table is also useful for countries using the EWC-Stat for their compilation of waste statistics as it provides useful information on the composition of the waste categories listed in EWC-Stat.

When countries use national waste classifications, they should always convert them into the corresponding classification in EWC-Stat. They should indicate in the quality report the national waste types and conversion practices used.

- In 2010, the breakdown by EWC-Stat categories was revised. Until reference year 2008, waste generation is broken down according to 48 categories defined in WStatR 2002. Since reference year 2010, generation is broken down into 51 categories as described above and as established by Commission Regulation (EU) No 849/2010. A synopsis of the breakdown according to WStatR 2002 and WStatR 2010 is shown in Annex IV.

With the revision of the List of Wastes in 2014 ⁽¹⁷⁾, three new waste entries were introduced. The new entries were integrated in the EWC-Stat by agreement with the Member States without changing Annex III of the Waste Statistics Regulation. The new List of Waste entries and their allocation to Annex III of the WStatR is shown in Table 7.

⁽¹⁶⁾ Commission Regulation (EU) No 849/2010 of 27 September 2010 amending Regulation (EC) No 2150/2002 of the European Parliament and of the Council on waste statistics. The complete list of this classification can also be found on https://ec.europa.eu/eurostat/ramon/other_documents/ewc_stat_4/index.cfm?TargetUrl=DSP_EWC_STAT_4

⁽¹⁷⁾ Commission Decision 2014/955/EU of 18 December 2014

TABLE 7

Allocation of new List of Waste entries to EWC-Stat 4

New List of Waste entry	Allocation to Annex III of WStatR
01 03 10* Red mud from alumina production containing hazardous substances other than the wastes mentioned in 01 03 07	12.31 Waste of natural occurring minerals
16 03 07* Metallic mercury	10.22 Mixed and undifferentiated material
19 03 08* Partly stabilised mercury	13.11 Solidified and stabilised waste

2.2.3.2. Recommendations for breakdown

Almost all combinations of economic activities and waste codes are possible. For instance, businesses other than construction companies can perform in-house construction activities and thus produce construction waste. In the same way, businesses usually discard some household-type waste produced by their staff and clients at the business site. Some waste streams are however produced by a small number of economic activities and are unlikely to occur as a result of other economic activities.

In the following paragraphs, definitions of waste are given as well as examples and main economic activities that produced them. More information can be found in the 'Guidance on classification of waste according to EWC-Stat categories' document ⁽¹⁸⁾. This document should be consulted when a hesitation occurs on the assignment of a waste to any waste source or waste category. It also gives additional information on correspondence between EWC-Stat and List of Waste codes. Guidance on the waste classification based on the List of Wastes is provided in the 'Commission notice on technical guidance on the classification of waste' (2018/C 124/01).

Spent solvents (01.1): item 1. These are hydrocarbons, fluorocarbons, chlorinated carbons; organic halogenated, non-halogenated solvents, including organic washing liquids, and organic fluorinated refrigerants. They are used in chemical industries as reaction agent and in extraction processes, cleaning processes in mechanical engineering and surface treatment and appear almost exclusively in the manufacture of chemicals, chemical products, basic pharmaceutical products and preparations and rubber and plastic products (item 9 of Section 8 of Annex I of the Waste Statistics Regulation). To a lesser extent, this type of waste can also be generated during the fabrication of metal products and during recycling. Separately collected

fractions of spent solvents can be generated by almost all economic activities, including private households.

Acid, alkaline and saline wastes (01.2): items 2/3. These are inorganic acids (like hydrochloridric, sulphuric, phosphoric, nitric acids); alkaline like calcium ammonium, sodium hydroxide and inorganic salts mainly from manufacturing of acids or alkaline and salt slags or solid slags. They mainly originate from surface treatment in metallurgy and equipment's sectors and inorganic chemical processes. In general, acids and alkaline are hazardous except lime mud and degreasing waste without dangerous substances (like oil, heavy metals or cyanides). Saline waste are dangerous when containing dangerous substances like heavy metals, arsenic or oil.

Used oils (01.3): item 4. These wastes are mineral-based, synthetic oils and biodegradable engine oils. This category includes engine, gear, hydraulic and lubricating oils, oils for insulation and heat transmission; emulsions from metal surface shaping and residues from tank cleaning. They originate both from refining process and from mechanical engineering and maintenance of vehicles in all economic activities. Most used oils are collected and treated by a small number of collectors and treatment facilities. Because of the hazards involved, these facilities are monitored and data coverage is quite good with regard to the quantities collected. Problems of comparability arise when used oils are mixed with other substances such as emulsions for metal surface shaping and residues from tank cleaning. All used oils are hazardous.

Chemical wastes (01.4, 02, 03.1): items 5/6. These are solid or liquid spent chemical catalysts; off-specification products and wastes like agro-chemicals, medicines, paint, dyestuff, pigments, varnish, inks and adhesives, including related sludges; chemical preparation waste like preservatives, brake and antifreeze fluids, waste chemicals; tars and carbonaceous waste like acid tars, bitumen, carbon anodes,

⁽¹⁸⁾ Guidance on classification of waste according to EWC-Stat waste categories, version 2, December 2010

tar and carbon waste; fuels, emulsions, sludges containing oil, like bilge oil, waste fuels oil, diesel, petrol, waste from oil water separator; aqueous rinsing and washing liquids, aqueous mother liquors; spent filtration and adsorbent material like activated carbon, filter cakes, ion exchangers. They mainly originate from chemical industry and from various industrial branches producing and using chemical products. They are hazardous when containing toxic chemical compounds, oil, heavy metals or other dangerous substances.

Industrial effluent sludges (03.2): items 7/8. These wastes are sludges and solid residues from industrial waste water treatment including external/physical treatment; solid and liquid wastes from soil and groundwater remediation; sludges from boiler cleaning; wastes from cooling water preparation and cooling columns; drilling mud. Waste water treatment takes place in many manufacturing industries. Industrial effluent sludges are hazardous when containing oil and heavy metals. A problem of comparability among countries might arise when LUs are used as statistical units, as the waste water treatment processes might not be geographically isolated and the sludges might not be attached to the primary activity.

Sludges and liquid wastes from waste treatment (03.3): items 9/10. These waste comprise different types of sludges and liquid wastes from waste treatment facilities. They include wastes from the physico/chemical treatment of hazardous wastes, liquids and sludges from the anaerobic treatment of waste, landfill leachate and effluent treatment sludges from oil regeneration. Sludges and liquid wastes from waste treatment are hazardous and non-hazardous.

Health care and biological waste (05): items 11/12. These wastes comprises waste from health care for animals and humans. They mainly originate from clinics and hospitals, including veterinary activities but can also be produced by industries generating health care and biological products as production wastes and in lower quantities by all economic activities as they all have first-aid kits. Health care and biological waste are hazardous when infectious.

Metallic wastes, ferrous (06.1): item 13. These wastes are ferrous metals (iron, steel) and alloys. They include wastes like mill scales from the iron and steel industry, metal filings, turnings and particles from metal processing, construction and demolition waste, discarded moulds from ceramic production, metals from mechanical treatment and shredding of waste, and metals removed from waste incineration slag. The ferrous metal wastes covered by category 06.1 are non-hazardous.

Metallic wastes, non-ferrous (06.2): item 14. These wastes are non-ferrous metals (aluminium, copper zinc, lead, tin, etc.) and alloys. They include wastes like metal filings, turnings and particles from processing of non-ferrous metals, hard zinc from galvanising processes, cables, construction and demolition waste, components from ELV dismantling and metals from mechanical treatment and shredding of waste. Non-ferrous metal wastes covered by category 06.2 are non-hazardous.

Metallic wastes, mixed ferrous and non-ferrous (06.3): item 15. These wastes are mixtures of ferrous and non-ferrous metals and alloys or unspecified metal wastes. They include mixed metals from construction and demolition, mixed metals from separate collection (e.g. metal packaging) and unspecified metal waste the agricultural sector. Mixed metal wastes covered by category 06.3 are non-hazardous.

Glass wastes (07.1): items 16/17. These wastes can be waste from glass packaging, glass waste from production of glass and glass products, waste glass from sorting and recycling processes. Glass waste occurs in a small number of production sectors (construction and demolition, recycling of end-of-life vehicles and electrical, electronic equipment and glass manufacturing) and also as a result of the separate sorting by businesses and households, but can be generated by all economic activities as consumption residues or packaging. Glass wastes are hazardous in case of glass powder (particle size relevant) and when containing heavy metals.

Paper and cardboard wastes (07.2): item 18. These wastes are paper and cardboard from sorting and separate sorting by businesses and households. This category includes fibre, filler and coating rejects from pulp, paper and cardboard production. These wastes are largely generated by three activities: separate collection, mechanical treatment of waste and pulp, and paper and cardboard production and processing. All paper and cardboard wastes are non-hazardous.

Rubber wastes (07.3): item 19. These wastes are only end-of-life tyres which come from maintenance of vehicles, and end-of-life vehicles. All rubber wastes are non-hazardous. They can be generated in all economic activities.

Plastic wastes (07.4): item 20. These are plastic packaging; plastic waste from plastic production and machining of plastics; plastic waste from sorting and preparation processes; separately collected plastic waste. They originate from all economic activities as packaging waste, from industries producing plastic products and from separate sorting by businesses and households. All plastic wastes are non hazardous. A distinction should be made between

plastic waste and mixed packaging (mixed and undifferentiated materials, items 36/37).

Wood wastes (07.5): items 21/22. These wastes are wooden packaging, sawdust, shavings, cuttings, waste bark, cork and wood from production of pulp and paper, wood from construction and demolition of buildings, separately collected wood waste. They mainly originate from wood processing, pulp and paper industry and demolition of buildings but can occur in all economic activities in smaller quantities due to wooden packaging. Wood wastes are hazardous when containing hazardous substances like mercury or tar based wood preservatives.

Textile wastes (07.6): item 23. These wastes are textile and leather waste; textile packaging; worn clothes and used textiles; waste from fibre preparation and processing; waste tanned leather; separately collected textile and leather waste. They originate from only a small number of activities: the leather and fur industry, the textile industry, the mechanical treatment of waste and separate collection. All textile wastes are non-hazardous.

Waste containing PCB (07.7): item 24. These wastes are PCB-containing oils (e.g. hydraulic oil, insulation and heat transmission oil from transformers); electrical equipment (and components thereof) containing or contaminated with PCB-containing oils (transformers, capacitors); construction and demolition wastes containing PCB (e.g. sealants and resin-based floorings). They originate from construction and demolition sector, from mechanical treatment of waste, from the energy sector, and in lower quantities from all industries still discarding PCB containing equipment or components. All waste containing PCB are hazardous. Metallic parts, like transformer carcasses or metal casings of capacitors, that are contaminated with PCBs are reported under this category and not under metals (06).

Discarded equipment (08 excl. 08.1, 08.41): items 25/26. These wastes are discarded electrical and electronic equipment (e.g. small and large household equipment, IT equipment, electric tools) and fluorescent tubes. Batteries and end-of-life vehicles are excluded from this category as they should be reported in items 28/29 and 30/31, respectively. They can be generated by all economic activities and need to be separately collected in accordance with EU directives on electrical and electronic equipment ⁽¹⁹⁾.

Discarded vehicles (08.1): items 27/28. These are all kinds of end-of-life vehicles. They originate from businesses and households. Discarded vehicles are hazardous when containing dangerous substances (e.g. cooling liquids, engine oil or fuel, chlorofluorocarbons from air conditioning).

Batteries and accumulators wastes (08.41): items 29/30. These wastes mainly originate from households although they can be produced in lower quantities by all economic activities. Batteries and accumulators are hazardous when containing dangerous substances; e.g. nickel, cadmium, mercury, lead and unsorted batteries and accumulators wastes.

Animal and mixed food wastes (09.1): item 31. These wastes are animal and mixed wastes from food preparation and products, including sludges from washing and cleaning; separately collected biodegradable kitchen and canteen waste, and edible oils and fats. They originate from food preparation and production (agriculture and manufacture of food and food products) and from separate collection. Animal and mixed waste of food preparation and products are non-hazardous.

Vegetal wastes (09.2): item 32. These wastes are vegetal wastes from food preparation and products, including sludges from washing and cleaning, materials unsuitable for consumption and green wastes. They originate from food and beverage production, and from agriculture, horticulture and forestry. Vegetal wastes are non-hazardous.

Animal faeces, urine and manure (09.3): item 33. These wastes are slurry and manure including spoiled straw. They originate from agriculture. Animal faeces, urine and manure are non-hazardous.

Household and similar wastes (10.1): item 34. These wastes are mixed municipal waste, bulky waste, street cleaning waste like packaging, kitchen waste, household equipment except separately collected fractions. They originate mainly from households but can also be generated by all economic activities in canteens and offices as consumption residues. Household and similar wastes are non-hazardous.

Mixed and undifferentiated materials (10.2): items 35/36. These are unspecified and mixed waste without any general waste source. This category covers not only mixed packaging, but also mainly residual categories from different branches of industry (food production, textile industry, combustion plants, surface treatment of metals

⁽¹⁹⁾ Directive (EC) 2002/96 of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment and Directive (EC) 2002/95 of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

and plastics, etc.). These residual categories are often used for nation-specific waste codes. Mixed and undifferentiated materials are hazardous when containing heavy metals or organic pollutants.

Sorting residues (10.3): items 37/38. These wastes are sorting residues from mechanical sorting processes for waste; combustible waste (refuse derived fuel); non composted fractions of biodegradable waste. They mainly originate from waste treatment and separate collection and also from pulp, paper and cardboard production and processing. Sorting residues from demolition activities are excluded. They are hazardous when containing heavy metals or organic pollutants.

Common sludges (11): item 39. These are waste water treatment sludges from municipal sewerage water and organic sludges from food preparation and processing. They mainly originate from households and industrial branches with organic waste water (mainly pulp and paper as well as food preparation and processing). They can also occur in waste water treatment plants or in anaerobic treatment of waste. All common sludges are non hazardous. Comparability can be problematic between countries using different statistical units as they will not assign the waste to the same economic activity.

Mineral waste from construction and demolition (12.1): item 40/41. These are concrete, bricks, and gypsum waste; insulation materials; mixed construction wastes containing glass, plastic and wood; waste hydrocarbonised road-surfacing material. They originate from construction and demolition activities. They are hazardous when containing organic pollutants.

Other mineral wastes (12.2, 12.3, 12.5): items 42/43. These are waste gravel, crushed rocks, waste sand and clays, muds and tailings from extractive industries; blasting materials, grinding bodies, sludges, particulates and dust from manufacture of glass, ceramic goods and cement; casting cores and moulds from casting of ferrous and non-ferrous pieces; linings and refractories from thermal processes; asbestos materials from all branches (asbestos processing, -cement, brake pads etc.). They are hazardous when containing asbestos, oil or heavy metals.

Combustion wastes (12.4): items 44/45. These are wastes from flue gas cleaning (desulphurisation sludges, filter dust and cakes, fly ashes); slags, drosses, skimmings, boiler dusts, and ashes from thermal processes. They originate from any thermal and combustion process (power stations and other combustion plants, thermal metallurgy, casting of ferrous and non-ferrous pieces, manufacture of glass and glass products, manufacture of ceramic goods, bricks, tiles and

construction products, manufacture of cement, lime and plaster). Combustion wastes are hazardous when containing organic pollutants, oil and heavy metals.

Soils (12.6): items 46/47. These wastes are soils and stones that originate mainly from construction activities, excavation of contaminated sites and soil remediation. They are hazardous when containing organic pollutants, heavy metals or oil.

Dredging spoils (12.7): items 48/49. These are wastes that mainly come from construction and maintenance of water projects, dredging and subsurface work. They are hazardous when containing heavy metals or organic pollutants.

Mineral waste from waste treatment and stabilised wastes (12.8, 13): items 50/51. These are wastes from the incineration and pyrolysis of waste (bottom ash, slag, fly ash, sands from fluidised beds, boiler dust, filter cake from gas treatment; mineral fraction from mechanical treatment of waste; wastes from treatment processes that solidify waste, stabilise or neutralise dangerous substances by a chemical reaction or vitrify waste in a thermal process. The wastes are hazardous when containing organic pollutants or heavy metals, or when only partly stabilised.

2.2.4. Recommendations for specific issues

2.2.4.1. Allocation of discarded vehicles to economic activities and households

The comparison of data on the generation of 'discarded vehicles' across countries has shown significant discrepancies in previous reference years which seriously hamper the comparability and the interpretation of the data. The discrepancies are assumed to result from the use of different data sources and collection methods in the countries on one hand, and from a different application of the WStatR concept on the other hand. Differences are observed in particular with regard to two aspects: Whereas some countries report the amount of discarded vehicles at two stages, firstly as hazardous waste before depollution, and secondly as depolluted non-hazardous waste after pre-treatment, other countries report the vehicles only once, either as hazardous or as non-hazardous waste. As a result, the generated amounts are not comparable across countries, neither at the level of the waste category total, nor at the level at the non-hazardous or hazardous category respectively.

The allocation of discarded vehicles to the generating source is handled differently in the countries. Whereas some countries allocate all or nearly all discarded vehicles to only one source, which is either the 'households' or the 'service activities' (NACE G - U, excl. 46.77), other countries may report zero tonnes under 'households' and allocate all vehicles to other economic activities.

In order to provide for a harmonised reporting of the data on 'discarded vehicles', the countries are asked to proceed as follows:

- Discarded vehicles shall preferably be reported as hazardous primary waste and, in that case, they shall not be reported again as de-polluted non-hazardous vehicles.
- Discarded vehicles shall be assigned to the generating source (NACE and households). Where the origin of vehicles is not known the respective amounts shall be reported under the activity 'services' (NACE section G-U except class 46.77)

Countries are furthermore encouraged to compare the WStatR data on 'discarded vehicles' with the data on the generation of end-of-life vehicles (ELV) reported under Directive 2000/53/EC (ELV Directive). The definition of the EWC-Stat category 'discarded vehicles' is broader than that of 'end-of-life vehicles' (ELV) according to the ELV Directive. Discarded vehicles may include not only passenger cars and small trucks covered by the ELV Directive but all types of vehicles, including heavy trucks, off-road machinery, ships, trains, etc. The amounts of 'discarded vehicles' should

therefore be equal or higher than the amount of ELV for the same reference year. The difference between both figures should be explainable by the broader coverage of the waste category 'discarded vehicles'. The case that the arising of discarded vehicles is lower than that of ELVs is considered implausible. The countries will be asked for an explanation in such cases.

Wastes that arise in the course of the maintenance or repair of vehicles, like oils, batteries, oil filters, tires etc., are considered to be generated by the statistical unit that carries out the maintenance or repair work, regardless of who owns the vehicle. If vehicles are repaired in workshops, the corresponding wastes are to be reported under 'services' (NACE G-U, excl. G4677). If companies maintain and repair their own vehicles within the company, the waste is to be assigned to the company's economic activity. If vehicles are maintained or repaired by their private owners, the corresponding wastes are to be assigned to 'households'.

2.2.4.2. wet-dry data on sludges

The 'sludge' categories could contain very different fractions of water. Therefore, a reporting in wet weight would hamper the comparability. Table 8 shows a list of the affected waste streams, i.e. all waste items representing sludges which are to be reported in dry weight, based on the current reporting formats.

TABLE 8

Overview on affected waste streams in the tables on waste generation and treatment

Item	EWC-Stat	Description	HAZ/NHAZ
7	03.2	Industrial effluent sludges	NHAZ
8	03.2	Industrial effluent sludges	HAZ
9	03.3	Sludges and liquid waste from waste treatment	NHAZ
10	03.3	Sludges and liquid waste from waste treatment	HAZ
39	11	Common sludges	NHAZ
48	12.7	Dredging spoils	NHAZ
49	12.7	Dredging spoils	HAZ

Starting with the reference year 2008, countries should report sludges in dry weight only. In the original 2004 data, less than half of the countries reported both the dry and the wet value. On the basis of these countries' data, conversion factors were established in which were made available to the countries in 2008 and have been in use also for imputations done by Eurostat on missing data 2004 and 2006 ⁽²⁰⁾.

Since reference year 2008, when only dry values were to be reported for sludges, countries which have data on sludges available in both dry and wet weight have been asked to report their figures for wet weight in the quality reports. By means of these data, combined with the reported values in dry weight, new conversion factors were calculated in 2017, based on an analysis of the quality reports 2008 to 2014. In the analysis, an overall of 239 factors of 28 countries were investigated, of which 181 were excluded for the following reasons:

- Eurostat factor used (59),
- Implausible (37),
- Newer value available (85).

The results of the analysis are presented in Table 9. They represent the results for the totals over all activities due to the lack of data on sector level. The average factors are presented as mean and weighed mean, minimum and maximum are displayed in addition, as is the number of factors, the averages are based on. The weighed mean was calculated in addition to the mean because it better represents the overall management of sludges in the EU, despite being less stable from the influence of larger countries. The old factors published in 2008 are shown for comparison. The grey shaded cells represent factors which did not exist back in 2008, prior to the revision of the EWC-Stat classification.

TABLE 9

Conversion factors for calculating dry weight from the wet weight of sludges by waste items (values represent the ratio dry weight to wet weight)

EWC-Stat	Waste description	HAZ/NHAZ	Conversion factors 2017					Conversion factor 2008
			N	Mean	Weighed mean	Min	Max	
03.2	Industrial effluent sludges	NHAZ	16	0.28	0.23	0.15	0.70	0.27
03.2	Industrial effluent sludges	HAZ	12	0.27	0.26	0.13	0.57	0.27
03.3	Sludges & liquid waste from waste treatment	NHAZ	4	0.25	0.20	0.14	0.32	
03.3	Sludges & liquid waste from waste treatment	HAZ	4	0.32	0.35	0.28	0.35	
11	Common sludges (excl. dredging spoils)	NHAZ	14	0.23	0.20	0.11	0.49	0.20
12.7	Dredging spoils	NHAZ	11	0.37	0.49	0.18	0.59	0.50
12.7	Dredging spoils	HAZ	2	0.37	0.50	0.20	0.54	

The basis for the calculation (number of available factors between 2 and 4) is fairly small for those sludges for which no conversion factor 2008 exists (EWC-Stat 3.3 and 12.7 - hazardous). Much higher numbers of factors between 11 and 16 existed for the calculation for the sludge categories listed in the quality report. More specifically, it can be seen

that for EWC-Stat 03.2 (Industrial effluent sludges), the means and weighed means are similar to the existing factors both for hazardous and non-hazardous waste. The same applies to EWC-Stat 11 (Common sludges (excl. dredging spoils)). For these three categories it is recommended to keep the old factors.

⁽²⁰⁾ See Working Group Document Doc. WASTE WG 79/3.1 b (2008), Wet – dry conversion of sludges.

The factors marked in bold might serve for updating the existing factors or the implementation of new factors. For non-hazardous EWC-Stat 12.7 (Dredging spoils), the mean calculated from 11 available countries' factors (0.37) is lower than the existing 2008 factor (0.5), and it is the same as the value calculated from only two available factors for the new hazardous category (see 12.7 HAZ). However, the weighed means (marked in *italics*) for both categories of dredging spoils are fairly close to the old factors. Nevertheless, the minimum (0.18 and 0.20 for non-hazardous and hazardous dredging spoils, respectively) and maximum (0.59 and 0.54 for non-hazardous and hazardous dredging spoils, respectively) values indicate that the new means in bold (0.37) are reasonable for updating the factors.

For the new category EWC-Stat 3.3, no factors exist for comparison and the data basis is small, so that the mean or weighed means might be used as provisional new factors. Looking at the minimum and maximum values again, it can be seen that the means better reflect this range than the weighed means which are, with 0.20, either close to the minimum (0.14), for the non-hazardous category, or even equal to the maximum (0.35) for the hazardous category.

2.3. Waste treatment: data set 2

Data collection on waste treatment as laid down in Annex II of the WStatR is closely linked to the definitions of Directive 2008/98/EC. Accordingly, waste treatment is understood as generic term for all recovery and disposal operations including preparatory operations.

Recovery means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy (see WFD Article 3(15)).

Recycling is a subset of recovery and "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 (e.g. composting, anaerobic digestion, ...) but "does not include energy recovery and the reprocessing

into materials that are to be used as fuels or for backfilling operations" (see WFD Article 3(17)).

Preparing for re-use is also subset of recovery and "means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing" (see WFD Article 3(16)).

Disposal "means any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy" (see WFD Article 3(19)).

Lists of treatment operations are set out in Annex I (Disposal operations) and Annex II (Recovery operations) of Directive 2008/98/EC. The lists of R and D operations build the basis for the breakdown of data by treatment categories (see chapter 2.3.2)

2.3.1. Required variables

Data on waste treatment should be reported as total amount of waste entering recovery and disposal facilities ⁽²¹⁾ for final treatment in the country.

- In case of disposal, the final treatment is for most of the waste the thermal treatment or the final deposit on a landfill. For specific wastes other disposal operations may apply (see D2 to D4, D6, D7 in Table 11).
- In case of recovery, the final treatment step is either the incineration of waste for energy recovery, or the treatment step where the waste ceases to be waste because it is turned into a product or used in another way where it replaces primary material. Concerning the point where the waste ceases to be waste, the provisions of the Waste Framework Directive apply.
- In case of recycling, the final treatment step frequently takes place in production facilities like, for instance, paper mills, glass works or metal works. These facilities may not need a waste permit according to national legislation but are nevertheless covered by Annex II of the WStatR. In case that these production facilities should not be covered by a survey the respective countries have to make sure that the waste flows destined for recycling are covered by other means (e.g. by output data of pre-treatment facilities).

⁽²¹⁾ The term recovery and disposal facility means a facility that requires a permit or registration pursuant to Articles 23 to 27 of Directive 2008/98/EC.

END-OF-WASTE CRITERIA ACCORDING TO THE WASTE FRAMEWORK DIRECTIVE

Article 6(1) of the Waste Framework Directive allows to define for certain wastes material-specific criteria to determine when the respective material ceases to be waste. This mechanism is intended to encourage recycling by creating legal certainty on the end-of-waste for materials destined for recycling.

The Commission laid down a set of end-of-waste criteria for the following waste streams:

- Iron, steel and aluminium scrap (see Council Regulation (EU) N° 333/2011)
- Glass cullet (see Commission Regulation (EU) N° 1179/2012)

- Copper scrap (see Commission Regulation (EU) N° 715/2013)

The End-of-Waste mechanism leads to changes concerning the final treatment step for the concerned materials. The final waste treatment may then take place in treatment plants that prepare the waste for the recycling in production facilities. Instructions on how to report in such cases are provided in chapter 2.3.1.1.

2.3.1.1. Recovery and disposal operations covered by the Waste Statistics Regulation

The recovery and disposal operations to be reported under the Waste Statistics Regulation are listed in Table 10 and Table 11. The listed treatment operations are described in more detail in chapter 2.3.2.

TABLE 10**Recovery operations pursuant to Annex II of the Waste Framework Directive**

Code	Types of recovery operations
R1	Use principally as a fuel or other means to generate energy
R2	Solvent reclamation/regeneration
R3	Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)
R4	Recycling/reclamation of metals and metal compounds
R5	Recycling/reclamation of other inorganic materials
R6	Regeneration of acids or bases
R7	Recovery of components used for pollution abatement
R8	Recovery of components from catalysts
R9	Oil re-refining or other reuses of oil
R10	Land treatment resulting in benefit to agriculture or ecological improvement
R11	Use of wastes obtained from any of the operations numbered R1 to R10

Please note: The treatment operation R12 *Exchange of waste for submission to any of the operations numbered R 1 to R 11*, which covers a variety of preliminary treatment operations, is not covered by the Waste Statistics Regulation. The input to R12 operations shall therefore not be reported. However, the outputs from R12 operations shall be reported in those cases where R12 is the final treatment step before the waste leaves the waste regime. This applies in the following cases:

- the output fulfils end-of-waste criteria and leaves the waste regime.
- waste products or materials are prepared for re-use and cannot be measured at any other point.

Treatment operation R12 is describe in more detail in chapter 2.3.2.

TABLE 11**Disposal operations pursuant to Annex I of the Waste Framework Directive**

Code	Types of disposal operations
D1	Deposit into or onto land (e.g. landfill, etc.)
D2	Land treatment (e.g. biodegradation of liquid or sludgy discards in soils, etc.)
D3	Deep injection (e.g. injection of pumpable discards into wells, salt domes or naturally occurring repositories, etc.)
D4	Surface impoundment (e.g. placement of liquid or sludgy discards into pits, ponds or lagoons, etc.)
D5	Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment, etc.)
D6	Release into a water body except seas/oceans
D7	Release into seas/oceans including sea-bed insertion
D10	Incineration on land
D12	Permanent storage (e.g. emplacement of containers in a mine, etc.)

2.3.1.2. Exclusion of some recovery and disposal operations, pre-treatment

Some recovery and disposal operations fall out of the scope of reporting for Annex II (see Table 12) This list specifically excludes disposal and recovery operations defined as preparatory operations as well as the temporary storage of waste (R13, D15). Also excluded is disposal operation D11 'incineration at sea' since this treatment option is banned by

international agreements. The excluded treatment operations are described in more detail in chapter 2.3.2.

Please note: In those cases where a treatment operation listed in Table 12 produces an output that fulfils the legally established End-of-Waste criteria and thus leaves the waste regime, this waste stream shall be reported under the WStatR even if the corresponding treatment operation is otherwise excluded from reporting.

TABLE 12**Treatment operations excluded from reporting on waste treatment: pre-treatment, temporary storage and incineration at sea**

Code	Types of recovery and disposal operations
Disposal operations	
D8	Biological treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12
D9	Physico-chemical treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12 (e.g. evaporation, drying, calcination, etc.)
D11	Incineration at sea
D13	Blending or mixing prior to submission to any of the operations numbered D 1 to D 12
D14	Repackaging prior to submission to any of the operations numbered D 1 to D 13

Code	Types of recovery and disposal operations
D15 ⁽¹⁾	Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where it is produced)
Recovery operations	
R12	Exchange of wastes for submission to any of the operations numbered R 1 to R 11
R13 ⁽¹⁾	Storage of wastes pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where it is produced)

(1) Temporary storage.

2.3.1.3. Exclusion of co-incineration plants using specific biomass wastes

Excluded from Annex II of the Waste Statistics Regulation are co-incineration plants in the meaning of Directive 2010/75/EU on industrial emissions⁽²²⁾ ⁽²³⁾ that use as a fuel only the following biomass wastes:

- vegetable waste from agriculture and forestry;
- vegetable waste from the food processing industry;
- fibrous vegetable waste from virgin pulp production and from production of paper from pulp;
- uncontaminated wood waste (excluding wood from construction and demolition or other wood waste that may contain halogenated organic compounds or heavy metals);
- cork waste.

This means that no statistics have to be compiled on:

- the number and capacity of such co-incineration facilities, and
- the amount of waste treated in such facilities.

It is important to emphasise that the exemptions refer only to co-incineration plants that use no other wastes than the biomass wastes listed above. Statistics have to be compiled for:

- all co-incineration plants that use as a fuel other wastes than those listed above;
- all incineration plants dedicated to the thermal treatment of waste, with or without energy recovery.

The exclusions concerning biomass waste shall provide for coherence with the scope of Directive 2010/75/EU, chapter IV establishing special provisions for waste incineration

plants and waste co-incineration plants, on the incineration of waste.

2.3.1.4. Exclusion of internal recycling

No statistics have to be compiled for waste that is recycled on the site where the waste is generated; i.e. internal recycling. Internally recycled waste is excluded from reporting on waste generation (Annex I) and from reporting on waste treatment (Annex II). This provision of the Waste Statistics Regulation aims to exclude from reporting the recycling of waste which is an integral part of the production process.

'Recycling' is defined in Directive 2008/98/EC and illustrated by a list of included and excluded operations below.

The 'site of waste generation' is generally understood as the local unit. Only in the case that the local unit of a company comprises several kind-of-activity units (KAU), the term 'site of waste generation' refers to the KAU. The latter case will be relevant only for big companies.

Internal recycling includes the following operations where they take place at the site of waste generation:

- the reprocessing of production waste (e.g. of cuttings, shavings, rejects, etc.) in the same or a similar process by which it was generated, as typically carried out in the paper and glass industry, in steel works, or other sectors of the manufacturing industry ('traditional' recycling);
- the regeneration of spent process materials in order to be reused for the same or a similar purpose (e.g. regeneration of spent solvents, waste oils, acids and bases, catalysts, adsorbents);

⁽²²⁾ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Recast) (OJ L 334, 17.12.2010, p. 17)

⁽²³⁾ Co-incineration facilities are defined in Art. 3(41) of Directive 2010/75/EU on industrial emissions as follows: 'Co-incineration plant' means any stationary or mobile technical unit whose main purpose is the generation of energy or production of material products and which uses waste as a regular or additional fuel or in which waste is thermally treated for the purpose of disposal through the incineration by oxidation of waste as well as other thermal treatment processes, such as pyrolysis, gasification or plasma process, if the substances resulting from the treatment are subsequently incinerated

- the (re)use of bitumen, gravel or other wastes at road works directly at the construction site.

Internal recycling excludes:

- any disposal operation, such as the disposal of waste at a company's own landfill;
- energy recovery operations;

any backfilling operation (see chapter 2.3.2.3 item 3b)

These two lists are not exhaustive and can be extended when necessary.

Enterprises which recycle waste internally may also receive waste from other companies for recycling. In these cases, statistics should include recycling of external waste and exclude recycling of internal waste.

Figure 2 illustrates the coverage of the Waste Statistics Regulation with regard to internal recycling, taking an automotive manufacturer as an example. The facility includes a coating line for automobiles, a facility for the

regeneration of waste solvents, a heating installation and a landfill. The dashed frame represents the manufacturer's production site. Black arrows show the waste flows covered by the Waste Statistics Regulation, whereas the dashed arrows indicate the internally recycled waste flow not covered by the Regulation.

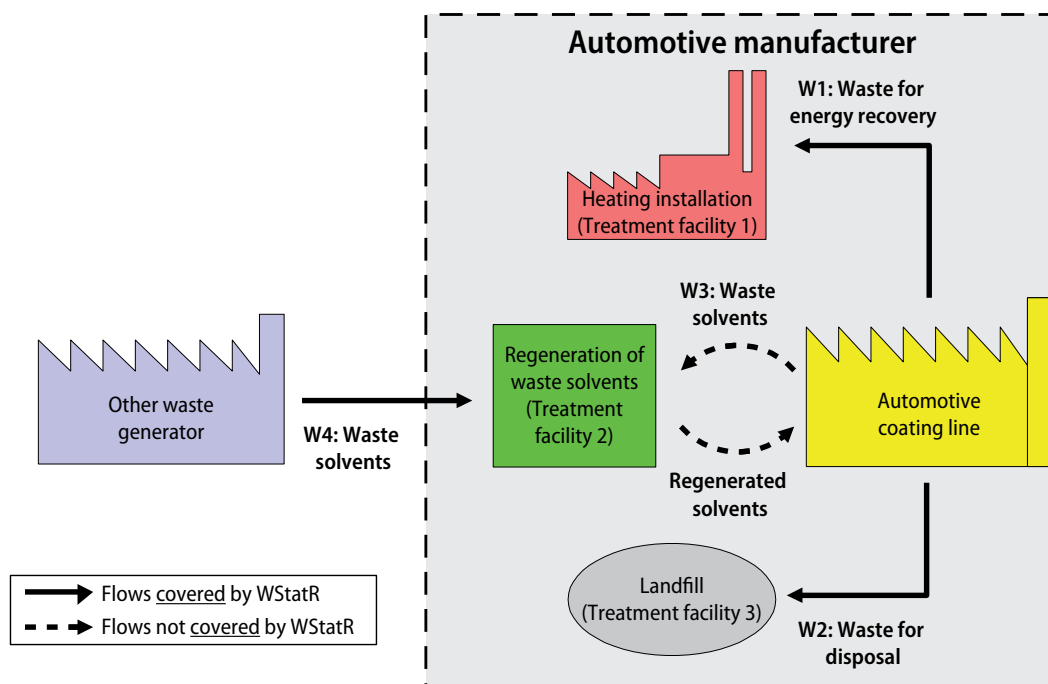
The solvent reprocessing plant regenerates waste solvents which are generated by the manufacturer's local coating facility but also receives and reprocesses waste solvents from external waste generators.

The Waste Statistics Regulation does not cover the quantities of waste solvents generated and reprocessed at the production site (waste flow W3), but it does cover the quantities of solvents received from outside (W4).

Note that waste entering treatment facility 1 (heating installation) and waste entering treatment facility 3 (landfill) are included in the waste that fall in the scope of the Regulation as it is not recycling.

FIGURE 2

Example of the scope of the Waste Statistics Regulation with regard to internal recycling



2.3.1.5. Reporting units

Reporting units are the same as those for waste generation:

- All waste categories except for the sludges mentioned in the next bullet point shall be reported in tonnes of normal wet weight.
- Sludges (EWC-Stat categories 03.2, 03.3, 11 and 12.7) shall be reported in dry weight.

2.3.1.6. Reference period

Statistics must be compiled for all waste which undergoes one of the treatment operations listed in Table 10 or Table 11 during the reference year. Waste is considered to be treated when it enters the treatment process.

2.3.1.7. Regional level

Statistics on waste treatment have to be compiled on the national level.

2.3.2. Breakdown in treatment types

Statistics on waste treatment are broken down into the following five treatment categories:

- Item 1: energy recovery (R1)
- Item 2: waste incineration (D10)
- Item 3: recovery (other than energy recovery) (R2 to R11)
 - Item 3a: recycling
 - Item 3b: backfilling
- Item 4: landfilling (D1, D5, D12)
- Item 5: other forms of disposal (D2, D3, D4, D6, D7).

The recovery and disposal operations, as defined in Annex I and II of the Waste Framework Directive must be understood and applied in a consistent way so that the data produced are comparable.

The European Court of Justice established the following basic principles for distinguishing between recovery and disposal operations ⁽²⁴⁾:

- The decision as to whether the treatment of waste constitutes a recovery operation depends on the principal objective of the operation.
- The principal objective of a recovery operation must be that the waste serves a useful purpose in replacing other materials which would have had to be used for that purpose.

These basic principles should generally be applied as a first step when classifying a waste treatment process.

2.3.2.1. Item 1: Energy recovery (R1)

The treatment operation *R1 Use principally as a fuel or other means to generate energy* covers the incineration and co-incineration of waste in power stations and industrial facilities such as cement kilns so that the resultant energy can be used to generate heat or electricity. Common examples of energy recovery are:

- the use of tyres, waste oils, or spent solvents in cement kilns;
- the co-incineration of sewage sludge or refuse-derived fuel (RDF) from municipal waste in power stations.
- To be classified as an energy recovery operation, the incineration of waste must meet the following criteria ⁽²⁵⁾:
- The main purpose of the operation must be to use the waste as a means of generating energy, replacing the use of a source of primary energy.
- The energy generated by, and recovered from, combustion of the waste must be greater than the amount of energy consumed during the combustion process (net energy production).
- The surplus energy must effectively be used, either immediately in the form of the heat produced by incineration or, after processing, in the form of electricity.
- The greater part of the waste must be consumed during the operation and the greater part of the energy generated must be recovered and used.

R1 also includes incineration facilities dedicated to the processing of municipal solid waste under the condition that their energy efficiency is equal to or above the level set in Annex II of the Waste Framework Directive (footnote to recovery operation R1) and referred to as R1 energy efficiency formula. The application of the efficiency formula is specified and explained in the document '*European Guidance for the use of the R1 energy efficiency formula for incineration facilities dedicated to the processing of Municipal*

⁽²⁴⁾ Judgment in case C-6/00

⁽²⁵⁾ Established by the EJC's rulings in the cases C-228/00 and C-458/000

Solid Waste according to Waste Framework Directive 2000/98/EC, Annex II, R1 formula' (26).

Please note that the preparation of secondary fuels by treatment operation R12 shall also be reported under item 1 'energy recovery' if the secondary fuel produced is a product and will therefore not be recorded as waste at the entry into the final recovery step.

Item 1 does not cover:

- The combustion of municipal solid waste in incineration facilities that do not fulfil the energy efficiency standards set in Annex II of the Waste Framework Directive (à Item 2).
- The combustion of non-municipal waste in dedicated waste incineration plants where the main purpose of the operation is the thermal treatment of the waste and not the production of energy (à Item 2).
- The combustion of biogas produced by anaerobic digestion, as the biogas is a product and therefore its combustion is no waste treatment.

2.3.2.2. Item 2: Waste incineration (D10)

Disposal operation *D10 Incineration on land* covers the incineration of waste where the main purpose of the incineration is the thermal treatment of waste in order to reduce the volume and the hazardousness of the waste, and to obtain an inert product which can be disposed of. This primarily includes incineration plants dedicated to the thermal treatment of wastes by oxidation or other thermal treatment processes (e.g. pyrolysis, gasification or plasma processes) (27), with or without recovery of the combustion heat generated. The most common examples are:

- municipal solid waste incineration plants (unless they fulfil the energy efficiency standards set in Annex II of the Waste Framework Directive);
- hazardous waste incineration plants;
- sewage sludge incineration plants;
- incineration plants for clinical waste;
- incineration plants for animal carcasses.

D10 also covers the incineration of waste in co-incineration plant (28) where the waste undergoes thermal treatment rather than being used as a fuel.

Item 2 does not cover:

- the use of waste as fuel for energy production (à Item 1);

2.3.2.3. Item 3: Recovery (excluding energy recovery) (R2 – R11)

In Item 3, the Waste Statistics Regulation lists all operations which may lead to the recovery of waste, apart from energy recovery and preparatory treatment operations. The R-codes covered by Item 3 differ considerably with regard to their level of specification. While some operations are quite specific, others are very general and cover a wide range of waste types and activities. They can be divided into four different groups:

- six operations deal with the recovery of clearly defined, specific waste streams (solvents (R2), metals (R4), acids and bases (R6), pollution abatement components (R7), catalysts (R8), and waste oils (R9));
- two operations cover the reclamation and recycling of all organic substances (R3) and inorganic substances (R5) which do not belong to one of the specific waste streams above;
- a specific code covers the use of waste as fertiliser or soil improver in agriculture or for other ecologically beneficial purposes (R10);
- a specific code covers recovery of secondary waste from recovery operations (R11).

In order to produce data that approximately reflect the recycling of waste as defined in the Waste Framework Directive, item 3 is further broken down into 3a 'recycling' and 3b 'backfilling'.

Please note: The WStatR contains no separate treatment category for the preparing for reuse of waste. These amounts shall therefore be reported under item 3a 'recycling' (29). Preparing for re-use usually takes place in pre-treatment facilities under the recovery operation R12. e.g. in the course of the dismantling of discarded vehicles and equipment or through sorting of bulky waste. The output from these pre-treatment facilities is the only measurement point where the amounts prepared for reuse can be measured. These amounts shall therefore be reported under the WStatR, even if the treatment operation R12 is otherwise excluded from reporting.

(26) The guidance is available at: <https://ec.europa.eu/environment/pdf/waste/framework/guidance.pdf>

(27) Within the meaning of the Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions; Article 3 (41).

(28) Within the meaning of the Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions; Article 3 (41).

(29) Pursuant to Directive 2008/98/EC, 'preparing for re-use' is not a sub-set of 'recycling' but an own type of treatment which is preferable to recycling according to the waste hierarchy in Article 4 of the Directive. The corresponding quantities should nevertheless be reported under recycling, as the WStatR does not provide for a separate treatment category for 'preparing for re-use'.

Item 3a: Recycling

Item 3a comprises the following operations:

R2 Solvent reclamation/regeneration covers all treatment activities, whose purpose is the regeneration or recovery of spent solvents, e.g.:

- re-refining of solvents in order to separate contaminants and to restore the solvent to its original quality or to a lower grade product (e.g. lacquer thinner);
- preparation of secondary liquid fuels.

Please note: The preparation of secondary fuels from waste solvents is not a recycling operation (see definition of recycling in WFD article 3(17)) and shall therefore not be reported under item 3a 'recycling' but under item 1 'energy recovery'.

R3 Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) comprises operations whose purpose is the recovery of biodegradable and non-biodegradable organic materials. These operations include the following:

- the preparing for re-use of organic materials (e. g. of wooden building elements like windows, doors, beams, planks);
- recycling of waste paper and board;
- reprocessing and recycling of plastic waste;
- composting of bio waste and green waste;
- anaerobic digestion of biodegradable waste;
- gasification and pyrolysis of waste using the components as chemical (chemical recycling);
- Please note:
- R3 also includes the recovery of organic materials in the form of backfilling. However, this operation shall be reported separately under item 3b Backfilling.
- R3 excludes the mechanical-biological treatment of mixed municipal waste.

R4 Recycling/reclamation of metals and metal compounds covers all treatment operations whose purpose is the recycling of metal waste, and of complex products with metals as the predominant material. These treatment operations include a variety of mechanical, thermal and chemical treatment steps and processes, such as the following:

- recycling of scrap and production waste in steelworks;
- shredding and reprocessing of end-of-life vehicles and waste electrical and electronic equipment;
- thermal treatment of cables or oil-contaminated metals;
- battery recycling;

- electrolytic recovery of silver from photo chemicals.

R5 Recycling/reclamation of other inorganic materials covers all treatment operations whose purpose is the recovery of inorganic non-metal wastes and which are not covered by other more specific operations (e.g. R6, R8, R10). Inorganic non-metal wastes represent a large proportion of the total waste generated and consist of a broad spectrum of waste types. The main groups are waste from thermal processes (slag, ashes, sands, dust, etc.), construction and demolition waste, and waste from mining and quarrying. The treatment processes applied are manifold and include the following, for example:

- preparing for re-use of waste (e.g. bricks, stones or concrete elements from selective deconstruction of buildings);
- reprocessing of construction and demolition waste;
- reprocessing and recycling of glass waste;
- use of wastes as secondary raw material in cement kilns;
- asphalt mixing plants using reclaimed asphalt and other mineral wastes.

Please note: R5 also includes the recovery of inorganic materials in the form of backfilling. However, this operation shall be reported separately under item 3b Backfilling.

R6 Regeneration of acids or bases comprises operations whose purpose is the regeneration and subsequent reuse of spent acids/bases for the original purpose or for other purposes. Such operations include:

- the re-concentration of spent acids;
- the thermal decomposition of spent sulphuric acid for use as feedstock in sulphuric acid production.

R7 Recovery of components used for pollution abatement includes treatment operations whose purpose is the regeneration of pollution abatement materials such as activated carbon and ion exchange resins. Common applications are:

- the regeneration of activated carbon from water purification and flue gas treatment, mainly by thermal treatment;
- the regeneration of resins by solvent washing.
- *R8 Recovery of components from catalysts* covers treatment operations whose purpose is:
- the regeneration of catalysts to be reused as catalysts;
- the recovery of catalyst components, mainly of metal components, e.g. recycling of precious metals from catalytic converters in vehicle exhausts.

R9 Oil re-refining or other reuses of oil covers all processes whose purpose is the reuse of waste oil. The two main

options are the re-refining of waste oil and the preparation of fuels from waste oils:

- Re-refining reconverts waste oils into base oils which can be used to manufacture lubricating products. The treatment typically includes distillation, treatment with acids, solvent extraction, contact with activated clay and hydrotreating.
- Waste oils are also used to generate fuel which can be used as a substitute for coal, diesel and light fuel, for example. This usually involves the separation of solids and water, e.g. by heating, filtering, dehydrating and centrifuging.

Please note: The preparation of secondary fuels from waste oils is not a recycling operation (see definition of recycling in WFD article 3(17)) and shall therefore not be reported under item 3a 'recycling' but under item 1 'energy recovery'.

R10 Land treatment resulting in benefit to agriculture or ecological improvement comprises:

- the use of organic and mineral wastes as fertilisers or soil conditioners in agriculture;
- In practice, the following land treatments are assigned to R10:
- the use of sewage sludge in agriculture in compliance with the Sewage Sludge Directive ⁽³⁰⁾;
- the use of manure in compliance with agricultural regulations ⁽³¹⁾;
- the use of mineral wastes as fertilisers in compliance with national legislation.

R11 Use of wastes obtained from any of the operations numbered R1 to R10 comprises the recovery of residual waste from previous recovery operations.

R11 is a redundant entry as it covers only treatment operations that could also be assigned to one of the more specific codes R2 to R10. Priority should be given to the most specific assignment.

Item 3a does not cover:

- the spreading of waste on land for the purpose of final disposal (à Item 5);
- the preparation and (co)incineration of secondary fuels (à Item 1)
- the backfilling of waste (à Item 3b).

Item 3b: Backfilling

"Backfilling means any recovery operation where suitable non-hazardous waste is used for purposes of reclamation in excavated areas or for engineering purposes in landscaping. Waste used for backfilling must substitute non-waste materials, be suitable for the aforementioned purposes, and be limited to the amount strictly necessary to achieve those purposes." (WFD Article 3(17a))

In order to classify a treatment operation as backfilling, all four criteria in the definition have to be fulfilled, i.e.

- suitable non-hazardous waste is used for purposes of reclamation in excavated areas or for engineering purposes in landscaping;
- the waste must substitute a non-waste material;
- the waste must be technically suitable for backfilling purposes;
- only the amount that is strictly necessary for the purpose of the operation can be counted as backfilling.

Operations that fail to meet the four criteria cannot be classified as a backfilling operation.

Backfilling of mineral waste is assigned to recovery operation R5 '*Recycling/reclamation of other inorganic materials*' and builds a sub-set of the recovery operations covered by R5.

Backfilling of organic wastes is assigned to recovery operation R3 '*Recycling/reclamation of organic substances which are not used as solvents*' and builds thus a sub-set of the recovery operations covered by R3. Backfilling does not include the following treatment operations:

- permanent storage of waste (D12), which is a disposal operation that aims primarily at the safe disposal of the waste and does not fulfil the criteria for backfilling listed above.
- the use of waste as daily landfill cover, which shall be classified as a disposal operation (D1 or D5).

In order to facilitate the collection of data on backfilling, it is advisable to define separate subcategories for backfilling to recovery operations R5 and R3, as is already the practice in several Member States.

⁽³⁰⁾ Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture

⁽³¹⁾ The treatment and use of waste consisting of or containing animal by-products (manure, catering waste, etc.) falls under the provision of Regulation (EC) No 1069/2009 on animal by-products.

2.3.2.4. Item 4: Landfilling (D1, D5, D12)

Item 4 comprises the deposit of waste on landfills within the meaning of Directive 1999/31/EC on the landfill of waste ⁽³²⁾. This includes:

- landfills for inert waste, non-hazardous waste and hazardous waste above ground;
- landfills for the underground storage of waste;
- use of waste as daily landfill cover.
- Item 4 does not cover the following treatment operations:
 - the use of waste for underground stowage, where it fulfils the criteria for recovery (à Item 3b);
 - the use of inert waste for backfilling (à Item 3b);
 - temporary storage of waste;
 - sea-bed insertion, impoundment or deep injection of waste (à Item 5).

2.3.2.5. Item 5: Other disposal operations (D2, D3, D4, D6, D7)

Item 5 summarises other methods of disposal such as land treatment (D2), deep injection (D3), impoundment of waste (D4) and the release of waste into water bodies (D6 and D7). These disposal methods can be used only for a limited range of waste types. However, the quantities of waste can be considerable, with many tonnes of sludge being involved, depending largely on geographical conditions.

D2 Land treatment (e.g. biodegradation of liquid or sludgy discards in soils, etc.) means the spreading of waste on land, often followed by the incorporation of the waste into the soil. Land treatment activities are assigned to D2 if the treatment constitutes a disposal operation and does not result in benefit to agriculture or other ecological improvements. In practice, land treatment within the meaning of D2 may be deployed for non-hazardous sludge and for liquid wastes, e.g. for the disposal of non-hazardous dredging sludge.

D3 Deep injection (e.g. injection of pumpable discards into wells, salt domes or naturally occurring repositories, etc.) means the injection of waste into natural or artificial cavities, or into porous formations of rock.

D4 Surface impoundment (e.g. placement of liquid or sludgy discards into pits, ponds or lagoons, etc.) means the deposit of

waste in natural or engineered ponds, pits or lagoons which is, for instance, a common method for the management of tailings ⁽³³⁾ in mining operations (e.g. in the metal mining sector and in certain coal extraction industries)

D6/7 Release into water bodies including sea-bed insertion is restricted by law to only a few types of waste and includes:

- the deposit of non-hazardous dredging sludge and other non-hazardous sludge in surface water including the bed and the subsoil;
- the discharge of waste at sea in accordance with the OSPAR Convention ⁽³⁴⁾ (e.g. the discharge of fish processing waste and inert materials of natural origin).
- Item 5 does not cover:
 - the spreading of waste on land for agricultural or other ecologically beneficial purposes (à Item 3a);
 - the discharge of liquid wastes to the urban sewage system and to urban wastewater treatment plants (e.g. the discharge of leachate in urban waste water treatment plants). If discharged to the urban sewage system in accordance with legislation the liquid wastes are considered as waste water and no longer subject to waste legislation and waste statistics.

2.3.2.6. Treatment operations excluded from reporting (D8, D9, D13, D14, D15, R12, R13)

D8 Biological treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12 comprises operations which use aerobic or anaerobic biological processes in order to prepare the waste for subsequent disposal, e.g. by reducing the amount of biodegradable components, or by degradation of organic pollutants. This includes, in particular:

- biological-mechanical treatment of municipal waste;
- biological treatment of contaminated soil, sludges or mineral wastes, if followed by disposal.

D9 Physico-chemical treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12 (e.g. evaporation, drying, calcination, etc.) covers the pre-treatment of mainly fluid and pasty hazardous waste by a variety of chemical, thermal and physical processes in

⁽³²⁾ OJ L 182, 16.7.1999, last amended by OJ L 311, 21.11.2008

⁽³³⁾ Tailings are the waste solids which are left over from the mineral processing of ore, which involves a number of different methods. The resulting fine slurry has the consistency of sand, clay and silt and is commonly stored in impoundments retained by tailings dams.

⁽³⁴⁾ The OSPAR Convention is the current legal instrument guiding international cooperation on the protection of the marine environment of the North-East Atlantic. See www.ospar.org for more information.

order to achieve an output which can be recovered or disposed of. Physico-chemical treatment is typically deployed for:

- emulsions and oil/water mixtures;
- neutral aqueous organics and inorganics (production specific waste water, leachate, etc.);
- cyanides;
- acids and alkalis.

Typical treatment steps are detoxification (oxidation/reduction), precipitation, neutralisation, emulsion separation, immobilisation, electrolysis and osmosis.

D13 Blending or mixing prior to submission to any of the operations numbered D 1 to D 12 covers preliminary operations prior to disposal including pre-processing such as, inter alia, sorting, crushing, compacting, pelletising, drying, shredding, conditioning, separating, blending or mixing prior to submission to any of the operations numbered D1 to D12. *D14 Repackaging prior to submission to any of the operations numbered D 1 to D 13* covers preparatory activities whose purpose is the (re)packaging of waste for transport and submission to further disposal operations (e.g. the packaging of asbestos)

D15 Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where the waste is produced) covers the temporary storage of waste prior to disposal. Temporary storage for disposal is limited to a period of less than one year. ⁽³⁵⁾

R12 Exchange of waste for submission to any of the operations numbered R 1 to R 11 covers preliminary operations prior to recovery including pre-processing such as, inter alia, dismantling, sorting, crushing, compacting, pelletising, drying, shredding, conditioning, repackaging, separating, blending or mixing prior to submission to any of the operations numbered R1 to R11 provided that there is no other R code appropriate

Please note: Although the treatment operation R12 is otherwise excluded from reporting, the outputs from R12 shall be reported under the WStatR in the following cases:

- the output fulfils end-of-waste criteria and leaves the waste regime;
- the output is prepared for re-use and cannot be measured at any other point.

R13 Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage,

pending collection, on the site where the waste is produced) covers the temporary storage of waste prior to recovery. Temporary storage for recovery is limited to a period of less than three years. ⁽³⁶⁾

2.3.3. Breakdown in waste categories: EWC-Stat classification

The breakdown by waste categories for waste treatment is the same as for waste generation. This means that the treated waste quantities have to be broken down by the 51 EWC-Stat categories that are described in detail in section 2.2.2 of this Manual.

2.3.4. Recommendations on specific issues

2.3.4.1. Plausibility of treatment operations

Table 13 overleaf classifies the WStatR treatment categories according to their plausibility into likely and unlikely treatment operations for all EWC-Stat categories.

The table shall help to identify combinations of waste categories and treatment operations that are uncommon and should therefore be checked when reported by statistical units. The table thus indicates which treatment operations are likely to be questioned by Eurostat in the course of data validation. Countries are therefore encouraged to comment on the unlikely treatment operations in their quality reports or add a comment in the questionnaire.

Treatment operations are classified as unlikely if they are not or only rarely applied because of legal provisions, technical constraints or on account of the scope and concept of the WStatR.

Accordingly, likely treatment operations are operations that are legally compliant, technically plausible and in line with the concept of the WStatR.

Recycling (Item 3a)

As described in chapter 2.3.2, treatment operations are classified as 'recycling' under the WStatR if waste is treated by one of the R-operations R2 to R11 but excluding backfilling of waste. The treatment category 'recycling' does not cover preliminary operations prior to recycling such as

⁽³⁵⁾ In accordance to the Landfill Directive (Directive 1999/31/EC, Article 2(g))

⁽³⁶⁾ In accordance to the Landfill Directive (Directive 1999/31/EC, Article 2(g))

R12 operations (e.g. dismantling, sorting) or other preliminary operations such as D8 or D9, unless the waste is 'prepared for reuse'. Mixed wastes such as 'household and similar wastes' (EWC-Stat 10.1) and 'sorting residues' (10.3), or wastes consisting of complex products such as 'discarded vehicles' (08.1) and 'discarded equipment' (W08 excl. 08.1, 08.41) usually need to be separated into materials, e.g. by sorting or dismantling, that are suitable for recycling. The materials that finally go to recycling are reported under a different EWC-Stat code than the input into pre-treatment. Therefore, it is not in line with the concept of the WStatR to report the input into preliminary treatment operations under 'recycling', even if the recycling of the respective wastes is the main aim of the pre-treatment. The recycling of materials separated from such waste streams should be reported under the respective material-specific EWC-Stat categories. The reporting of these waste categories under 'recycling' is therefore marked as unlikely in Table 13. More explanations by waste category are provided in the following:

'Household and similar wastes' (W101) consist predominantly of 'mixed municipal waste' (LoW 20 03 01) and of other mixed or multi-material wastes, i.e. bulky wastes, street-cleaning residues and wastes from markets, that cannot be recycled directly but have to be sorted or separated before recycling. The typical pre-treatment operations like mechanical or mechanical-biological treatment of mixed municipal waste or shredding of bulky waste are classified under treatment operations R12 or D8 that are not covered by waste statistics and shall not be reported. The outputs from these operations are no longer classified as W101 but under material-specific EWC-Stat categories (e.g. metals...) or as 'sorting residues' W103. The recycling of the components of 'household and similar wastes' is therefore not reported under W101 but under the material-specific waste categories.

Recycling of 'household and similar wastes' should only be reported under recycling in those cases where the waste is recycled directly. Examples for such cases are:

- the preparing for reuse of bulky waste;
- the biological treatment of market wastes

'Discarded equipment' (EWC-Stat 08 excl. 08.1, 08.41) consists of whole waste electrical and electronic equipment, of components from such equipment and of components from discarded vehicles (e.g. Oil filters, Brake pads etc.). Whole equipment needs to be pre-treated, i.e. depolluted and dismantled or shredded, before specific

fractions can be recycled. The direct recycling of whole equipment is not plausible and shall not be reported under EWC-Stat 08 excl. 08.1, 08.41 but under the EWC-Stat codes of the recycled material fractions.

Recycling of 'discarded equipment' shall only be reported under this EWC-Stat category in those cases where the waste is directly recycled. Examples for such cases are:

- the preparing for reuse of discarded equipment or components thereof;
- the recycling of metal-containing components (e.g. LoW 16 02 15*, 16 02 16) in smelters.

The EWC-category **'discarded vehicles' (EWC-Stat 08.1)** comprises only two LoW entries which both refer to whole vehicles. LoW entry 16 01 04* refers to vehicles containing hazardous liquids or other hazardous components and entry 16 01 06 refers to vehicles after the removal of pollutants. Neither hazardous nor non-hazardous vehicles are recycled directly but have to be dismantled, shredded or pre-treated by other operations that are not covered by the WStatR. The recycling of 'discarded vehicles' should therefore be zero. The recycled materials and components from the vehicles are to be reported under the respective material-specific EWC-Stat categories (e.g. metal wastes).

Sorting residues (EWC-Stat 10.3) are outputs from waste treatment processes (e.g. from chemical-physical treatment, composting or mechanical treatment) that are usually not suitable for recycling without further preparatory treatment. The further treatment generally leads to a change in EWC-Stat classification so that the finally recycled materials will not be reported under EWC-Stat 10.3 but under other categories.

The EWC-Stat category **'wastes containing PCB' (07.7)** includes for instance transformers or capacitors with PCB-containing or PCB-contaminated oils. Such equipment can be decontaminated in a preliminary treatment operation so that the metal components can be recycled subsequently. The recycling of the respective metals should be reported under the EWC-Stat category 06 metals and not under 07.7.

Backfilling (Item 3b)

According to Directive 2008/98/EC, backfilling is restricted by definition to non-hazardous wastes⁽³⁷⁾ that are suitable for the purpose of backfilling. This essentially limits the spectrum of wastes usable for backfilling to non-hazardous mineral wastes belonging to the EWC-Stat categories 12.1 to

⁽³⁷⁾ The restriction of backfilling to non-hazardous waste has been introduced with Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 and should be transposed by Member States into national legislation since 5 July 2020.

12.8_13 and non-recyclable glass waste (07.1). Backfilling of hazardous wastes and of non-hazardous waste categories other than EWC-Stat 12 and 07.1 are therefore classified as 'unlikely treatment' in the Table 13.

The use of other than mineral wastes for backfilling is not generally excluded. This is suggested by the footnote to operation R3 in Annex II of Directive 2008/98/EC which says that R3 includes "recovery of organic materials in the form of backfilling". When backfilling of other than mineral wastes is reported, countries are asked to specify the type of the waste used and the backfilling measure in the quality report or add a comment in the questionnaire.

Energy recovery (Item 1)

Energy recovery is considered as a plausible treatment option for all wastes except for metal wastes, inert wastes and complex products such as discarded vehicles. In Table 13, energy recovery is therefore classified as unlikely for metal wastes (EWC-Stat 06), glass waste (07.1), discarded vehicles (08.1), batteries (08.41) and for most mineral wastes (EWC-Stat 12, except 12.1). The use of mineral construction and demolition wastes (12.1) is not classified as unlikely as this EWC-Stat category covers some waste types that may include significant shares of combustible wastes so that energy recovery is a plausible treatment operation ⁽³⁸⁾.

Incineration (Item 2)

Waste incineration is considered as a plausible treatment option for most wastes, in particular for hazardous waste where the incineration aims at the destruction of contaminants. However, treatment by waste incineration is considered as unlikely for metal wastes (EWC-Stat 06), glass wastes (07.1) discarded vehicles (08.1) and batteries (08.41). For soils (12.6), dredging spoils (12.7) and mineral wastes from waste treatment (12.8_13) it is assumed that they are only incinerated when they are hazardous. The incineration of mineral construction and demolition wastes (12.1) and of other mineral wastes (12.2, 12.3, 12.5) is not classified as unlikely as both EWC-Stat categories cover a few waste types for which incineration is a plausible treatment operation.

Landfilling (Item 4)

Landfilling is considered as plausible treatment for most non-hazardous and hazardous waste types provided that the landfills are adequately equipped, and the landfilled waste fulfils the acceptance criteria in Annex II of the Landfill Directive. Disposal by landfilling, however, should be the very last resort according to the waste hierarchy and should therefore be limited to wastes that cannot be recycled or recovered. Treatment by landfilling is classified as unlikely in the table only for solvents (01.1), whole discarded vehicles (EWC-Stat 08.1), tyres (07.3) and for infectious health care waste (05). The landfilling of the latter two waste categories is prohibited according to Article 5(3) of the Landfill Directive.

Landfilling of recyclable fractions like for instance metals, glass, paper or plastics is certainly not desirable from a waste management perspective but it is plausible when the material is not suitable for recycling e.g. due to low material quality with regard to quality.

Other disposal (Item 5)

The treatment category 'other disposal' covers treatment operations that are not frequently applied and that are admissible only for specific waste types. This includes the disposal of non-hazardous and hazardous tailings from mining operations, i.e. wastes covered by EWC-Stat category 'other mineral wastes' (12.2, 12.3, 12.5), in tailing ponds (treatment operation D4). Further operations include the release of non-hazardous sludges such as dredging spoils (12.7), common sludges (11) or some industrial effluent sludges (03.2) in water bodies and to seas. The treatment of other waste categories than the ones mentioned before are classified as unlikely and should be commented when reported to Eurostat.

Please note that the treatment category 'other disposal' comprises clearly defined waste treatment operations, as explained in chapter 2.3.2, and is not a catch-all category for treatment types that have not been mentioned before.

⁽³⁸⁾ LoW 17 02 04 glass, plastic and wood containing or contaminated with hazardous substances;
LoW 17 09 04 mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03

TABLE 13**Classification of treatment operations acc. to their plausibility into likely and unlikely operations**

EWC-Stat category		nhaz/ haz	Recycling (item 3a)	Backfilling (item 3b)	Energy recovery (item 1)	Inciner- ation (item 2)	Land- filling (item 4)	Other disposal (item 5)
Code	Label							
01.1	Spent solvents	haz	+	-	+	+	-	-
01.2	Acid, alkaline or saline wastes	nhaz	+	-	+	+	+	-
		haz	+	-	+	+	+	-
01.3	Used oils	haz	+	-	+	+	+	-
01.4, 02, 03.1	Chemical wastes	nhaz	+	-	+	+	+	-
		haz	+	-	+	+	+	-
03.2	Industrial effluent sludges	nhaz	+	-	+	+	+	+
		haz	+	-	+	+	+	-
03.3	Sludges, liquid wastes from waste treatment	nhaz	+	-	+	+	+	-
		haz	+	-	+	+	+	-
05	Health care and biological wastes	nhaz	-	-	+	+	+	-
		haz	-	-	+	+	-	-
06.1	Metal wastes, ferrous	nhaz	+	-	-	-	+	-
06.2	Metal wastes, non-ferrous	nhaz	+	-	-	-	+	-
06.3	Metal wastes, mixed ferrous, non-ferrous	nhaz	+	-	-	-	+	-
07.1	Glass wastes	nhaz	+	+	-	-	+	-
		haz	+	-	-	-	+	-
07.2	Paper and cardboard wastes	nhaz	+	-	+	+	+	-
07.3	Rubber wastes	nhaz	+	-	+	+	-	-
07.4	Plastic wastes	nhaz	+	-	+	+	+	-
07.5	Wood wastes	nhaz	+	-	+	+	+	-
		haz	+	-	+	+	+	-
07.6	Textile wastes	nhaz	+	-	+	+	+	-
07.7	Waste containing PCB	haz	-	-	-	+	+	-
08 excl. 08.1, 08.41	Discarded equipment	nhaz	-	-	+	+	+	-
		haz	-	-	+	+	+	-
08.1	Discarded vehicles	nhaz	-	-	-	-	-	-
		haz	-	-	-	-	-	-
08.41	Batteries and accumulators wastes	nhaz	+	-	-	-	+	-
		haz	+	-	-	-	+	-
09.1	Animal and mixed food waste	nhaz	+	-	+	+	+	-
09.2	Vegetal wastes	nhaz	+	-	+	+	+	-

EWC-Stat category		nhaz/ haz	Recycling (item 3a)	Backfilling (item 3b)	Energy recovery (item 1)	Inciner- ation (item 2)	Land- filling (item 4)	Other disposal (item 5)
Code	Label							
09.3	Animal faeces, urine and manure	nhaz	+	-	+	+	+	-
10.1	Household and similar wastes	nhaz	-	-	+	+	+	-
10.2	Mixed and undifferentiated materials	nhaz						
		haz		-				
10.3	Sorting residues	nhaz	-	-	+	+	+	-
		haz	-	-	+	+	+	-
11	Common sludges	nhaz	+	-	+	+	+	+
12.1	Mineral waste from construction and demolition	nhaz	+	+	+	+	+	-
		haz	+	-	+	+	+	-
12.2, 12.3, 12.5	Other mineral wastes	nhaz	+	+	-	+	+	+
		haz	+	-	-	+	+	+
12.4	Combustion wastes	nhaz	+	+	-	-	+	-
		haz	+	-	-	+	+	-
12.6	Soils	nhaz	+	+	-	-	+	-
		haz	+	-	-	+	+	-
12.7	Dredging spoils	nhaz	+	+	-	-	+	+
		haz	+	-	-	+	+	-
12.8, 13	Mineral wastes from waste treatment	nhaz	+	+	-	-	+	-
		haz	+	-	-	+	+	-

Legend:

- + Likely treatment operation
- █ Unlikely treatment operation
- Not classified because of unspecified waste

2.3.4.2. Reporting on Treated mineral construction and demolition waste (EWC-Stat 12.1)

Mineral construction and demolition waste (EWC-Stat 12.1) is an EWC-Stat category that is defined not only on the basis of its material character, i.e. its mineral nature, but also on the basis of the generating activity (i.e. construction and demolition activities). This approach has been chosen in the WStatR revision 2010 because mineral C&D waste is a very relevant waste stream in terms of quantity and in view of the circular economy and should therefore be visible in waste statistics as a separate waste flow. The identification of this flow solely via the economic activity (NACE F) has proven to be insufficient as significant amounts of mineral C&D waste may be reported under other economic activities than NACE F, depending on the legal reporting

obligations for construction and demolition activities in the countries.

For the tracking of this waste stream, it is important to have the generation and treatment of mineral C&D waste reported under the same EWC-Stat category, i.e. under EWC-Stat 12.1. In those cases, where mineral C&D waste is recovered or disposed of in the first treatment step this is ensured. However, where mineral C&D waste is pre-treated by an R12 operation, the output from the pre-treatment will usually be classified as secondary waste under LoW chapter 19 (most likely as LoW 12 10 09 minerals (for example sand, stones) from the mechanical treatment of waste). According to the conversion table in Annex III of the WStatR, this waste will then show up in waste treatment statistics under EWC-Stat 12,8, 13 *Mineral waste from waste treatment and stabilised wastes*, together with wastes from the thermal

treatment of waste which are assigned to this waste category.

In order to harmonise the reporting of mineral construction and demolition waste and to be able to follow this waste stream from generation to final treatment, treated mineral construction and demolition waste should generally be reported under EWC-Stat category 12.1, even if it has undergone pre-treatment. Please note that this proceeding is only valid for mineral C&D waste but not for any other EWC-Stat category.

2.3.4.3. Reporting on liquid wastes in wastewater treatment plants

Liquid wastes such as landfill leachate are partly not disposed of in waste treatment plants but in industrial or municipal wastewater treatment facilities where they are treated together with the wastewater. This raises the question whether and how this treatment should be reported in waste statistics.

Please note, that this type of treatment is not covered by Annex II of the WStatR and shall therefore not be reported in waste statistics. According to Annex II, section 1 of the WStatR, statistics on waste treatment „are to be compiled for all recovery and disposal facilities which run any of the operations referred to in Section 8(2)“. Wastewater treatment facilities are not covered by this definition.

In previous years, some countries included such waste flows under the disposal operation D6 *Release into a water body*, i.e. under treatment category ‘other disposal’. The treatment operation D6 (and also D7), however, cover the direct release of waste into a water body but not the release wastewater treatment plants. The reporting under treatment category ‘other disposal operations’ would therefore be misleading.

It is important to emphasise that, although the discharge of liquid wastes in wastewater treatment plants is beyond the scope, the reported data shall include:

- the generated amount of the liquid wastes under Annex I, and
- the treatment of the sludges from wastewater treatment plants.

2.3.4.4. Reporting on PCB-treatment

PCBs⁽³⁹⁾ are probable human carcinogens and produce various adverse effects in both humans and animals. They are persistent and pervasive, and have been detected in soil, surface and ground water, as well as in food. Their use and marketing has therefore been very heavily restricted in Europe since 1985. Despite the restrictions, PCB-containing waste are still arising, mainly in form of electrical equipment (transformers, capacitors) containing or contaminated with PCB-containing oils, and as construction and demolition wastes containing PCB (e.g. sealants and resin-based floorings).

The management of PCB-containing wastes is regulated in the PCB-Directive⁽⁴⁰⁾ from 1996 and in the POPs Regulation⁽⁴¹⁾, which entered into force in July 2019. The POPs Regulation stipulates in article 7(2) that “*waste consisting of, containing or contaminated by any substance listed in Annex IV to this Regulation shall be disposed of or recovered, without undue delay and in accordance with Part 1 of Annex V to this Regulation, in such a way as to ensure that the POP content is destroyed or irreversibly transformed so that the remaining waste and releases do not exhibit the characteristics of POPs.*”

PCB-containing wastes with a PCB-content of 50 mg/kg or more are part of Annex IV. In Annex V, the POP-Regulation defines that for these wastes only the following treatment operations are permitted provided that the PCBs are “destroyed or irreversibly transformed”:

- D9 physico-chemical treatment;
- D10 incineration on land;
- R4 Recycling/reclamation of metals and metal compounds, only under strict conditions;
- Permanent storage (D5 or D12), only under strict conditions;
- Pre-treatment operations prior to these operations above.

The most widely available and used technology for effective PCB destruction is high-temperature incineration under well-defined conditions in hazardous waste incineration facilities. Further techniques for PCB destruction in waste oils include dechlorination, hydrogenation or solvated electron processes.⁽⁴²⁾

Recycling of the metallic parts of PCB-containing equipment, like transformer carcasses and windings or metal casings of

⁽³⁹⁾ The term ‘PCBs’ is used in the meaning of Article 2(a) of the PCB-Directive, i.e. including polychlorinated biphenyls, polychlorinated terphenyls and the further chemical compounds listed there.

⁽⁴⁰⁾ Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT)

⁽⁴¹⁾ Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (recast)

⁽⁴²⁾ JRC, 2018: Best available techniques (BAT) reference document for waste treatment. Industrial Emissions Directive 2010/75/EU (integrated pollution prevention and control)

capacitors, is possible after thorough decontamination of the equipment, e.g. by solvent washing.⁴²

Please note that the use as fuel of PCB-containing wastes with a PCB-content ≥ 50 mg/kg is not allowed.

Based on the legal situation, the treatment of PCB-containing wastes should be reported in waste statistics only under the treatment categories 'waste incineration' (item 2) and 'landfilling' (item 4). The physico-chemical treatment and other pre-treatment is not covered by Annex II of the WStatR and thus not reported. Recycling of metals from PCB-containing equipment takes place only after decontamination. The respective metals shall therefore be reported under EWC-Stat 06 and not under EWC-Stat 07.7. The treatment by 'energy recovery' (item 1) or 'other disposal' (item 5) is legally prohibited and therefore not expected to show up in statistics.

2.4. Treatment infrastructure and waste collection coverage: data set 3

2.4.1. Required variables

Aside from statistics on waste generation and waste treatment, additional information is needed on the number

and capacity of recovery and disposal facilities and on the coverage of the collection scheme for mixed household and similar waste.

2.4.1.1. Number and capacity of waste treatment facilities

Information should be provided on the number and capacity of waste treatment facilities, specified by treatment categories as described in chapter 2.3.2. The following information shall be reported:

- number and capacity of incineration facilities (item 1 and 2);
- number and capacity of landfills, and number of landfills closed since the last reference year (item 4);
- number of recovery facilities (item 3a and 3b).

The information on landfills has to be broken down into landfill types as defined by Directive 1999/31/EC, i.e. landfills for hazardous waste, for non-hazardous waste and landfills for inert waste. The required information is summarised in Table 14 below.

TABLE 14

Reporting requirements on number and capacity of treatment facilities

Item No	Type of facility	Required variables		
		No. of facilities	Capacity	No. of facilities closed since last reference year
1	Energy recovery	X	X	-
2	Waste incineration	X	X	-
3	Recovery facilities	X	-	-
4	Landfills for: haz. waste	X	X	X
	non-haz. waste	X	X	X
	inert waste	X	X	X
5	Other disposal facilities	-	-	-

Reporting units

For *incineration facilities* (items 1, 2), the Waste Statistics Regulation asks for the maximum treatment capacity in

tonnes/year. The 'maximum capacity' should be understood as the maximum operational capacity, unless the operational capacity exceeds the permitted capacity.

Where the operational capacity is greater than the treatment capacity laid down in the facility's permit, the permitted quantity must be reported.

In the event of co-incineration, only the maximum capacity reserved for the input of waste must be reported, but not the total capacity of the combustion plant. The relevant information will usually be laid down in the facility's permit. If no information on the co-incineration capacity should be available, the total waste that was energetically recovered in the reference year may be used as estimate.

In the case of *landfills* (Item 4), the capacity in m³ which remains at the end of the reference year must be reported. The remaining capacity is understood to be the operational capacity, if not restricted by the permitted disposal capacity.

Regional level

Data on treatment facilities should be provided at provincial (NUTS 2) level.

2.4.1.2. Coverage of waste collection scheme

Data on coverage should provide information on the percentage of population covered by a collection scheme for household and similar waste.

Reporting unit

Percentage of population.

Regional level

Data should be provided at the national level.

- Until reference year 2008 the coverage of waste collection had to be reported on the NUTS 2 level.

2.4.2. Classifications

2.4.2.1. Number and capacity of waste treatment facilities

In order to ensure a good consistency between the quantities of waste treated and the capacities of waste treatment facilities, the number and capacities of treatment facilities should relate to those facilities that have a permit or that are registered according to Directive 2008/98/EC and from which quantities of waste treated were reported in the data set waste treatment (data set 2).

2.5. Summary: reporting obligations

Table 15 summarizes the classifications and levels of details required for all three data sets.

TABLE 15

Summary of the reporting dimensions asked by the Waste Statistics Regulation on both waste generation and waste treatment

	Waste Generation	Waste treatment	Treatment infrastructure and collection
Data Set	1 GEN Generation of waste	2 TRT Treatment of waste	3 FAC Number and capacity of disposal and recovery operations
Sectors	19 items – 18 economic activities (NACE) – 1 sector 'households'	6 items – Incineration – Energy recovery – Recycling – Backfilling – Landfilling – Other forms of disposal	5 items – Incineration – Energy recovery – Recycling ⁽²⁾ – Backfilling ⁽²⁾ – Landfilling ⁽³⁾

	Waste Generation	Waste treatment	Treatment infrastructure and collection
No. of waste categories (EWC-Stat)	51	51	NA
Reporting units ⁽¹⁾	tonnes	tonnes	tonnes/year m ³
Geographical level	National	National	NUTS 2

NA: Not Applicable

⁽¹⁾ Waste are reported in normal wet weight, except sludges that have to be reported in dry matter

⁽²⁾ Only the number of recovery facilities has to be reported; no capacities.

⁽³⁾ In addition to number and capacities of landfills, the number of landfills closed since the last reference year has to be reported. All characteristics have to be broken down by landfill type (landfills for hazardous, non-hazardous and inert waste).

2.6. Link between generation and treatment: Voluntary data set 4

This chapter covers the questionnaire module that was introduced in 2023 to improve the link between generation and treatment data, in the following referred to as data set 4. The data set 4 is not part of the WStatR but constitutes an additional voluntary data collection. The data set consists of 5 tables the structure of which is displayed in Annex III.

The main aim of the data set 4 is to extend the scope of the WStatR data collection in view to the following objectives:

- to improve the link between the WStatR data on waste generation (data set 1) and waste treatment (data set 2);
- to improve the information on the material flows back to the economy for the monitoring of the circular economy.

For this purpose, an additional new questionnaire module (Excel workbook) was developed that collects the additional data needed to achieve the above objectives. A country consultation was conducted and the results were implemented as data set 4.

This chapter outlines the concept and the structure of the revised tables and the relation / interfaces to the WStatR data sets GEN and TRT.

2.6.1. Questionnaire concept and design

2.6.1.1. Objectives and approach

WStatR data on waste generation and on waste treatment have a different scope with regard to imported/exported waste and with regard to primary/secondary wastes.

Further differences between both data sets may arise from material dissipation during treatment (water losses, emissions) and from the time lag between generation and treatment.

Properly linking the two data sets requires balancing the data on waste generation and waste treatment with information to bridge the differences resulting from the above aspects. Hence, the following additional information is needed:

- imports and exports of waste,
- pre-treatment operations that are not covered by the WStatR,
- important outputs of the existing treatment operations (e.g. incineration), as reported in the data of the dataset TRT,
- a better distinction between primary and secondary wastes, and
- material losses in the course of waste treatment.

To build a proper link between the data sets GEN and TRT, the interfaces of the new data set 4 with both data sets have to be defined in a clear and logical way.

To produce a complete link for all waste categories would be rather challenging and very demanding to be completed by the countries. The data set 4 shall therefore focus on waste flows that are particularly important for the assessment of waste management (referred to as 'PRIORITY-ITEMS'). This primarily includes recyclable wastes like metal, glass, paper, plastics and wood and the mixed waste categories from which these materials are separated. It also includes household and similar waste (W101) which is important in terms of quantity and environmental impacts of its treatment.

Although this increases the number of cells to be reported it is important to distinguish between non-hazardous and hazardous waste in order to properly link the data to GEN

and TRT and because this information is relevant in view of the environmentally sound handling of the waste. Furthermore, this requirement was repeatedly raised by the countries in the country consultation process.

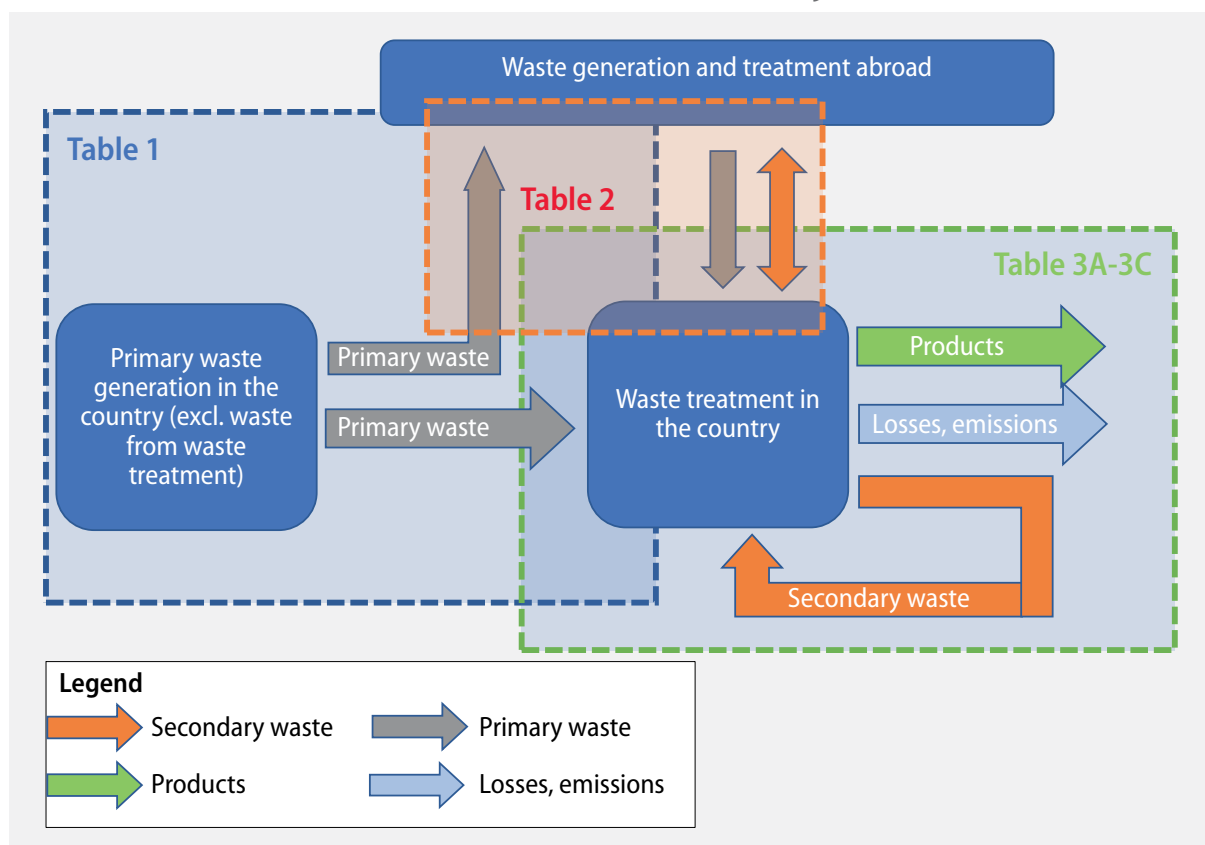
Figure 3 shows the concept of the questionnaire and the structure and coverage of the questionnaire tables. The questionnaire distinguishes between four material flows:

- primary waste;
- secondary wastes destined for further waste treatment;
- secondary raw materials or secondary fuels, referred to as 'products', that leave the waste regime and flow back into the economy; and
- material losses and emissions (e.g., water losses and emissions from incineration).

Table 1 aims to collect complete information on the amount and type of domestically generated primary waste and on the first treatment of this waste, specified by type of treatment. The table set 3A to 3C collects data on how the primary waste is transformed into secondary wastes, products and losses/emissions in the course of waste treatment. This information is collected separately for the treatment categories pre-treatment (Table 3A), incineration and energy recovery (Table 3B) and recycling (Table 3C). This is the most challenging information and is therefore collected only for the priority waste streams ('PRIORITY-ITEMS'). Table 2 complements the picture with the data on imports and exports of primary and secondary waste. The tables are described in more detail in chapter 2.6.2.

FIGURE 3

Data set 4 - relation between the tables and their major contents



2.6.1.2. Coverage of pre-treatment operations

An essential prerequisite for linking data sets 1 (GEN) and 2 (TRT) and closing the data gap between the two is the

collection of information on all treatment operations. Data set 4 therefore introduces the treatment category 'pre-treatment' (PRT) in addition to the six treatment categories defined in Annex II of the WStatR. For the purposes of this

data collection, 'pre-treatment' is defined as the treatment of waste by one of the recovery and disposal operations listed in Table 16. The category 'pre-treatment' consists of recovery and disposal operations that are excluded from the reporting under Annex II of the WStatR (see chapter 2.3.1.2). The R and D operations listed in Table 16 are explained in more detail in 2.3.2.6.

Please note: The treatment category 'pre-treatment' does not cover the temporary storage of waste, i.e. the treatment operations R13 and D15 of WFD Annex I and II, but are

considered as balancing items between primary waste generation and primary waste treated.

With the inclusion of the treatment category 'pre-treatment' the data collection covers all types of waste treatment. It is therefore possible to measure the first entry point of primary waste into waste treatment for all primary waste generated. This allows to approximately balance the primary waste generation and the input of primary waste into waste treatment, which is an important component to increase the transparency and interpretation of waste statistics.

TABLE 16

Pre-treatment operations to be reported in data set 4

Code	Types of recovery and disposal operations
Disposal operations	
D8	Biological treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12
D9	Physico-chemical treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12 (e.g., evaporation, drying, calcination, etc.)
D13	Blending or mixing prior to submission to any of the operations numbered D 1 to D 12
D14	Repackaging prior to submission to any of the operations numbered D 1 to D 13
Recovery operations	
R12	Exchange of wastes for submission to any of the operations numbered R 1 to R 11

Data on 'pre-treatment' are requested in the questionnaire tables 1, 2 and 3a:

- Table 1 asks for the input of domestically produced primary waste into pre-treatment by EWC-Stat category.
- Table 2 asks for the imported waste (primary and secondary) into pre-treatment by EWC-Stat category.
- Table 3a requests data on how different EWC-Stat categories are split into output flows in the course of pre-treatment. The information is requested for priority waste flows only.

2.6.1.3. Primary and secondary wastes

A crucial element of the questionnaire module is the distinction between primary and secondary waste, which are defined as follows:

- **Primary waste** is waste that is generated by any activity other than waste treatment. Primary waste includes waste from production and consumption and originates from economic activities and from households.
- **Secondary waste** is waste that originates from waste treatment operations as defined in Annex I and II of Directive 2008/98/EC, except treatment operations R13 and D15 ⁽⁴³⁾.

⁽⁴³⁾ Treatment operations R13 and D15 are excluded because the storage does not physically transform the waste and does not lead to a change of the waste code. For this reason, these operations are neither covered by the treatment items of Annex 2 nor regarded as preparatory treatment. They simply reflect the difference between the amount of waste generated in the reference year and the amount of that waste actually treated in the same year.

This distinction between primary and secondary waste is important to determine separately the waste flows that are produced directly by the primary sources/generators on the one hand and by waste management activities on the other hand. This allows to make transparent and to eliminate, where desired, the double-counting of waste during the waste treatment chain. In the questionnaire module, the distinction between primary and secondary waste is important:

- To exclude secondary waste from table 1, which asks for data on primary waste only;
- To specify the input into treatment into primary and secondary waste in the tables 3A to 3C.

In the European List of Wastes (LoW), secondary wastes are mostly classified in LoW chapter 19 "*Wastes from waste management, off-site wastewater treatment plants and the*

preparation of waste intended for human consumption and waste for industrial use". All entries of the LoW sub-chapters 19 01 to 19 07 and 19 10 to 19 12 are clearly and unambiguously defined as secondary wastes by the titles of the sub-chapters. These sub-chapters comprise 71 entries for secondary wastes.

However, chapter 19 includes also wastes from other activities than waste treatment, namely from the treatment of wastewater (sub-chapter 19 08), from the preparation of water for human consumption and for industrial use (sub-chapter 19 09) and from soil and groundwater remediation (sub-chapter 19 13). The wastes from these three sub-chapters are not related to waste management and therefore considered as primary wastes. An overview of the sub-chapters to chapter 19 and the classification as primary or secondary waste is provided in Table 17.

TABLE 17

Sub-chapters of LoW chapter 19 and their classification as primary or secondary wastes

LoW-Code	LoW description	Primary waste	Secondary waste
19 01	wastes from incineration or pyrolysis of waste		✓
19 02	wastes from physico/chemical treatments of waste (incl. dechromatation, decyanidation, neutralisation)		✓
19 03	stabilised/solidified wastes		✓
19 04	vitrified waste and wastes from vitrification		✓
19 05	wastes from aerobic treatment of solid wastes		✓
19 06	wastes from anaerobic treatment of waste		✓
19 07	landfill leachate		✓
19 08	wastes from wastewater treatment plants not otherwise specified	✓	
19 09	wastes from the preparation of water intended for human consumption or water for industrial use	✓	
19 10	wastes from shredding of metal-containing wastes		✓
19 11	wastes from oil regeneration		✓
19 12	wastes from the mechanical treatment of waste (e.g. sorting, crushing, compacting, pelletising) not otherwise specified		✓
19 13	wastes from soil and groundwater remediation	✓	
16 01	end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance	(✓)	(✓)

LoW-Code	LoW description	Primary waste	Secondary waste
16 02	wastes from electrical and electronic equipment	(✓)	(✓)
16 06	batteries and accumulators	(✓)	(✓)
13	Oil wastes and wastes of liquid fuels (except edible oils, and those in chapters 05, 12 and 19)	(✓)	(✓)

Legend: ✓: LoW codes of this (sub-)chapter include only waste codes that can unambiguously be classified as either primary or secondary waste.

(✓): LoW codes of this (sub-)chapter include waste codes that may be primary or secondary waste, depending on the waste generation activity/process.

Chapter 19, or more precisely the respective sub-chapters, cover most of the secondary wastes but the contained codes are not exhaustive, which means that codes for secondary wastes may be found also in other chapters of the LoW. This applies in particular to LoW chapter 16 “wastes not otherwise specified in the list” and to chapter 13 “oil wastes and other liquid fuels”. The following (sub-)chapters are relevant here:

- 16 01 end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13, 14, 16 06 and 16 08)
- 16 02 wastes from electrical and electronic equipment
- 16 06 batteries and accumulators
- 13 Oil wastes and wastes of liquid fuels (except edible oils, and those in chapters 05, 12 and 19)

The LoW entry 16 01 06 ‘end-of-life vehicles, containing neither liquids nor other hazardous components’ can generally be considered as a secondary waste as the waste results from the treatment (depollution) of the ‘end-of-life vehicles’ (16 01 04*). Several other codes in the listed (sub-)chapters, however, may be primary or secondary wastes, depending on the generating activities. Examples for such entries are:

- oil filters, brake fluids, car batteries, tyres that may result from **repair activities (primary waste)** and from the **dismantling of discarded vehicles (secondary waste)**;
- electrical or electronical components that may arise from **repair activities (primary waste)** and from the **dismantling of discarded equipment (secondary waste)**;
- waste engine, gear and lubricating oils (LoW sub-chapter 13 02) and nearly all other codes of chapter 13 may originate from **maintenance of vehicles, machines or other equipment (primary waste)** or from **waste treatment (secondary waste)**.

In these cases, the secondary waste cannot be determined solely/unambiguously on the basis of the LoW code but additional information on the generating activity is needed.

Please note that there exist further LoW entries in other (sub-)chapters of the List of Wastes that may encode secondary waste depending on the generating activity, but these are not explicitly mentioned here because they are considered of lower relevance in terms of quantity.

Table 18 shows how the waste codes for the secondary wastes mentioned above are allocated to the EWC-Stat classification. The table shows only those EWC-Stat categories that contain secondary waste codes which are included in one of the (sub-)chapters addressed above (i.e. in chapter 19, 16 or 13) and considered as relevant for the purposes of the questionnaire module.

The table specifies for each EWC-Stat category the number of LoW entries included that can unambiguously be classified as primary or secondary and the number of entries that can be either primary or secondary waste, depending on the generating activity.

As can be seen from Table 18, the distinction between primary and secondary waste is to a significant extent possible at the level of EWC-Stat categories, as there exist three categories that include exclusively secondary wastes:

- 03.3 Sludges and liquid wastes from waste treatment (haz. and non-haz.);
- 10.3 Sorting residues, non-hazardous (haz. and non-haz.)
- 12.8, 13 Mineral wastes from waste treatment and stabilised wastes (haz. and non-haz.)

The other EWC-Stat categories listed in Table 18 cover both primary and (potential) secondary waste which means that the categories have to be split for the completion of the questionnaire module based on the LoW-codes and/or on the origin activity of the waste. More information on how to produce the data is provided in chapter 3.3.2.

TABLE 18

EWC-Stat categories that contain specific LoW entries for secondary wastes

EWC-Stat category	Number of LoW codes included			
	Primary waste	Secondary waste	Primary or secondary waste	Total number
01.2 Acid, alkaline or saline wastes	49	1	1	51
01.3 Used oils	15		18	33
01.4, 02, 03.1 Chemical wastes	171	4	18	193
03.2 Industrial effluent sludges	73	1		74
03.3 Sludges and liquid wastes from waste treatment		13		13
06.1 Metallic wastes, ferrous	5	3	1	9
06.2 Metallic wastes, non-ferrous	9	2	1	12
07.1 Glass wastes	5	1	1	7
07.2 Paper and cardboard wastes	2	1		3
07.3 Rubber wastes			1	1
07.4 Plastic wastes	6	1	1	8
07.5 Wood wastes	8	2		10
07.6 Textile wastes	10	1		11
07.7 Waste containing PCB	3		3	6
08 (excl. 08.1, 08.41) Discarded equipment	7		12	19
08.1 Discarded vehicles	1	1		2
08.41 Batteries and accumulators wastes	2		5	7
10.2 Mixed and undifferentiated materials	78	5	1	84
10.3 Sorting residues		15		15
12.8, 13 Mineral wastes from waste treatment and stabilised wastes		21		21
12.1, 12.3, 12.5 Other mineral wastes	75		2	77
Total number of LoW codes covered ⁽⁴⁴⁾	519	72	65	656

2.6.1.4. Losses and Emissions

The variable 'losses and emissions' is introduced into the data collection in the tables 3A to 3C in order to allow the balancing of the input into waste treatment with the final output from waste treatment for the priority waste streams. The parameter includes:

- Water losses through technical dewatering processes or through evaporation;

- The transformation of waste components into gaseous emissions, e.g. through incineration, biological or chemical processes;
- dissipative losses of waste material.

The variable 'losses and emissions' reflects the difference between the total input into waste treatment and the sum of the secondary wastes and products produced. The determination of the value may be challenging for some waste streams. However, it should be possible to determine

⁽⁴⁴⁾ The List of Wastes comprises 842 wastes entries. The total number in the table is lower because that table covers only the EWC-Stat categories that include one or more secondary waste code of LoW chapter 19 od LoW chapter 16.

or estimate the parameter approximately and to check the plausibility of the input-output balance for the respective waste stream.

2.6.2. Description of data set 4 and the proposed tables

Dataset 4 consists of several tables shown in Annex II and will be explained separately in the following chapters (Table 1: 2.6.2.1; Table 2: 2.6.2.2; Table 3A: 2.6.2.3; Tables 3B to 3C: 2.6.2.4). The description of the tables in the following chapters refers to the affected columns by stating the column numbers shown in Annex II, e.g., C1 refers to column number 1.

2.6.2.1. Table 1: Primary waste generation and input into 1st treatment

Table 1 deals only with domestically ⁽⁴⁵⁾ generated primary waste and the 1st treatment of the waste, i.e., on the entry point into the waste treatment chain. The type of treatment is broken down by the six treatment categories of the WStatR. To provide the full picture, additional columns are added for "Pre-treatment" (PRT) (C4 ⁽⁴⁶⁾) and for direct exports of primary waste (C11).

Table 1 is of particular importance. If completed, it provides full information on the 1st destination point of all domestically generated primary waste. It will help to understand how much of the primary waste goes directly to final treatment operations (sum of C5 to C10) and how much of the waste needs to be pre-treated.

Table 1 collects in C1 the total domestically generated waste and in C3 the total input of domestically generated waste into treatment. Depending on the data collection approach and the measurement points, the generated amounts and the input into treatment may deviate but should be similar. C2 is inserted to bridge the gap that may result e.g. from time delays and/or losses between generation and 1st treatment (e.g. through temporary storage, ...). If these do not occur, C1 and C3 are equal.

Relation to other tables:

- C1 'domestically generated waste' refers to primary waste only and should therefore be a subset of the total waste generated according to column TOTAL_HH in data set GEN for each EWC-Stat category, as the data reported in

TOTAL_HH include the domestically generated primary and secondary waste.

- C5 to C10 show the amounts of the primary wastes that go directly to a final treatment operation in the country. The respective amounts should thus be subsets of the data set TRT for each treatment operation and waste category (i.e. for each cell).

2.6.2.2. Table 2: Treatment of imports and exports

Table 2 collects the amounts and the treatment of imported and exported waste. Information on both waste flows is important a) to balance the data on waste generation and waste treatment, and b) to calculate treatment rates for the domestically generated wastes. The data on imports and exports have so far been collected (or approximated with foreign trade data) for the calculation of the Waste Management Indicators in a separate data collection following the WStatR reporting.

Both tables, the one on imports and the one on exports, are broken down by the six WStatR treatment categories. For the imported waste, a column for pre-treatment is added, because it is aimed to understand, how much of the pre-treated waste from imports may have contributed to secondary wastes reported under waste treatment. This was not considered necessary for the exported waste, as this consideration would have increased the complexity of data set 4 even further.

Moreover, it was not considered necessary to display changes of waste categories in this table if only dismantling and sorting was carried out. The wastes can be entered in the way they are before or after complete treatment, e.g. a car can be entered in W081 (discarded vehicles), but as well as the materials it consists of. If the car is entered under W081 (discarded vehicles) as input to the process, the outputs should be distributed over the different treatment operations, by which the materials are finally treated. If the available data on exports contain amounts treated by preparatory treatment (R12, D8, D9, D13, D14), the amounts finally treated shall be estimated.

In Table 2, no distinction is made between primary and secondary wastes. Only the sum shall be reported. The share of secondary waste exported for treatment in C10 is calculated automatically from the exported total (C9) and the exports of primary waste in Table 1 (C11).

⁽⁴⁵⁾ Domestically generated waste is meant as waste that is generated in the reporting country.

⁽⁴⁶⁾ The abbreviation CX refers to the column number used in Annex III, where X refers to the number displayed in the columns of the Tables 1 to 3C.

Relation to other tables:

- The total exports in C9 of Table 2 should be equal or higher than the exports reported in Table 1, C11, as Table 1 refers to primary waste only.

However, the figures reported in Table 2 do not necessarily refer to waste that was generated during the same year and may comprise amounts that were generated in previous years and held in temporary storage. In this case, the correct relation to table 1 may be challenging to achieve, e.g., through estimates.

2.6.2.3. Table 3A: Reporting of pre-treatment (PRT) and output flows

Table 3A reports how the waste inputs (EWC-Stat categories in rows) are transformed into outputs (in columns). The table must be completed only for the priority waste categories but not for the other waste categories (see chapter 2.6.1).

In the input part (C1 to C4), the table distinguishes between the input of domestically generated waste and imported waste, as this information is considered relevant to approximately allocate the produced outputs to the origin of the waste. The columns 'of which Input ... secondary' can be filled for further allocation but are rather seen as additional information. Please note that the input part of the table should be completed for all EWC-Stat categories.

In the part 'output flows', countries are asked to specify for each priority waste category the main outputs of the pre-treatment operations. The cells of non-priority categories, for which no information is requested, are blacked out in the table. The table distinguishes three types of output flows:

- secondary wastes destined for further treatment and characterised by EWC-Stat codes, all aggregated in two columns 'Output remaining in waste treatment total', hazardous and non-hazardous, respectively;
- 'products' that leave the waste regime (e.g. glass or metals fulfilling end-of-waste criteria after pre-treatment; materials or equipment being prepared for re-use); and
- material losses & emissions (e.g., water losses through dewatering or evaporation).

For each priority input flow (row), the amounts of secondary wastes, products and losses shall sum up to the input total (sum of C1 and C3). The amounts of secondary wastes shall reflect the separated waste that leaves the pre-treatment operations for final treatment and is thus included in the data set TRT, unless it is exported for further

treatment. An approach, how the output flows can be allocated to the waste category of interest in the input, when several waste categories are mixed in the pre-treatment operation, is shown in chapter 3.3.3.

The part 'output flows' of the table includes labelled columns for those wastes that are expected to be produced through pre-treatment from one or several of the input flows. Further waste outputs may be added, if considered necessary, or summarised under 'Other'. To allow for more flexibility, the hazardousness of three 'Other' columns can be entered by the countries as needed.

Relation to other tables:

- The 'input domestic total' (C1) includes primary and secondary waste and must thus be equal or higher than the total primary waste input into PRT (C4) in Table 1. The difference between C1 of Table 3A and Table 1 C4 is due to secondary wastes, which are already pre-filled.
- The 'import input total' (C3) must be equal to the imported input into PRT (C2) in Table 2 and is therefore already pre-filled with the figures from Table 2, C2.

2.6.2.4. Table 3B to 3C: Reporting of thermal processes (Table 3B) and of Recycling processes (Table 3C) and output flows

Thermal processes (R1 RCV_E; D10, DSP_I) and recovery processes (R2 – R11, RCV_R) are referred to as 'final treatment' in the context of the WStatR. However, technically they are not 'final' in the sense that waste treatment would come to an end. These processes also produce secondary wastes although to a lesser extent than pre-treatment operations. Incineration processes produce significant amounts of slag and ashes. Recovery processes are assumed to transform a major part of the waste into non-waste products, but they produce also residues consisting of non-recoverable parts of the waste.

Depending on the way countries have covered these outputs from 'final treatment' in their reporting in the dataset TRT, these tables provide the option to cover these outputs and provide the missing link to the reported data. Otherwise, filling these tables is not required and the rest of this section can be skipped.

The structure of the two tables is the same as in Table 3A for pre-treatment, but with a different set of EWC-Stat codes in the output seen as relevant. For example, the only waste outputs that are expected in table 3B are mineral wastes from waste treatment (W128_13), combustion wastes (W124) and metals separated from the incineration bottom

ash (W06). Other secondary wastes may be added, if considered necessary.

Relation to other tables:

- The 'input domestic total' (C1) includes primary and secondary waste and must thus be equal or higher than the total primary waste input into the coloured sets of columns in Table 1 (Table 3B, $C1 \geq \sum(C5, C6)$; Table 3C, $C1 \geq \sum(C7)$). The difference between C1 of Tables 3B and 3C and the mentioned amounts from Table 1 are secondary wastes, which are already pre-filled.
- The 'import input total' (C3) must be equal to the imported input into the coloured sets of columns in Table 2 (Table 3B, $C3 = \sum(C3-C4)$; Table 3c, $C1 = \sum(C5)$ and are therefore already pre-filled with the respective figures from Table 2.

2.6.3. Expected results

The data collected via the additional questionnaire module is expected to provide the following results:

- The data on waste generation and the data on the (input into) treatment can be better balanced through the data

collection on pre-treatment and on imports and exports, and through the distinction between primary and secondary waste. However, this balance is only possible for the total treatment by materials and, differentiated by treatment operations according to dataset TRT, since this would have required a major additional module table specifying the detailed distribution of output by treatment types. This would certainly be too burdensome. Furthermore, the balancing is limited to the priority waste streams.

- Treatment rates for the domestically produced priority waste categories can be calculated or at least approximated through the data collection on the amounts and treatment of imported and exported waste. The module will in particular improve the knowledge on the flow of recyclables, e.g. on their origin and quantity by EWC-Stat categories.
- The data collection via the module can be limited in the beginning to the wastes that are considered to be of highest importance. It can then be expanded stepwise to further waste categories as desired.

Refer to chapter 3.3 that describes the methods to collect or estimate the additional data.

3

Data collection and processing

3.1 Data collection on waste generation

This Chapter is structured in line with the Waste Statistics Regulation. Article 3 of the Waste Statistics Regulation lists four different methods which Member States can use to collect the necessary data:

- Surveys,
- administrative or other sources,
- statistical estimation procedures,
- a combination of the above methods.

The following sections outline the various methods of data collection and the problems involved. As the distinction between the different methods is not always clear, explanations are provided.

3.1.1. Surveys

3.1.1.1. Definition

Surveys are used in order to collect information from units, i.e. response units. Information on waste generation will generally be collected using a questionnaire on waste and the units will be enterprises (or parts of enterprises) or private households.

As a method of data collection, “surveys” include both total (comprehensive) surveys and sample surveys which are carried out regularly in order to collect statistical data on waste generation directly. Surveys carried out to establish the basis for models are not included. Surveys of this kind will be examined in Section 3.1.3 on statistical estimation procedures. Surveys conducted primarily with a view to the supervision and monitoring of enterprises are also excluded.

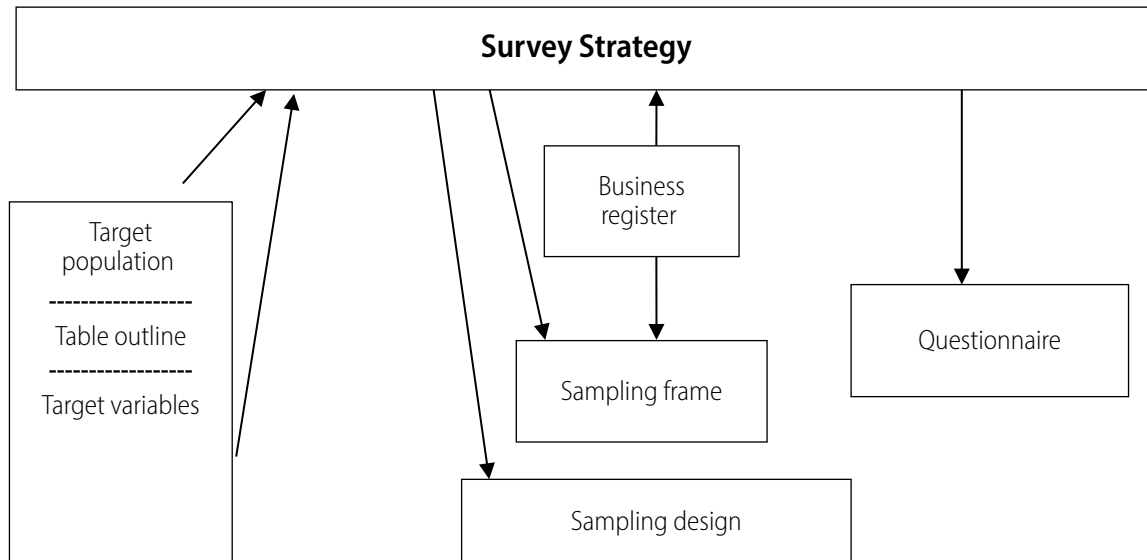
FIGURE 4**Elements of survey preparation ⁽⁴⁷⁾**

Figure 4 shows the various stages of a (business) survey and how they are connected. The starting points (externally defined preconditions) are the target population(s), the target variables and the business register, which is the most important source of data. The sampling frame, the sampling design and the questionnaires must be developed and the sampling selection scheme established on the basis of these external preconditions. The survey strategy covers the various activities involved and should ensure that the sample selection scheme is effective.

The Survey strategy directs the activities involved in the survey, including its preparation. It requires information on the “target population” and “target variables” as input and generates the “sampling frame”, the “sampling design” and the “questionnaire” as output.

The Target population is the set of units which is the object of the survey. In the present case, the target population is defined in two stages. First, 19 items or categories are defined in relation to NACE Rev. 2 (except Item 19) and second, these categories include all the units which correspond to the item definitions. The target population consists of a set of 19 units, each of which contains an (unknown) number of sub-units which can be

approximated by the business register or another administrative source.

The Target variables are the relevant dimensions for the units of the target population. In the present case, 51 dimensions (waste types) are defined, for which values can be assigned to the units ⁽⁴⁸⁾. The quantities of waste generated by each unit should be split up into the 51 dimensions. Values on each dimension do not need to be provided for each unit.

The Business register can be described as “an up-to-date file of all statistical units, active within the country’s territory and generating value added, as well as their relevant statistical and administrative attributes” ⁽⁴⁹⁾. A business register can be seen as a system for converting data from administrative sources (tax registers, social insurance registers and registers of chambers of commerce) into data which can be used in statistics ⁽⁵⁰⁾.

The Sampling frame defines (a) the type of units and (b) the scope or quantity of units to be included from each unit type in the sampling process. The sampling frame refers to the target population. The units defined in the sampling frame should be the same as the units defined in the target

⁽⁴⁷⁾ Figure 3 is taken from: WILLEBOORDSE, A. (Ed.), Handbook on the design and implementation of business surveys, European Commission, 1998; part B, Preparing the Survey Operations p. 69 ff. Some changes have been made to the diagram.

⁽⁴⁸⁾ Following a survey of the units, values are assigned to them for the variables studied, i.e. the values are the responses or outcomes which are obtained when the units are exposed to the stimuli (questionnaire).

⁽⁴⁹⁾ WILLEBOORDSE, A., p. 79.

⁽⁵⁰⁾ Ibid, p. 78.

population, the so-called “analytical units”. The sampling units should preferably be composed of analytical units⁽⁵¹⁾. If the business register is used as a source for sampling, problems may arise with regard to the use of different statistical units in the target population and in the sampling frame.

The Sampling design describes the samples to be drawn⁽⁵²⁾. As the sampling process has an impact on the

estimates which can be produced, sampling design and estimates are usually handled together in sampling theory. A huge variety of sampling types exist. The most relevant are probability samples, which can be further divided into “simple random samples”, “systematic samples”, “stratified samples” and others⁽⁵³⁾.

The Questionnaire is the method used to collect the information from the units included in the sample.

FIGURE 5

Elements of the survey on waste generation

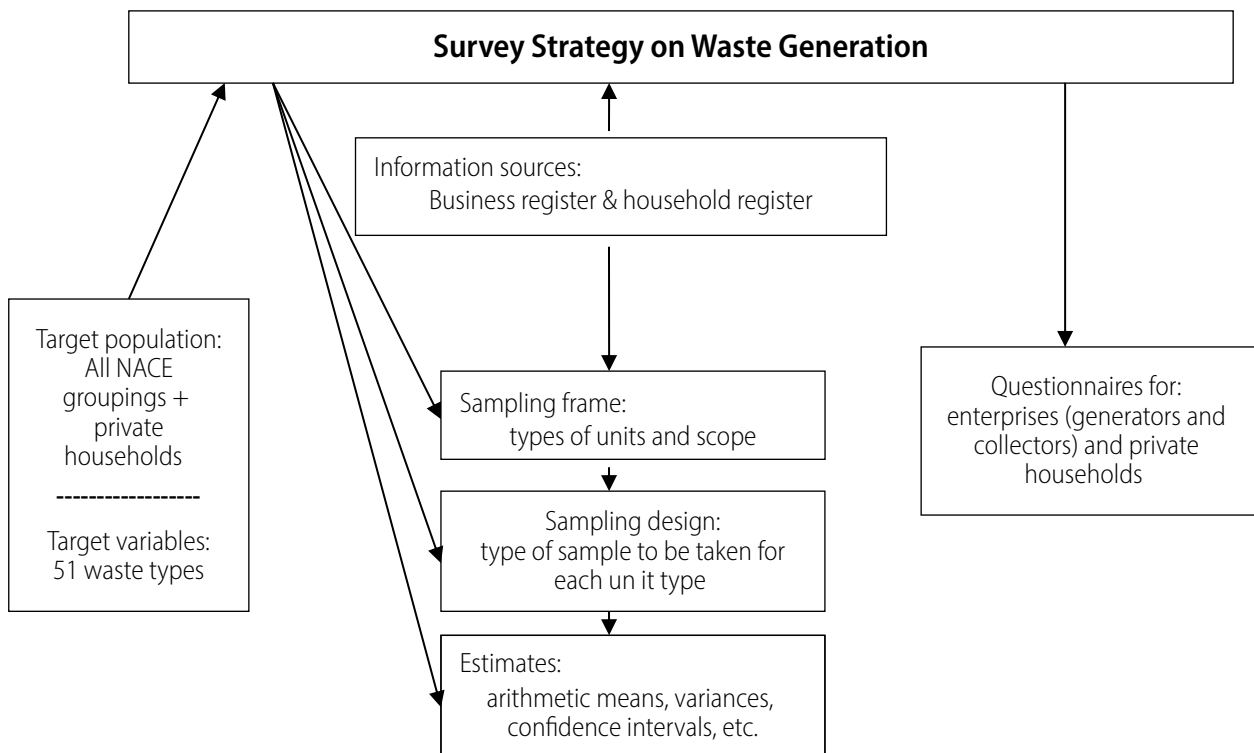


Figure 5 shows the different stages of a survey on the generation of waste and how they are connected. It provides more sources of information than Figure 4: not only the business register but also the population register can be a source of information.

Target population and the target variables for waste generation are defined in Annex I of the Waste Statistics Regulation:

The target population (NACE groupings + Households) is defined in paragraph 1.1 of Section 8 and the target variables (waste items) are defined in paragraph 1 of Section 2.

The target population consists of:

- 18 economic activities classified in accordance with NACE rev. 2; they cover the economy as a whole and are therefore highly aggregated;

⁽⁵¹⁾ Ibid, p. 85.

⁽⁵²⁾ “The sampling design is a set of specifications, which defines the target population, the sampling units and the probabilities attached to the possible samples”.

⁽⁵³⁾ GALTUNG, J., Theory and Methods of social research, p. 56 ff.

- all households.

The target population can be split into two distinct sub-populations: economic activities and households. The two sub-populations, which can also be roughly differentiated by activity (production versus consumption) and waste types produced, are usually entered in different registers. Economic activities are consistently entered in the national “business registers for statistical purposes” and households are registered in residents’ registration offices or other population registers, which may differ from country to country.

The target variables are 51 waste types. These waste types cover the entire waste universe as defined by the waste classification EWC-Stat.

3.1.1.2. Information sources

Business registers

Articles 2 and 3 of Regulation (EU) 2019/2152 ⁽⁵⁴⁾ define the units (legal unit, enterprise and local unit) included in and the scope of the business register. It is important that the inclusion of enterprises whose main activity falls within Section A or O of NACE Rev. 2 is optional. In addition, the extent to which small enterprises should be included will be determined in accordance with the procedure laid down in Article 23(2).

Annex III of the Regulation on business registers defines the “identity number and descriptive details” of each of the three records or unit types which must be included (legal unit, local unit and enterprise).

The NACE activity code and other information relating to waste generation are important for waste statistics. It goes without saying that the information on the activity code, in particular, is crucial. Without this code, less valuable results would be obtained from a survey which used information from the register.

The record for a legal unit does not contain a NACE activity code, although the record for a local unit and also for an enterprise contains the NACE activity code at the four-digit level. This is valid for the main activity. The registering of secondary activities is optional for local units and only necessary for enterprises if these activities account for at least 10% of the (total) “gross value added at factor costs” of the enterprise or 5% of this activity at national level.

The record of an enterprise should also contain the information on size measured by:

- the number of persons employed or, failing that, by allocation to one of the size classes;
- and the net turnover from sales of goods and services (except for financial intermediaries); failing that, by allocation to one of the size classes.

Another register which can be used to gather statistics on waste generation, especially for a sector not covered by the business register, is the farm register, which is used for the Farm Structure Survey (FSS).

Population register

For household waste generation, a sample from the national population register can be taken. The periodical Household Survey can also be used for the direct determination of waste generation.

3.1.1.3. Sampling frame

The sampling frame specifies:

- a. the sampling units to be included in the survey;
- b. the scope of the sampling frame.

(a) Sampling units

In principle, the units in the sampling frame should not necessarily be identical to the target units in the target population, i.e. to the analytical units. However, in most business surveys, a discrepancy of this kind would cause problems ⁽⁵⁵⁾.

The target units are enterprises or parts of enterprises which belong to certain economic activities, on the one hand, and households, on the other.

Economic activities

Section 8(2) (Production of results) of Annex I of the Waste Statistics Regulation stipulates that “for economic activities, statistical units are local units or kind-of-activity units, ... according to each Member State’s statistical system”. This means that countries are not obliged to define their sampling units in accordance with the target units (as kind-of-activity units) but are also allowed to use local units as sampling units. If countries use KAUs or LUs in statistical surveys, this will not necessarily produce non-comparable results, provided that the questionnaires differentiate

⁽⁵⁴⁾ Regulation (EU) 2019/2152 of the European Parliament and of the Council of 27 November 2019 on European business statistics, repealing 10 legal acts in the field of business statistics (OJ L 327, 17.12.2019, p. 1–35)

⁽⁵⁵⁾ Cf. p. 85

between the various activities carried out at LUs or by enterprises ⁽⁵⁶⁾. This subject is dealt with below under “questionnaire design”. This imperfect situation means that estimates based on waste factors to be applied to units recorded in the business register and their characteristics (employment, turnover) will be of restricted quality.

Waste collectors and transport operators can also be sampling units. In such cases, the sampling units are not identical to the target units. Waste collectors and transport operators must be able to identify the NACE code of the primary waste sources and to split up all wastes they have transported or collected accordingly.

A census of waste collectors and transport operators is necessary. The comprehensiveness of the census can be evaluated (and improved upon) using waste treatment operators as an information source.

Households

If a survey of households is carried out directly, sampling units and target units are identical. However, the waste generation of households can also be determined by conducting a survey of waste collectors. This has been the norm hitherto and, in such cases, target units and sampling units are different.

(b) **Scope of the sampling frame**

Both of the target populations are comprehensive. There is therefore no risk in theory that the sampling frame will lead to overcoverage.

Economic activities

The business register will not necessarily include all economic activities and size-classes. Coverage of agriculture and fishing varies across countries, and coverage of small enterprises can be incomplete due to thresholds. Appropriate measures should be taken to compensate for under-coverage. More complete coverage is required under the new Business Register Regulation.

Enterprises which went out of business or were created in the reference year constitute special cases. Enterprises which have been liquidated can still appear in the business

register if the sample was taken before the register was updated. For the same reason, enterprises which have just been set up cannot be incorporated into the register. The business register will therefore not be a suitable source of data for estimating the waste generated by enterprises of this kind.

Enterprises which went out of business in the reference year but continued to produce waste until their date of liquidation should also be included. These enterprises sometimes cannot be contacted, with the result that waste generated by them is underestimated.

The “survey strategy” should indicate how all special cases are to be handled (i.e. NACE A enterprises, small enterprises, defunct enterprises, new enterprises and other enterprises which are not included in sufficient detail in the business register).

Households

Household surveys have been conducted in a number of countries for over 100 years. Household surveys on consumer issues and opinion polls now have a very important role to play. Only a small number of countries conduct household surveys on waste generation. The generation of household waste is usually determined indirectly using waste collectors or waste treatment operators as data sources. However, household waste surveys are likely to take on a more important role, as they are one of the few reliable ways of determining household waste in particular rather than “municipal waste” in general.

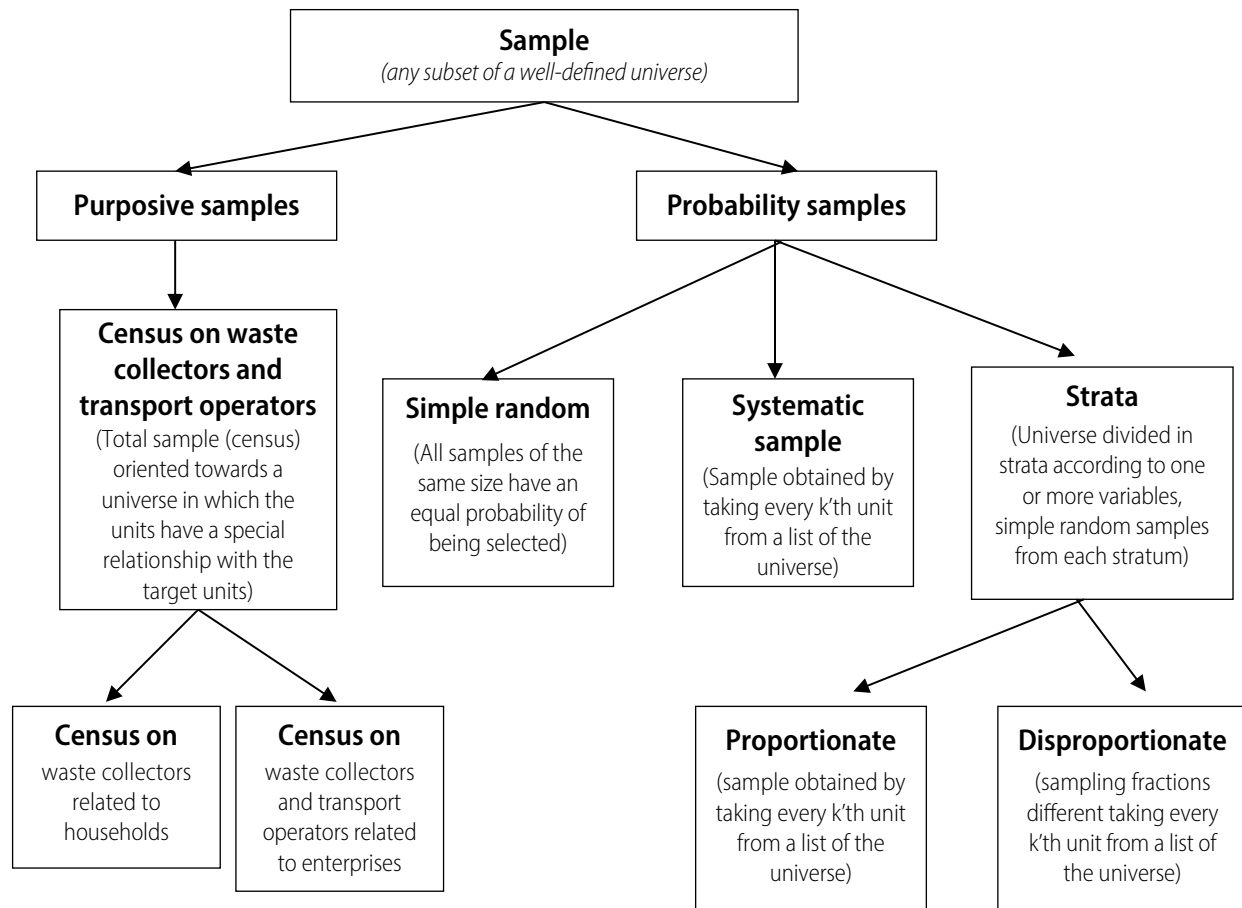
3.1.1.4. Sampling design and estimates

“The sampling design is a set of specifications which define the target population, the sampling units and the probabilities attached to the possible samples ⁽⁵⁷⁾.” The definition should also include the sampling method used. Figure 6 below gives examples of the different types of sampling methods which may be used for determining waste generation. The terms are taken from J. GALTUNG ⁽⁵⁸⁾ and have been adapted to the subject of waste. Figure 6 is not necessarily comprehensive and other sampling procedures may also be used in the Member States.

⁽⁵⁶⁾ The business register only requires the delineation of KAU for very big enterprises. Moreover, not all enterprises are delineated and not all secondary activities are known., Member States are therefore obliged in practice to use either legal units or local units as statistical units in their sample surveys.

⁽⁵⁷⁾ Cf. p. 88.

⁽⁵⁸⁾ Galtung, Johan: Theory and Methods of Social Research, p. 37 ff. (See in particular p. 57.)

FIGURE 6**Different sampling methods****Probability samples**

The sampling procedure, i.e. the sampling method and the number n of units selected from the sampling frame, determines the estimation procedure to be applied and the quality of the estimates.

It is evident that a strata probability sample will produce better results than simple random or systematic samples. A strata sample, especially a disproportionate strata sample which includes nearly all large industrial waste generators, will reduce the risk of underestimating the generation of waste. The amount of waste generated is not usually proportional to the size of the enterprise but increases in line with it⁽⁵⁹⁾. Underestimations are therefore more likely in sample surveys which do not use special strata for large enterprises.

Estimates to be calculated

General consideration: in the case of all the estimates discussed below, the sampling frame does not correspond fully to the target universe, i.e. not all enterprises will appear in the business register from which the samples will be taken. This will lead to an underestimation of the mean values. Member States should describe the way in which they have identified and compensated for this bias.

(a) Estimates of the total amount of waste generated per waste type i from source j . These estimates should be used to complete the cells of the target matrix.

The calculation should be done on the basis of the assumed distribution of the universe from which the sample is taken. The estimates are done for the separate NACE groupings and the waste types produced by these groupings. If

⁽⁵⁹⁾ In special sectors like agriculture and forestry, some countries come to the conclusion that waste is generated only by large enterprises.

stratified samples are taken, then the calculation must be done in steps: first for the strata and then for the NACE groupings in total.

(b) Estimates of variances of a sample set (taken from a distinct NACE grouping) concerning all or some of the waste types generated by this NACE grouping.

The variances provide valuable information. They complete the picture and are therefore important. They should be calculated and provided for all waste types because the calculation can be done automatically and therefore does not need any additional resources.

(c) Determining confidence intervals for estimates of the variances of a sample set (taken from a distinct NACE grouping).

The different kinds of probability samples (illustrated above) are connected to different distributions of the expected mean value. On the basis of the assumed distribution of the mean (or total) value, confidence intervals are computed which directly show the precision of the estimation.

Purposive samples

Waste generation can also be determined via waste collection. This can be seen in the case of household waste, where the census of (municipal) waste collectors is the traditional surveying method which is still applied in most Member States.

However, the source “waste collectors and transport operators” can also be used to determine important fractions of waste generation by economic activities. All wastes leaving the enterprise site must be either collected or transported away from the site. This means that industrial waste collectors and transport operators account entirely

for those quantities of waste which do not remain on the site for internal recovery or disposal, i.e. those quantities of waste which should be covered by the Waste Statistics Regulation.

3.1.1.5. Questionnaire design

The questionnaires proposed in the following section illustrate the topics to be considered and how they could be incorporated into a questionnaire.

These model questionnaires refer to enterprises. The recipients of the questionnaire can differ from country to country. Some countries send questionnaires directly to the KAUs of enterprises whereas other countries send them to municipalities which deal with waste collection.

Questionnaires which are sent directly to KAUs can of course be much simpler because it is not necessary to differentiate between KAUs.

3.1.1.6. Survey strategy

The survey strategy should outline how the various objectives will be achieved and how any problems will be solved.

Objectives:

- targeted surveys, i.e. closely linked to the target units;
- comprehensiveness of surveys, i.e. prevention of undercoverage but also of overcoverage (double counting) and consideration of population changes during the reference period;
- high accuracy of estimates (small variances and also relatively small confidence intervals);
- reduce considerable burden on respondents.

Questionnaires for waste generators

TABLE 19

Part 1 of the questionnaire for waste generators: Identification of the addressee and specification of the parts of the enterprise

Information on the enterprise		
1	Identification code of the enterprise in the Statistical Business Register or, if unavailable, in another register (chamber of commerce, social insurance, etc.) and the contact details of the enterprise:	This information can be entered in the questionnaire beforehand, with enterprises being asked to correct it if necessary
2	Starting date of the business:	
3	Main kind of activity of the enterprise and its NACE code:	
4	Further kind-of-activity units operating in the enterprise and their NACE-codes at four-digit level:	
5	Kinds of waste treatment activities carried out at the enterprise and the KAUs to which they belong:	
6	Ancillary activities carried out at the enterprise and the estimated percentage distribution of their services over the KAUs, including the aforementioned treatment facilities:	

The questionnaire proposed in Table 19 is usually addressed to enterprises. The relevant administrator of the enterprise should specify the code(s) and the contact details in order to facilitate further contact (row 1).

Rows 3 and 4 ask for information on principal and secondary activities. The criteria and conditions for the specification of secondary activities outlined in Regulation (EU) 2019/2152 on business registers for statistical purposes should be added as an annex to the questionnaire.

Row 5 asks explicitly for information on the waste treatment operations carried out at the enterprise and for the KAUs to which these activities belong. Although this information is

not necessary for the purpose of collecting data on waste generation, it will be useful from the point of view of understanding the enterprise's waste management policy and can also be helpful when it comes to identifying waste treatment facilities which are not included in administrative registers.

Row 6 refers to ancillary activities as defined in Regulation (EU) 2019/2152, which is mentioned above. These ancillary activities can also produce waste, which should be assigned to the various KAUs within the enterprise. It is proposed that the enterprise be allowed to decide how to split up the ancillary activities.

TABLE 20

Part 2 of the questionnaire for waste generators: Generation of waste by economic activities and waste types

Waste generation							
1	2	3	4	5	6	7	8
Waste types pursuant to LoW and/or EWC-Stat	Main kind-of-activity unit A	Secondary KAU B	Secondary KAU C	Secondary KAU ...	Secondary KAU X, including waste treatment	Net temporary storage	Total waste generation
Code (a)							
Code (b)							
...							
Code (z)							

Table 20 is the core table. The enterprises included in the sample survey should specify the waste they generate by waste codes and KAUs.

It is proposed that the waste treatment facilities within the enterprise should also be specified. This will explain how secondary waste is generated. In Table 20, a possible waste treatment facility is assigned to only one KAU (column 6). Several waste treatment facilities forming part of a number of KAUs might exist within the same enterprise. The situation should be clarified in Table 19.

Column 7 is optional. If enterprises are equipped with temporary storage facilities, and if temporary storage interferes in the waste flow, i.e. if temporary storage results in a considerable time lag between the generation of waste and its release for waste treatment, then temporary storage must be taken into account. It is proposed that the net effect be recorded, i.e. temporary storage at the beginning of the reference year minus temporary storage at the end, and that this net figure be added to the figure for the total in column 8.

Questionnaires for waste collectors and transport operators

TABLE 21

Questionnaire for waste collectors and transport operators: Identification of the addressee and specification of the enterprise

Enterprise details		
1	Identification code of the enterprise to which the waste collector/transport operator is assigned in the business register or, if unavailable, in another register (chamber of commerce, social insurance, etc.) and the contact details of the enterprise:	Once again, this information can be entered in the questionnaire beforehand, with enterprises being asked to correct it if necessary
2	Starting date of business:	
3	Main kind of activity of the enterprise and its NACE code:	
4	Does the enterprise carry out additional waste management activities on site, e.g. other waste transport activities and waste treatment activities? Please give details of all waste management activities conducted at the enterprise.	

As mentioned with regard to waste generators, questionnaires are usually addressed to enterprises. Table 21 must prepare the enterprise for the questions which follow.

The questions concerning information on the enterprise refer to the contact details of the enterprise (row 1) and to the structure of the enterprise as regards waste management (rows 3 and 4).

TABLE 22

Questionnaire for waste collectors and transport operators: Waste quantities collected and received

Waste collection and transport							
1	2	3	4	5	6	7	8
Waste types pursuant to LoW and/or EWC-Stat	Total amount collected and transported (except for internal recycling)	Waste collection from enterprises			Municipal waste collection		
		Waste collected or received from other enterprises	Waste received from own enterprise	Waste collected or received from waste traders	Waste collected from households	Commercial waste collected together with household waste	Waste collected from public places and others
Code (a)							
Code (b)							
.....							
Code (z)							

Column 2 of Table 22 specifies the total amount of waste collected and transported. Only waste transported for internal recycling should be excluded. The quantity given in column 2 should be the exact figure requested in Annex I of the Waste Statistics Regulation, i.e. the total amount of waste generated.

Columns 3 to 8 specify different sources of waste which are important. Further details should be provided in column 3 using NACE codes – also in column 7, as far as possible.

Column 5 prevents double counting. Column 2 should be constructed by adding together columns 3 to 8 and subtracting column 5.

Table 22 aims to identify and separate “waste from enterprises or economic activities” and “waste from households”. This questionnaire can be seen as a comprehensive tool designed to cover both sides of the process of waste generation (production and consumption).

Problems with the integrated questionnaire and the census on waste collectors:

- Waste collectors and transport operators do not necessarily belong to one NACE grouping. Transport operators must not be restricted to waste transport. Waste transport can be an ancillary or secondary activity of a given enterprise. It is difficult to cover all waste transport operators by questioning only enterprises whose main activity is “transport”.
- Waste collectors may also have problems specifying the sources from which they receive the waste. This applies to municipal waste, in particular. For waste collectors, the specification should be manageable to a certain degree.

3.1.2. Administrative or other sources

3.1.2.1. Definition

An administrative information source is established by an institution which regularly collects and puts together information from enterprises or institutions. If any information which is collected and put together by the

administration for purposes other than for waste statistics can also be used directly or with some additional effort to generate some of the information required for waste statistics, then this data set serves as an administrative source for waste statistics.

Administrative sources can be data sets from:

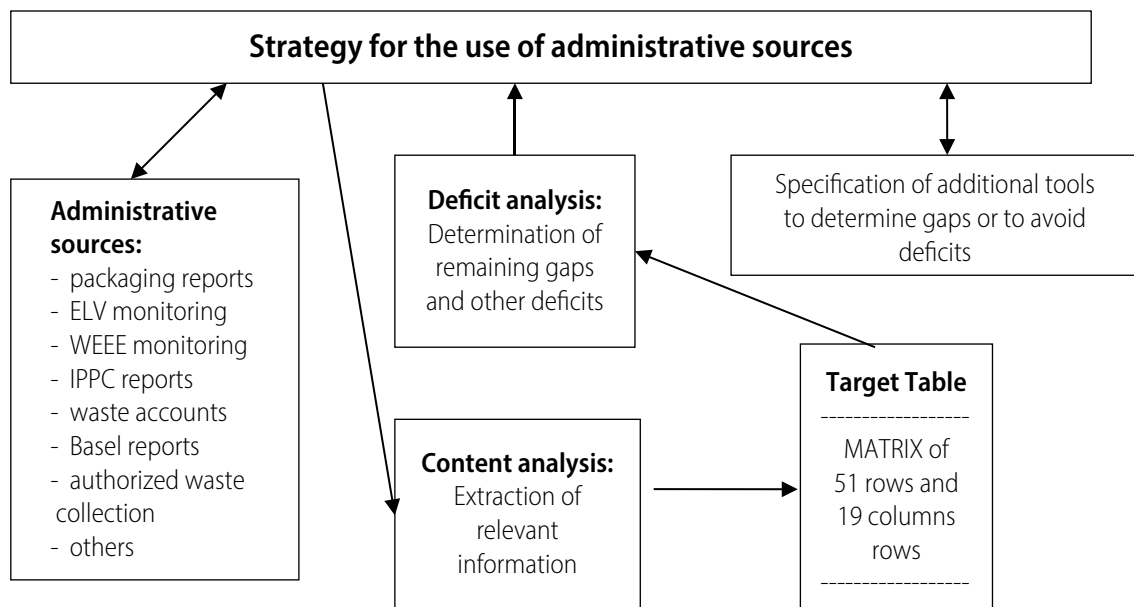
- public institutions (environment agencies and other supervising authorities);

- associations and organisations in the public sector which organise or handle specific aspects of waste management (dual system in Germany and France, regional waste oil collectors, etc.);
- others, such as the reporting obligations under Community legislation on waste management.

Figure 7 provides an overview of administrative sources and the way in which they are used:

FIGURE 7

Flow chart on the use of administrative sources



Content analysis

The administrative data set should be analysed with regard to units (economic activities, households) and variables (waste types). In the case of administrative data, it is often unnecessary to differentiate exactly between units as required under the Waste Statistics Regulation. The situation with regard to waste types is better, but recycling-related administrative data sets tend to include product-related terms which need to be translated into waste categories.

Deficit analysis

The deficit analysis should focus not only on specifying the residuals which are not covered but also on drawing up quality criteria for the data sets to be used.

“Quality criteria” are very important with regard to administrative data sets. Usually, it is either not possible to obtain enough information on how the data set was put together, or the data set was created without taking statistical principles into account. In any case, administrative data sets pose special problems in terms of quality. Important points which should be borne in mind when conducting a deficit analysis are the following:

- Continuity of the source
Is the information source regularly updated? Are changes planned or might the information source be shut down?
- Validity of information
Are there incentives in the system for over or under-reporting, e.g. are enterprises interested (or not interested) in being included in the administrative register for monetary reasons?

- Possibility of exerting an influence
Where necessary, is there any chance of shifting and directing the information contained in the administrative sources so that it can be better applied to waste statistics?

The subject of quality will be dealt with in greater depth in Chapter 4.

Additional tools and system of data sources

This part of the strategy should explain additional tools and the way in which they relate to the (main) administrative data. A description should then be provided of the complete system of data sources which is to be used to cover waste generation.

Strategy for the utilisation of administrative sources

The utilisation of administrative data sets should be prepared in a strategic way. The function of the administrative data set(s) in the statistical process should be defined. Will the administrative data form the core of the statistical data, will they serve as supplementary data (e.g. for specific waste streams) or will they be used mainly to check plausibility? This question needs to be answered first. The function of administrative data sets must first be clarified before examining the objectives of using the data set, i.e. which cells of the target matrix should be completed or which totals should be checked.

Another preparatory task is content analysis. Differences between units and waste types used in the administrative data sets and in the Waste Statistics Regulation should be explained and information should be provided on how to overcome them.

A related aspect of content analysis is the analysis of under-coverage and over-coverage. This is not only a question of administrative rules, but also of identifying

possible incentives for over or under-registration. Another aspect of quality is the dating of waste streams. Administrative bodies often register several dates, such as date of collection, date of treatment and date of registration. Steps need to be taken to determine which date is most suitable for statistical purposes.

In general terms, the application of administrative sources means that the quality of the statistics depends directly on the quality of the administrative system. It is necessary to establish what quality procedures are in place, e.g. a quality monitor on the classification of waste or a waste accounting system which allows for check sums on waste stocks and flows.

3.1.3. Statistical estimation procedures

3.1.3.1. Definition

This section covers the statistical estimation procedures which are not dealt with in Section 3.1.1 on surveys. Surveys, as defined in Section 3.1.1, are carried out in order to gather the relevant information directly from enterprises or households.

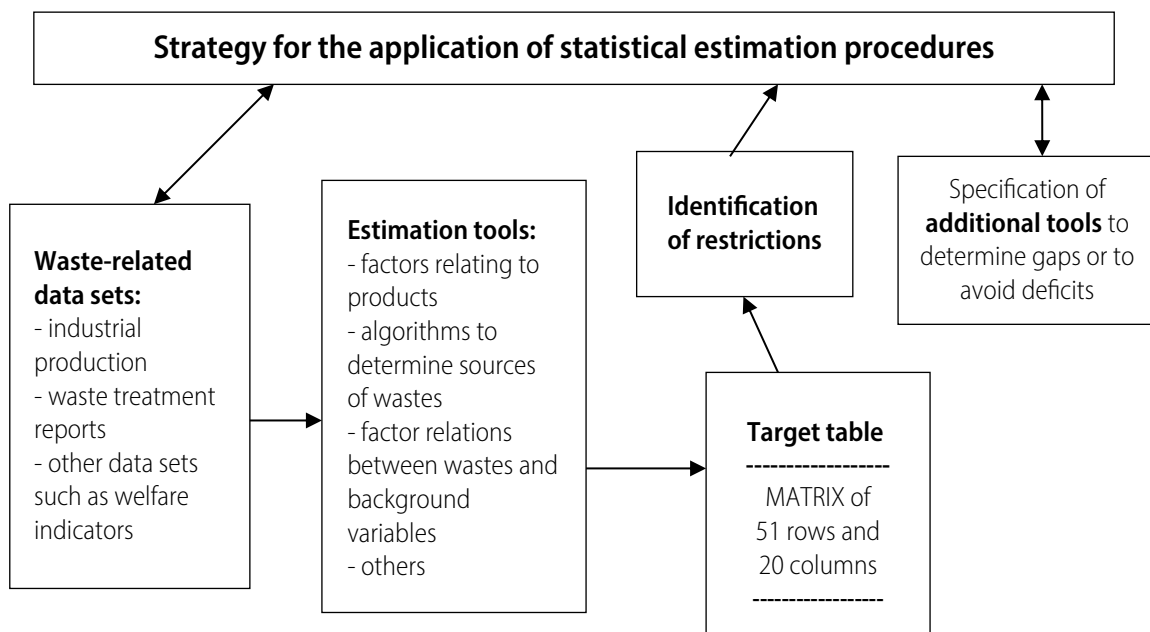
Statistical estimation procedures can be:

- the estimation of waste generation by waste factors to be applied to waste-related activities;
- the estimation of waste generation via (causal) models based on “visible” variables;
- the indirect determination of waste generation via waste treatment or waste collection;
- others.

Figure 8 provides an overview of the strategic planning of estimation procedures.

FIGURE 8

Flow chart on the application of statistical estimation procedures



3.1.3.2. Strategy for the application of statistical estimation procedures

The strategy must be explained. It should consist of (i) a description of the basic data sets, (ii) an exploration of the estimation procedure(s) and (iii) an identification of the restrictions of the methods proposed. Finally, the strategy should outline how the available procedures should be combined to form an integrated and comprehensive method of data collection.

Waste-related data sets

Two data sets tend to be used for the estimation procedure:

(A) EU production statistics

Community production statistics in accordance with the PRODCOM - classification ⁽⁶⁰⁾ are restricted to mining and manufacturing industry (i.e. to sections B and C of the NACE Rev. 2 classification). As of reference year 2019, in addition data on the production in NACE E38 'waste collection, treatment and disposal activities; materials recovery' will be collected ⁽⁶¹⁾. None of the remaining sectors, like agriculture,

construction and demolition, and services, are included, although some of them are quite important.

(B) Waste treatment reports

Waste treatment reports are without doubt the most important source when it comes to determining waste generation indirectly. They are comprehensive, provided that all the waste always ends up at the waste treatment facilities in question ⁽⁶²⁾ and that a sufficient distinction is made between waste types.

Two problems are associated with the use of waste treatment reports in determining waste generation: a practical problem and a theoretical or ideological problem.

The practical problem is that the waste treatment operators usually do not know, or do not want to know, from whom (i.e. from what source) they receive the waste. The reports must therefore be split up by sources according to waste substances. This cannot be done satisfactorily because a lot of waste types are non-specific.

The theoretical problem is that the Regulation seeks to ensure that data is collected on the two cornerstones of the waste cycle (waste generation and waste treatment), with

⁽⁶⁰⁾ Council Regulation (EEC) No 3037/90 of 9.10.1990 on the statistical classification of economic activities in the European Community.

⁽⁶¹⁾ For this purpose, two new codes were added to the PRODCOM list: 38.32.20.00 'Metal secondary raw materials' and 38.32.30.00 'Non-metal secondary raw materials'

⁽⁶²⁾ Statisticians usually take this for granted. They argue that illegal waste "management" is a matter for the police and not for statisticians.

independent methods being used to guarantee that both aspects are covered. If one country uses, for example, only one source of information, such as waste treatment, in order to determine both cornerstones of the waste cycle, then the results will be entirely consistent. But consistency of this kind provides only limited additional information. It is only logical that consistency could be achieved in such cases, but this would be at the expense of the information contained in the data. If the amounts of waste generated and treated are established independently, the differences which will arise will reflect both real differences (e.g. storage, time lags) and the quality of the estimation methods.

Other sources of data also exist. These are summarised under:

(C) Other data sets such as welfare indicators

The generation of household waste and of agricultural waste can also be estimated on the basis of models linked to variables which are regularly observed. Economic indicators can be used to estimate household waste, while agricultural data, such as the number of animals, can be used to estimate manure, etc.

Estimation tools

(A) and (C)

Comparable estimation tools are used for the cases covered by (A) and (C). The aim is to identify causal relations and to translate these into mathematical formulas. Waste factors, which establish the relation between the production of a certain product (measured by weight or even by monetary value) and the quantity of waste generated during the production process, depend on a number of assumptions. These assumptions are not very practical for a large segment of manufacturing industry. The application of waste factors suggests a constant relation between the level of production in an industry and waste generation. Changes in the composition of the industry or changes in the production processes should appear in new waste factors.

(B)

The estimation tools used in waste treatment reports are pure algorithms which assign to a certain type of waste the source(s) from which the type of waste "appears".

Identification of restrictions

(A) and (C)

The following main restrictions apply to waste factor applications:

- Variability of causal relation in time and space, i.e. production techniques periodically change and are renewed, and the techniques applied can vary.
- Figures on some products are not available as physical measurements but only as monetary values. Even if the product figures are available as physical measurements, waste factors can be almost impossible to generate because the products are too complex (e.g. motor vehicles).

Waste factors can be applied successfully only for a small proportion of basic products, where stable and strong causal relations exist between production and waste generation. Waste factors seem to be most useful when applied to agriculture.

(B)

The problems and restrictions associated with the use of waste reports for the estimation of waste generation are manifold.

The problem of "ideology" has already been mentioned, i.e. where the method does not look independently at the two cornerstones of the waste cycle but looks at waste generation only from the point of view of waste treatment.

The most important problem is how to break down the waste types which do not belong exclusively to one sector. A related problem is reduced comparability with other Member States which collect data via surveys on waste generators. These "survey-based MS" will have NACE groupings which are not pure, i.e. they will necessarily include ancillary activities and non-specified secondary activities. However, the NACE groupings which are isolated via waste treatment will be pure.

Additional tools and system of data sources

As with the previous type of data source, additional tools and the way in which they relate to the (main) data estimations should be explained. A description should then be given of the entire system of data sources which is to be used to cover waste generation.

3.1.4. Combination of the foregoing methods

3.1.4.1. Definition

The data collection method "combination of the foregoing methods" is a method which is not only based on several of the foregoing methods but which can also include small additional tools to close data gaps.

Data collection methods which are (mainly) based on one of the foregoing methods and use only small tools to cover residual data gaps are not considered to be a combination method. Methods of this kind should be attached to their primary data collection method.

Examples of combination methods:

- combination of (i) indirect determination of waste generation via waste treatment for specific waste types and (ii) business survey of waste generation for the distribution of the remaining waste type;
- combination of (i) business survey of selected economic sectors and (ii) administrative sources for remaining sectors or specific waste types;
- combination of (i) business survey of the economy and (ii) household survey of private households;
- others.

3.1.4.2. Problems associated with a combination of different sources

Three problems in particular can occur:

- double counting and/or lack of clarity in the delimitation of methods or data sets;
- differences in level of detail;
- differences in level of quantity.

The three problems are explained in the examples described below.

Double counting

The most important and difficult case with regard to double counting and unclear delimitation is where two comprehensive surveys are planned and carried out for economic activities, on the one hand, and households, on the other. It is even more complicated if the household waste data are obtained from a census of waste collectors⁽⁶³⁾.

Using a census of waste collectors to determine household waste already presents a number of problems. If a survey of this kind is designed to complement a business survey, further problems will arise.

“Internal” problems associated with using a census on waste collectors to determine household waste:

Waste collectors collect not only household waste but also similar waste from enterprises; it is not easy to differentiate between the two if enterprises and households are located in the same districts or even in the same buildings.

⁽⁶³⁾ Both methods are described in Section 3.1.1.

Waste collectors, in particular collectors of waste for recycling, are not easy to identify. In addition to specialist waste management companies or municipal authorities, charity organisations and traders also collect and trade in waste. Traders of this kind mainly deal with the administrative aspects of the transaction and use transport companies and specialist companies for the logistics. Double counting can occur if both types of companies are included in the survey. This also applies to waste which is traded several times before treatment.

The business survey of economic waste generation should exclude those enterprises (or special activities from those enterprises) which handle household waste only, and should include collectors which collect waste similar to household waste from enterprises and public institutions.

To avoid double counting and undercoverage, the survey questionnaires must take into account the possibility of waste fractions being wrongly included or excluded.

Differences in level of detail

If waste generators are questioned directly, the level of detail (e.g. the number of relevant waste types) can be very high:

If the source of waste generation is determined indirectly, e.g. via waste treatment operators, the determination of the source is only clear for the waste streams which relate to specific economic activities. For non-specific waste types, the indirect determination of the source will generally lead to less detail in the waste streams per source.

Differences in level of quantity

If different methods are used to determine the quantities of waste generated, e.g. for the important waste streams “waste oils” and “construction and demolition wastes”, the comparability of the resultant data can be undermined. This reduction in comparability can appear at international and at inter-sectoral level.

Non-comparable results can be obtained if motor waste oil is estimated either on the basis of the operating vehicles and the average waste-oil changes or on the basis of the material accounts of exclusive waste oil collectors. The estimations will usually lead to comparable higher amounts because it can be assumed that not all of the waste oils will end up with authorized waste oil collectors.

The aim should be not to eliminate the differences but to prepare for and explain them. This is possible only if the methodological information is also provided along with the figures.

Construction and demolition waste (C&D waste) is often used directly in the construction and repair of pathways in forests and agricultural land or in noise-control walls. Waste of this kind is also treated directly on site to reduce treatment costs or to increase the value of the residuals. This type of waste will probably not appear in input waste statistics. But the waste will be registered if C&D companies are surveyed directly. The national figures available on C&D waste include a certain amount of non-comparable data. These differences may be somewhat reduced by the reduced scope of the new Waste Framework Directive (2008/98/EC) that now excludes the uncontaminated soil and other naturally occurring material excavated in the course of the construction activities where it is certain that the material will be used for the purposes of construction on the site from which it was excavated.

3.2. Data collection on waste treatment

The objective of Annex II of the Waste Statistics Regulation is to draw a comprehensive picture of waste recovery and disposal. Annex II indicates that statistics should provide information on the final destination of all types of waste (except radioactive waste) and on the type, number and capacity of treatment facilities.

Statistics are to be compiled on two types of characteristics:

- the quantities of waste treated by treatment category and waste category;
- the waste treatment infrastructure, i.e. number and capacity of waste treatment facilities by treatment category and region.

This Section seeks to describe the most relevant sources and approaches for the collection of data on waste treatment and to highlight the aspects which are crucial to the compilation of data in accordance with Annex II of the Waste Statistics Regulation.

3.2.1. Introduction

The collection of data on waste treatment differs from the collection of data on waste generation in the following ways:

- The number of operators of waste treatment facilities is much lower than the number of waste generators.
- Treatment facilities are subject to a stricter supervision regime than waste generators on account of the possible environmental impacts of waste treatment. This

enhances the availability of administrative data which can be used for statistical purposes.

- Data requirements on waste treatment refer to treatment facilities, not to local units or kind-of-activity units. This means that specific technical information is required which is below the level at which it is usually recorded in business registers.
- Most treatment facilities are unique with regard to the waste types treated, their capacities, the actual throughput and the technology applied. This makes it almost impossible to draw an inference from a sample, which clearly limits the use of sample surveys or estimation procedures.
- Currently statistics on waste treatment includes also imported waste and statistics on waste generation includes exports of waste.
- The constant improvements in the technical standard of recovery and disposal operations mean that waste treatment is increasingly becoming a multi-step process and this makes double counting an important issue.

3.2.1.1. Sources of data on waste treatment and data collection methods

The main sources of data on waste treatment are the treatment facilities themselves. The most important requirement for comprehensive data on waste treatment is a complete overview of all treatment facilities, i.e. comprehensive, accurate and up-to-date waste facility registers. Comprehensive registers are a prerequisite for the collection of facility-related information and for data on treated quantities, irrespective of the method of data collection used.

The sources and collection methods used to compile statistics on waste treatment can be summarised as follows:

- Data collection on waste treatment relies strongly on the use of administrative data collected for licensing and monitoring purposes such as facility registers, consignment notes, or waste management reports.
- Statistics on waste treatment are usually based on total surveys which only exclude small treatment facilities, if at all. Sample surveys and estimations play a negligible role.
- Due to the wide variety of waste treatment operations and waste streams, data often have to be drawn from different sources, which makes the harmonisation of definitions, classifications and reporting requirements an important issue.
- Some countries use data from industrial or public associations, and from the monitoring of waste products, in addition to data from other sources. This option is

mainly used for data on the recycling, recovery and export of green list waste.

The different sources of data and methods of data collection are described in detail below.

3.2.2. Administrative sources

3.2.2.1. Types of administrative data and data sources

As defined in Section 3.1, administrative data are understood to be data which are not collected primarily for statistical use but for administrative purposes such as licensing, monitoring and law enforcement. A distinction can be made between:

- data collected or recorded by competent authorities on the basis of legal provisions;
- other data collected on a voluntary, economic or other basis by the private or public sector; this includes, in

particular, data collected by associations for their own purposes.

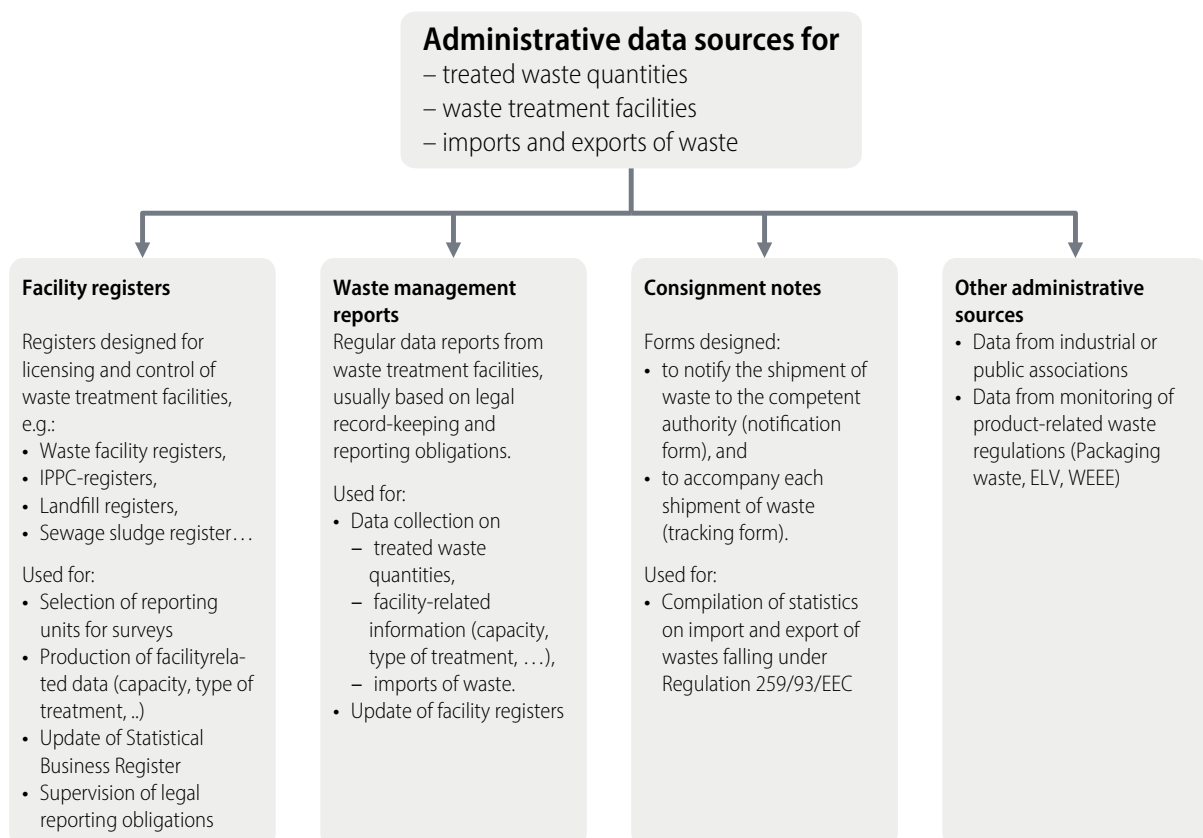
The use of administrative data for statistics is increasing across the board. The most important reason for this is undoubtedly to reduce the burden on response units and administrative bodies by avoiding redundant data collection. In general, administrative data are also assumed to have a higher coverage than statistical sources. A further advantage is that administrative registers usually refer to facilities and not to statistical units, which complies with the requirements of Annex II of the Waste Statistics Regulation.

On the other hand, administrative sources are by definition not designed primarily for statistical use. As a consequence, administrative data may be based on inappropriate definitions or classifications, may lack important information or may have other shortcomings. Also lack of timeliness often militates against the use of administrative data.

Figure 9 provides an overview of the main administrative data sources and their use in the compilation of waste treatment statistics.

FIGURE 9

Overview of administrative data sources used for waste treatment statistics



3.2.2.2. Waste facility registers

Waste facility registers are designed to assist the competent authorities in the registration and licensing of waste treatment facilities, in the issuing of permits and in monitoring compliance with legal requirements. Waste facility registers usually form the core of a waste information system.

For the purposes of waste statistics, waste facility registers are used in different ways:

- as a database for the selection of reporting units for surveys, i.e. for the identification of plants falling within the scope of the Waste Statistics Regulation;
- for the production of facility-related information: data on capacity, treatment method, regional location can be retrieved directly from the register;
- for the supervision and enforcement of legal reporting obligations;
- as a source for updating statistical registers used in surveys on waste treatment.

Issuing of permits to and the registration of waste treatment facilities

The provisions of Directive 2008/98/EC (Waste Framework Directive) on the issuing of permits to and the registration of waste treatment facilities can be seen as the legal basis underpinning the obligation of Member States to register waste treatment facilities.

Article 23 of the Waste Framework Directive requires all establishments or undertakings which carry out waste treatment to obtain a permit. Under certain conditions, Articles 24 and 25 allow the Member States to exempt specific treatment operations/facilities from this obligation. Operations which are exempt from the obligation must be registered with the competent authority. This means that every waste treatment operation which falls within the scope of Directive 2008/98/EC must be registered in one way or another.

However, this does not mean that the Member States have to establish a central database of authorised or registered treatment facilities. Member States handle the issuing of permits and registration in very different ways.

In practice, responsibilities with regard to the issuing of permits, registration, monitoring and enforcement are spread across different administrative bodies and different administrative levels. It is often the case that national authorities are in charge of the licensing and supervision of large treatment facilities while smaller facilities and

low-impact operations are handled at regional or municipal level.

Furthermore, the licensing and registration of waste treatment facilities does not necessarily take place in accordance with waste legislation but may be regulated by other laws. This applies, in particular, to types of waste which are excluded from the scope of Directive 2008/98/EC, as stipulated in Article 2.

Here are some typical examples of cases in which waste treatment is regulated under legislation other than waste legislation:

Environmental legislation: Waste treatment activities falling under the IPPC Directive

Agricultural legislation: Spreading of waste on land

Building laws: Management of waste arising and treated in the context of construction measures

Mining legislation: Management of waste from mining and quarrying

Water rights: Management of dredging sludges; spreading of waste on land

Public health laws: Management of animal carcasses, infectious waste, etc.

Information on waste treatment facilities may therefore be spread across different registers and authorities depending on the national legislation and administrative structure in place. This might make it very difficult to select the treatment facilities which are to be covered by waste statistics. The problems of combining data from different sources are discussed in Section 3.2.4.

Structure and content of waste facility registers

The concept and structure of a waste facility register are conceived in the light of the register's principal purpose, e.g. the administration of permits, the monitoring and control of facilities, etc. The basic advantage of facility registers compared to statistical registers is the fact that the units, i.e. the 'facilities', are defined in line with the requirements of Annex II of the Waste Statistics Regulation. The data recorded in the waste treatment registers are usually taken from permits or registration forms. Additional information may be collected from reports, surveys or other registers.

Waste facility registers usually contain a set of base data for each waste treatment facility. This typically includes:

- identification number of the treatment facility (license number, registration number, etc.);
- name and address of the treatment facility;
- name and address of the operator;
- purpose of the plant;
- type of treatment operation(s) carried out;
- waste types for which the facility is authorised;
- licensed capacities of the treatment plant.

Where registers are used for statistical purposes, some further characteristics and aspects should be taken into consideration:

The legal classification of treatment operations by R and D codes is necessary for identifying whether the facility falls within the scope of the Waste Statistics Regulation and for assigning the data collected (facility-related data and quantities of treated waste) to the treatment category, as required in Section 8(2). In practice, however, the type of treatment is often classified in a national technical classification, which is more meaningful from the point of view of waste management than the classification by R and D codes. Where a national classification of waste treatment facilities is used, it is important that the register contains both classifications (national and R/D-codes), and that they are compatible.

Besides indicating the legal classification of the type of treatment concerned, the register should provide information on the point at which the facility is located in the treatment chain (hereinafter referred to as the treatment level) in order to distinguish between pre-treatment facilities and facilitate the prevention of double counting. This information should be coded so that the relevant facilities can be selected easily.

In the case of treatment facilities which carry out a variety of treatment operations and operate several process lines, it is useful to specify these lines in the register, i.e. to add a sub-level to the facilities.

Wherever possible, the classification of waste in the facility registers should be done in accordance with the European List of Waste or at least in accordance with a classification which is compatible with the List of Waste and EWC-Stat. This is a prerequisite for combining different data sources and producing results pursuant to Annex II of the Waste Statistics Regulation.

It is also important to use unambiguous identifiers for the treatment facilities and the operating enterprises, such as registration numbers, licence numbers, or business identity numbers. The same identifiers should be used in different registers to facilitate the combination of data sources and to

provide for convenient and accurate data exchange. It should be possible to use the data on the operator to interface with statistical registers, where this is legally possible.

In general, it is of the utmost importance that the same definitions, classifications and coding systems be used in different registers.

Coverage of waste facility registers

The coverage of waste facility registers depends primarily on the legal basis of the register, i.e. the definition of facilities which need a permit or have to be registered. Depending on the legal provisions in place, small facilities which fall below defined thresholds might not be covered.

Secondly, coverage depends on the completeness, accuracy and up-to-dateness of the registers.

Thresholds for the issuing of permits and registration

As pointed out above, European waste legislation does not exclude small treatment facilities from the requirements regarding permits and registration. In practice, however, Member States may have established legal exemptions of this kind for small treatment facilities in order to reduce red tape. Thresholds are usually defined with reference to the quantities of waste treated or the facility's treatment capacity.

Where legal thresholds mean that treatment facilities are not included in the statistics, this should be mentioned in the quality report. The quality report should specify the treatment operations for which a threshold exists and the threshold values. Where different thresholds exist for the treatment of hazardous and non-hazardous waste, this should also be specified.

Furthermore, an estimate should be given for the number and capacity of facilities falling below the threshold, and for the quantities of waste treated in these facilities.

Comprehensiveness of the register

In general, administrative data are assumed to have a higher coverage than statistical data, thus having a lower risk of undercoverage. This may be true where procedures concerning permits, and the monitoring and enforcement of legal provisions are well-established. However, in countries which are still in the process of establishing administrative structures and implementing relatively new waste regulations, registers which are incomplete pose serious problems.

In such cases, the comprehensiveness of the registers must be improved continually by using other registers and further surveys. The quality of the register should be discussed in the quality report.

3.2.2.3. Use of other registers

Obtaining a complete list of treatment facilities for which statistics have to be compiled usually involves gathering information from several registers. Relevant types of registers are described in brief below.

Register of IPPC-licensed facilities

Depending on national regulations and permitting arrangements, waste treatment facilities may operate under IPPC licences and not under waste licences. This is likely in the case of waste treatment facilities covered by Annex I of Directive 2010/75/EC ⁽⁶⁴⁾, i.e.:

- incineration facilities for non-hazardous wastes with a capacity exceeding 3 tonnes/hour;
- landfills receiving more than 10 tonnes per day or with a total capacity exceeding 25 000 tonnes (excl. landfills of inert waste);
- installations for the treatment of waste oil with a capacity exceeding 10 tonnes/day;
- installations for incineration and treatment of hazardous waste with a capacity exceeding 10 tonnes/day.

IPPC registers may also cover waste treatment facilities associated with facilities which fall under the IPPC Regulation. In Ireland, experience has shown that a large proportion of the private waste treatment infrastructure is associated with facilities which fall under the IPPC Directive.

IPPC registers therefore cover a large proportion of large treatment facilities and may also provide information on further treatment facilities in the private sector.

Sewage sludge register

An important source of data on the use of sewage sludge in agriculture are the records which must be kept pursuant to Article 10(1) of Directive 86/278/EEC ⁽⁶⁵⁾. Member States have to make sure that records are kept on the generation and agricultural use of sewage sludge. Characteristics to be registered are:

- quantities of sludge produced by waste water treatment plants;
- quantities of sludge used in agriculture;
- properties of the sludge (e.g. water content, heavy metal content, etc.);
- the place where the sludge is used.

The records include all the information required for statistical use, i.e. the quantity treated, the type of treatment (R10) and the water content.

National data on the quantities of sludge generated and used in agriculture (in dry matter) have to be produced from the registers and reported to the Commission in sectoral reports at three-yearly intervals.

Registers on landfills

All the facility-related information on landfills which is needed for the purposes of the Waste Statistics Regulation can be obtained from comprehensive landfill registers. This information consists of:

- the number and location of landfills;
- the remaining capacity (m³);
- the status of the landfill (active/closed).

The scope of the register will determine whether the register includes data on disposal sites and impoundments of the mining and quarrying industry or whether data on these facilities must be obtained from other sources.

3.2.2.4. Waste management reports

Article 35 of Directive 2008/98/EC on waste stipulates that waste treatment facilities must keep records of their activities. The records must, among other things, provide information on:

- the “the quantity, nature and origin of that waste and the quantity of products and materials resulting from preparing for re-use, recycling or other recovery operations;
- the treatment method foreseen in respect of the waste”.

The information must be made available to the competent authority on request.

Several Member States use the records as a basis for regular reporting. They have established in their national waste law the general obligation for waste management facilities to

⁽⁶⁴⁾ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

⁽⁶⁵⁾ Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture (OJ L 181, 04.07.1986, p.6), last amended by Regulation 807/2003/EC (OJ L 122, 16.05.2003, p.36).

submit regular reports to the competent authority summarising the information on the treated waste and the treatment methods carried out. These reports, hereinafter referred to as waste management reports, are used by the competent authorities for a variety of purposes, such as:

- monitoring compliance with permit provisions;
- updating facility registers;
- compiling reports on waste management and waste management infrastructure;
- compiling waste treatment statistics.

Reporting obligations of this kind usually depend on thresholds which typically refer to the quantity of waste treated annually. Different thresholds usually apply to hazardous and non-hazardous waste.

Content and format of reports

Mandatory standardised formats for reports must be established so that the data obtained is useful and can be handled easily. The formats must specify the minimum content of the reports, the classification and coding of characteristics and, where appropriate, the technical formats for data transmission. The minimum content of the reports, in view of the requirements of the Waste Statistics Regulation, is summarised in Table 23. The list is complemented by characteristics which, although not obligatory, are considered to be useful for data processing and the production of results.

In order to eliminate double counting, it is important that information be collected on the origin and destination of the treated waste. With regard to the origin of the waste, the reports should distinguish between:

- waste from waste generators, specified by name, NACE code and registration number of the generator;
- waste from treatment facilities (secondary waste), specified by name and registration number of the facility.

The destination of the waste should be specified by the name, address and registration number of the treatment plant which receives it and the type of treatment it undergoes (R or D code). This information makes it possible to identify the locations at which the waste undergoes several treatment processes and to prevent treated quantities from being counted twice.

In order to assess the quality of the data collected, it is particularly useful to request information on the way in which the quantities of treated waste have been determined. The reporting form should distinguish between the following measurement methods:

- weighing;
- measurement of volume or numbers (counting is quite common for end-of-life vehicles and large household appliances);
- estimation (e.g. estimates based on the number of truckloads).

Furthermore, it is recommended that the economic activity of the operating company, as indicated in NACE, be included in the reporting formats. This ensures that the reports may also be used for the compilation of statistics on generation in accordance with Annex I.

Reporting obligations on waste treatment usually refer to the operator of a waste treatment plant. In cases where one enterprise operates several plants, the operator should be obliged to submit separate reports for each of the facilities. Data which are more detailed are more useable from the point of view of monitoring and control and are necessary for the regional breakdown of data on waste treatment infrastructure pursuant to Annex II of the Waste Statistics Regulation.

The waste reports are often submitted to and managed by the environmental authorities at local or regional level which are responsible for the monitoring and control of treatment plants. However, this means that the data are handled and used by a large number of different authorities. A well-developed information system will need to be put in place so that the data can be merged at national level for statistical purposes.

Reporting should preferably be done electronically in order to reduce the burden of reporting on the response unit and the competent authority. This facilitates the completion of reports and the validation and processing of data, and furthers the standardisation of data.

Coverage of reports

Unlike surveys, reports have to be compiled and submitted by enterprises on their own initiative and not in response to questionnaires. The companies concerned must therefore be informed about their reporting obligations, must check whether they exceed the legal thresholds, where applicable, and must be willing to complete the reports. The creation of new facilities, the closure of old facilities and changes in capacities or quantities treated will lead to continuous changes in the number of parties subject to reporting obligations. There is therefore a risk of undercoverage if reporting obligations are not strictly enforced. Coverage must be checked regularly, e.g. by comparing waste reports with data from other sources such as facility registers and consignment notes.

TABLE 23

Content of reports and questionnaires for data collection on waste treatment pursuant to Annex II of the Waste Statistics Regulation

Minimum content of reports or questionnaires				
Enterprise details		Treated waste quantities		
Name and address of the treatment facility	Licensed capacity of the treatment plant	by waste types pursuant to: European List of Waste and/or EWC-Stat.	by treatment operation pursuant to: R codes; D codes.	Water content for sludge

Useful additional information				
Enterprise details		Origin of waste		
Identification number of the treatment plant, compatible with other registers e.g.: – registration number; – license number.	Economic activity of the operator pursuant to – NACE.	Waste from waste generators specified by: – name; – NACE code; – registration number of the generator.	Waste from treatment facilities (secondary waste), specified by: – name; – registration number of the facility.	Method of measurement: – weighing; – volume measurement; – counting; – estimation.

3.2.2.5. Consignment notes for Hazardous waste

Article 19(2) of Directive 2008/98/EC stipulates that “whenever hazardous waste is transferred within a Member State, it shall be accompanied by an identification document, which may be in electronic format, containing the appropriate data specified in Annex IB to Regulation (EC) No 1013/2006”. Annex IB of the Waste Shipment Regulation sets out the movement document for transboundary shipments of waste, which contains, inter alia, information on:

- the waste generator (name, address, process and location of generation);
- the name and chemical composition of waste;
- the waste identification code (LoW-code);
- the actual quantity of the waste shipped;
- the disposal/recovery facility (name, location, address, registration number);
- the code of disposal/recovery operation (R and D codes);
- the dates of shipment and reception;
- hazard criteria (H number).

Hence, consignment notes for the transport of hazardous waste contain all information required to produce hazardous waste statistics. The LoW codes together with the R and D codes make it possible to edit the data in accordance with the requirements of Annex II of the Waste Statistics Regulation, i.e. by waste types and treatment categories.

As consignment notes are mandatory for any transport / transfer of hazardous waste, they cover the treatment of all hazardous waste generated in the country, unless the waste is treated at the site of generation and has therefore not to be transferred. Together with the data on the imports of hazardous waste from the Waste Shipment Regulation, the consignment notes provide full information on hazardous waste treated in a country. They are thus a useful and reliable administrative data source for the compilation of hazardous waste statistics. Where electronic formats are used the data should be readily available for statistical use.

3.2.2.6. Data from the monitoring of specific product-related waste

In EU legislation on waste and in national legislation in the Member States, there are a number of regulations which

apply the principle of producer responsibility by setting targets for the recycling and recovery of specific product-related waste. Data collection systems which provide for the necessary data have been (or are being) put in place so that the targets can be monitored. In some countries, these data are also used for statistics on waste treatment.

As regards Community legislation on waste, the EU has adopted product-related Directives on the packaging of waste (94/62/EC), on end-of-life vehicles (2000/53/EC), on waste electrical and electronic equipment (2002/96/EC) and on some further products. Each Directive requires the Member States to set up a monitoring system and to report on compliance with the targets. The content and format of the reporting obligations are (or will be) stipulated in separate decisions. In the case of the packaging of waste, monitoring and reporting have been obligatory since 1997. Reporting for WEEE and ELV have been mandatory, starting with the reference years 2005 and 2006 respectively.

The characteristics to be reported with regard to waste treatment are:

- the total quantities recycled;
- the total quantities recovered;
- the quantities of waste exported for recycling or recovery of the respective waste products.

The way in which the Member States collect the data is left to them. In practice, data are usually based on different sources, in particular on:

- data from obligated parties, i.e. producers, importers or compliance schemes responsible for collection and treatment;
- data from collection and treatment facilities;
- statistical surveys.

The use of monitoring data for waste statistics is an efficient approach as it avoids redundant data collection. Furthermore, the monitoring of waste products provides data on exports of green list waste, thus closing a data gap for the targeted waste streams.

On the other hand, the use of these data for waste statistics presents a number of problems:

- In order to ensure that the data can be used in a variety of ways, the definitions and classifications applied to monitoring must be compatible with those of the Waste Statistics Regulation as regards waste types and treatment categories. This is not the case for all the European product-related waste Directives mentioned above.

- The data on specific waste streams have to be integrated into the overall data set on waste treatment without leading to double counting or data gaps.
- Questions may rise with regard to data quality where the data are collected by private organisations, and where the methodology is not clear and well documented.

As regards the quality of monitoring data, the relevant Directives require the Member States to provide information on the methodology used. Where such data are used for waste statistics, the methodological descriptions should be included in the quality reports.

3.2.2.7. Data from associations

A number of public and industrial associations at national and European level compile statistics for their own use on the management of specific waste streams and/or on specific treatment operations. Sectoral data of this kind are used by some Member States in their national statistics on waste treatment, e.g. data from the paper industry on the recycling of paper and board.

Where such data are used, steps must be taken to ensure that they meet the requirements and quality criteria of the Waste Statistics Regulation. The following conditions should be met:

- In compiling their data, associations should include all enterprises in a particular sector in order to ensure complete coverage. This requirement can usually be met only by associations in sectors which are well organised and which have a limited number of enterprises/facilities.
- The definitions and classifications of waste types and treatment categories must comply with the requirements of the Waste Statistics Regulation.
- The waste flows and treatment operations under consideration must be clearly defined and delimited so that the data can be incorporated into the overall data set on waste treatment without double counting or data gaps.
- The methodology applied should be clear and well-documented.

Where data from associations are used, information on the methodology used, and on the definitions and classifications applied should be set out in the quality report.

3.2.3. Surveys

As defined in Section 3.1, surveys are understood to involve the collection of data specifically for the compilation of

statistics. As the methods of data collection are chosen specifically with a view to the data being used for statistical purposes, the information collected is usually more in line with statistical requirements than administrative data.

Where data on waste treatment are not obtained from administrative sources, they are usually gathered through surveys carried out by the Statistical Offices. The reporting units may be selected on the basis of waste facility registers, the statistical business register or specific statistical registers on waste treatment facilities.

As pointed out above, surveys on waste treatment facilities, unlike operations to collect data on waste generation, are usually designed as total surveys which seek to cover all facilities which are subject to the relevant obligations.

In the field of waste treatment statistics, surveys are used:

- as the principal method of data collection and are sometimes split up into different specialised surveys;
- in addition to administrative data in order to plug gaps, enhance data or assess the coverage of data collection;
- to check the completeness of administrative registers, especially as regards recycling facilities.

3.2.3.1. Scope of surveys

When it comes to the approach adopted in the survey and the selection of reporting units, it is crucial that the scope of the survey be defined, i.e. what waste treatment facilities it will cover. The scope of the survey is usually established in the statistical regulations or statistical programmes of the Member States.

Some Member States define the scope of waste treatment surveys on the basis of the licensing obligations of waste facilities, i.e. the surveys cover all licensed facilities. In cases of this kind, the Statistical Offices depend on administrative data relating to the facilities which have permits. The Statistical Offices may manage their own facility registers, which are updated regularly with data from the administrative registers.

Other Member States select reporting units on the basis of statistical business registers or specialised registers which they have established. When using the business register, the problem arises as to how to identify companies which operate waste treatment facilities. The following sections describe the way in which waste treatment activities are classified in the NACE and outline the options available and problems which arise when selecting reporting units on the basis of the business register. This analysis is based on the

classification of economic activities NACE Rev. 2 that was incorporated into the statistical business registers in 2008.

3.2.3.2. Economic activities in the NACE relating to waste treatment

Economic activities which explicitly relate to the treatment and disposal of waste are covered by Division 38 of NACE rev. 2 *Waste collection, treatment and disposal activities; materials recovery*.

Division 38 includes the collection, treatment, and disposal of waste materials. This also includes local hauling of waste materials and the operations of materials recovery facilities (i.e. those that sort recoverable materials from a waste stream). The bulk of those treatment operations fall within the scope of Annex II, but Division 38 also covers operations which are excluded from the scope of Annex II as preparatory operations. Division 38 is divided in three groups.

Group 38.1 Waste collection

This group includes the collection of waste from households and businesses by means of refuse bins, wheeled bins, containers, etc. It includes collection of non-hazardous and hazardous waste e.g. waste from households, used batteries, used cooking oils and fat, waste oil from ships and used oil from garages, as well as construction and demolition waste.

Group 38.2 Waste treatment and disposal

This group includes the disposal and treatment prior to disposal of various forms of waste by different means, such as treatment of organic waste with the aim of disposal, treatment and disposal of toxic live or dead animals and other contaminated waste; treatment and disposal of transition radioactive waste from hospitals, dumping of refuse on land or in water; burial or ploughing-under of refuse; disposal of used goods such as refrigerators to eliminate harmful waste; disposal of waste by incineration or combustion. Included is also energy recovery resulting from waste incineration process.

Group 38.3 Materials recovery

This group includes dismantling of wrecks of any type (automobiles, ship, computers, televisions, and other equipment) for materials recovery. Also included is the processing of metal and non-metal waste and scrap and other articles into secondary raw materials, usually involving a mechanical or chemical transformation process; the recovery of materials from waste streams in the form of (1) separating and sorting recoverable materials from non-

hazardous waste streams (i.e. household waste) or (2) the separating and sorting of commingled recoverable materials, such as paper, plastics, used beverage cans and metals, into distinct categories.

The economic activities listed above do not cover the following:

- Industries which use waste as fuel, e.g. cement kilns and power plants. Incineration facilities which use waste as a secondary fuel are mainly found in the energy sector or in the sector 'manufacturing of non-metallic mineral

products' (cement kilns) but can, in principle, be found in all economic sectors where enterprises operate their own combustion facilities.

- Industries which use secondary raw materials for production, i.e. the manufacturing of paper, glass, plastics, metals, etc.
- Waste treatment activities which do not constitute economic activities as they are carried out by an enterprise for its own purposes.

TABLE 24

Economic activities (divisions and classes) relating to waste management pursuant to NACE Rev. 2

NACE code	Description of Division/Class
38	Waste collection, treatment and disposal activities; materials recovery
38.1	Waste collection
38.11	Collection of non-hazardous waste
38.12	Collection of hazardous waste
38.2	Waste treatment and disposal
38.21	Treatment and disposal of non-hazardous waste
38.22	Treatment and disposal of hazardous waste
38.3	Materials recovery
38.31	Dismantling of wrecks
38.32	Recovery of sorted materials

3.2.3.3. Selection on the basis of the business register

The business register is a list of enterprises and other units whose activities contribute to the gross domestic product of the Member State. The minimum content of statistical business registers is stipulated in the Registers Regulation (2019/2152) ⁽⁶⁶⁾. The Regulation stipulates that business registers must contain information on the following statistical units ⁽⁶⁷⁾:

- Enterprises carrying on economic activities contributing to gross domestic product and their local units;
- Legal units of which those enterprises consist;
- Truncated enterprise groups and multinational enterprise groups;
- All-resident enterprise groups;
- Kind of activity unit for those enterprises which due to their size have a significant influence and whose kind-of-activity units (KAUs) have a significant influence on the aggregated (national) data

⁽⁶⁶⁾ Regulation (EU) 2019/2152 of the European Parliament and of the Council of 27 November 2019 on European business statistics, repealing 10 legal acts in the field of business statistics

⁽⁶⁷⁾ Statistical units are defined in Council Regulation (EEC) No 696/93 of 15 March 1993 on the statistical units for the observation and analysis of the production system in the Community.

Other statistical units, such as kind-of-activity units of enterprise with less significant influence and local kind-of-activity units, are subsidiary entities which are included only in some Member States.

Enterprises should be identified in the register by their principal and secondary activity. The register should identify local units by their principal activity (code NACE 4-digits) and should indicate whether this activity constitutes an ancillary activity of the enterprise. The economic activity is classified in accordance with NACE Rev. 2.

The structure of the business register is such that ways of identifying waste treatment facilities are limited. The business register records information on enterprises and their local units, but not on facilities.

The business register can therefore be used to identify enterprises for which the collection, handling or treatment of waste represents an important economic activity, i.e. enterprises belonging to NACE 38. It can also be used to select enterprises which are likely to use secondary raw materials or secondary fuel in their production on account of their economic activity, e.g. paper industries and glass manufacturers, cement kilns, power stations. However, the business register cannot be used to isolate waste treatment facilities which are operated by enterprises for their own use. These activities do not constitute economic activities and will therefore not be recorded in the business register.

Hence, for a complete selection of facilities falling within the scope of the Waste Statistics Regulation, additional information on the facility level is needed. Such information may be obtained from administrative sources or from specialised statistical registers (e.g. satellite registers). In principle, facility-related information can also be incorporated into the business register by introducing facilities as statistical units at a level below the local units or the kind-of-activity units.

3.2.3.4. Satellite registers

Registers which are used for surveys on waste treatment must include a facility-related level. This level can either be incorporated into the business register as a sub-level, or a satellite register can be created for these data.

Satellite registers are registers which do not form part of the business register but are closely linked to it. They are usually more limited in scope than the general business register, e.g. in terms of NACE Rev. 2, but may have more comprehensive coverage within their scope. They contain

characteristics which are not found in the general business register. Satellite registers are often used for incorporating data from administrative sources ⁽⁶⁸⁾.

Where satellite registers for waste treatment facilities are used, they should contain all the characteristics which are necessary for the selection of reporting units, as already outlined for administrative registers in Section 3.2.2.

The satellite register should also contain an identifier for each facility in order to create an unambiguous link to other registers or data sources with which data have to be exchanged. Establishing a link of this kind between statistical registers and administrative registers might not be possible for legal reasons.

3.2.3.5. Coverage

Where the scope of the survey is defined according to licensed treatment facilities, the data will be drawn from administrative registers. In such cases, the competent authorities must guarantee the integrity of the data. However, the business register can be used to check the completeness of the administrative data, especially in the field of recovery and recycling.

Where the survey is based on statistical registers, the Statistical Offices must guarantee the integrity of the data. To prevent undercoverage, the comprehensiveness of the information should be ensured by using data from related registers and surveys to update and synchronise the data. Relevant information can be drawn not only from administrative registers but also, for example, from business surveys, energy surveys or farm structure surveys. Business surveys are carried out at frequent intervals and may include total surveys covering small enterprises. These data are useful for updating general information, such as the establishment and closure of enterprises or changes in economic activities. Energy surveys can provide information on enterprises which use waste as a secondary fuel in combustion facilities.

Overcoverage, on the other hand, may pose a problem where statistics on the capacity and number of treatment facilities are produced on the basis of outdated facility registers. In such cases, statistics may include information on facilities which have been closed down, which have reduced their treatment capacity or which have changed in other ways. This can be avoided by regularly updating and synchronising the data with related registers, as described in the previous section. Overcoverage with regard to the

⁽⁶⁸⁾ Eurostat 2010: Business registers – Recommendations manual <https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-32-10-216>

waste quantities treated could, in principle, occur where data are grossed up on the basis of faulty data. In practice, this should not be a problem, as treated waste quantities are usually not extrapolated.

3.2.4. Estimation procedures

It would be almost impossible to use statistical estimation procedures to determine treated quantities of waste by treatment categories; estimations of this kind would be highly speculative in nature. In the context of waste treatment, estimation tends to be a provisional method which is used to close data gaps rather than an accepted methodological approach.

An exception to this is the development and application of so-called *process-specific key factors*, which are discussed in the context of the monitoring of waste products (ELV, WEEE) ⁽⁶⁹⁾.

Key factors express, for a specific waste stream, the recycling and recovery rates for a subsequent treatment process or treatment chain. In practice, key factors are applied to the waste generated as a result of the dismantling and shredding of ELV and WEEE in order to minimise the monitoring work required for the purpose of determining recycling and recovery rates. If key factors were used, the waste would not need to be monitored until the final stage of recovery and recovery could be calculated on the basis of the treatment output.

3.2.5. Combination of different sources and methods

In practice, it is quite common for different data sources and collection methods to be used simultaneously and in combination. Sources are combined for a variety of purposes:

- different sources are used to identify treatment facilities and provide for a complete coverage of registers and surveys;
- data from different sources are combined to avoid multiple and overlapping data collection;
- data needs to be combined where responsibilities for registers or data collection are spread across different administrative bodies and/or administrative levels.

The merging of data is usually associated with a variety of problems. Registers are often incompatible because they are based on different concepts. Units used in administrative registers, for instance, do not correspond to statistical units, and definitions and classifications might be different. Sources can also be difficult to combine because of overlaps or gaps; and, last but not least, the use of different data can result in a lack of timeliness of the results.

The main requirements for minimising problems of this kind are:

- the harmonisation of the definitions and classifications applied;
- the establishment of clearly defined interfaces between registers;
- the development of integrated data collection systems, i.e. the harmonisation of reporting obligations with regard to scope, characteristics, frequency, formats, etc.

Compatibility requires a common set of definitions and classifications, and coding systems for waste types, facility types, source sectors and locations.

The classification of treatment operations should be harmonised in such a way that the data can be combined and aggregated according to six categories, as defined in Annex II of the Waste Statistics Regulation. Where different classifications are used, these classifications should be designed in such a way that they are clearly and unambiguously convertible.

Similarly, waste classification should be carried out in a harmonised way. The LoW codes or the EWC-Stat codes should be used, wherever possible, at least in addition to other names/classifications, in order to link waste data from different sources.

Where legally possible, different registers should use common identifiers for waste treatment facilities and operating enterprises in order to facilitate the exchange and synchronisation of data. In some countries, this is done by *business identity numbers*, which can be used or linked in both the statistical and the administrative contexts ⁽⁷⁰⁾. In other countries, however, identifiers of this kind do not yet exist or have not been established for legal reasons.

In general, data collection should adhere to an integrated approach. Statistical and administrative reporting obligations should be examined in their entirety and should subsequently be compared with data requirements in order

⁽⁶⁹⁾ For more detailed information, please refer to: Ökopol, 2002: Rule on Compliance with Article 7.2 of Directive 2000/53/EC. Report compiled for DG ENV. https://ec.europa.eu/environment/pdf/waste/studies/elv/compliance_art7_2.pdf

⁽⁷⁰⁾ Use of administrative sources for business statistics purposes: Handbook of good practices. Eurostat, THEME 4 Industry, trade and services, 1999.

to identify overlaps and streamline data collection. This will relieve the burden on administration and reporting units at the same time.

3.3. Collection of voluntary data linking waste generation and treatment

3.3.1. Pre-treatment of waste

The collection of data on waste treatment is described in detail in chapter 2.3. There is no fundamental difference between the collection of data on waste treatment operations covered by Annex II of the WStatR and on waste treatment operations covered by the additional treatment category “pre-treatment”. The described methods and sources are thus also valid for the collection of the pre-treatment data required in data set 4.

Data set 4 requires data on the input into pre-treatment (in tables 1, 2 and 3A) as well as on the output of pre-treatment (in table 3A). In view of the outputs, it is important that data are collected on all output flows, i.e. on the secondary wastes produced, on the non-waste products that flow back into the economy, and if possible, also on the losses and emission during pre-treatment.

Table 1 asks for the input of the domestically generated primary waste only, whereas in tables 2 and 3A the total input into pre-treatment is required, i.e. the input of primary and secondary waste. Secondary waste input into pre-treatment may include waste from all types of treatment operations, i.e. from incineration and energy recovery, from recycling operations, from landfilling (e.g. leachate) and also from pre-treatment operations. The multiple counting of waste in case of several sub-subsequent treatment operations is intended.

Please note that the temporary storage of waste, i.e. the treatment operations R13 and D15 are not considered as

pre-treatment operations for the purposes of this data collection. The data on temporary storage may, however, be used to check the difference between generation and first treatment in table 1 for plausibility.

3.3.2. Determination of primary and secondary waste

As described in chapter 2.6.1.3, the distinction between primary and secondary waste is a central element of the questionnaire module. EWC-Stat categories that contain both primary and secondary waste need to be split into the two sub-categories at least for the priority waste flows.

Primary and secondary wastes can be determined based on the waste classification and based on the origin of waste (technical process or economic activity). The determination on the basis of the waste classification is clearly the preferable option. Where the waste classification does not allow to distinguish between primary and secondary waste or where such data is not available, information on the origin may have to be used instead.

3.3.2.1. Determination based on waste classification

Most countries collect waste data according to the European List of Wastes (LoW) and then convert the data into EWC-Stat categories for WStatR reporting. The LoW-based data collection is a good basis for the distinction between primary and secondary because it allows the accurate distinction or at least an approximation for most EWC-Stat categories. Table 25 shows all 51 EWC-Stat items to be reported and indicates for each item whether the allocation to primary or secondary waste is possible on the basis of LoW codes alone or whether further information is required. The assessment is based on the explanations provided in chapter 2.6.1.2 and in particular on the information in Table 18.

TABLE 25

Distribution of primary and secondary waste among EWC-Stat categories

EWC-Stat category	1	2	3	4	5	6					
							nhaz/ haz	Category covers LoW codes for:			Assignment to prim/sec by LoW codes is possible
								Primary waste	Secondary waste	Prim. and sec. waste	
01.1 Spent solvent		haz	x			✓					
01.2 Acid, alkaline or saline wastes		nhaz	x			✓					
		haz	x	x	x	(✓)					
01.3 Used oils		haz	x		x						
01.4, 02, 03.1 Chemical wastes		nhaz	x		x	(✓)					
		haz	x	x	x						
03.2 Industrial effluent sludges		nhaz	x			✓					
		haz	x	x		✓					
03.3 Sludges and liquid wastes from waste treatment		nhaz		x		✓					
		haz		x		✓					
05 Health care and biological wastes		nhaz	x			✓					
		haz	x			✓					
06.1 Metallic wastes, ferrous		nhaz	x	x	x	(✓)					
06.2 Metallic wastes, non-ferrous		nhaz	x	x	x	(✓)					
06.3 Metallic wastes, mixed ferrous/ non-ferrous		nhaz	x			✓					
07.1 Glass wastes		nhaz	x	x	x	(✓)					
07.1 Glass wastes		haz	x			✓					
07.2 Paper and cardboard wastes		nhaz	x	x		✓					
07.3 Rubber wastes		nhaz			x						
07.4 Plastic wastes		nhaz	x	x	x	(✓)					
07.5 Wood wastes		nhaz	x	x		✓					
		haz	x	x		✓					
07.6 Textile wastes		nhaz	x	x		✓					
07.7 Waste containing PCB		haz	x		x						
08 (excl. 08.1, 08.41) Discarded equipment (excl. disc. vehicles, batteries/accumulators)		nhaz	x		x						
		haz	x		x						
08.1 Discarded vehicles		nhaz		x		✓					
		haz	x			✓					
08.41 Batteries and accumulators wastes		nhaz	x		x						
		haz	x		x						
09.1 Animal and mixed food waste		nhaz	x			✓					

1	2	3	4	5	6
EWC-Stat category	nhaz/ haz	Category covers LoW codes for:			Assignment to prim/sec by LoW codes is possible
		Primary waste	Secondary waste	Prim. and sec. waste	
09.2 Vegetal wastes	nhaz	x			✓
09.3 Animal faeces, urine and manure	nhaz	x			✓
10.1 Household and similar wastes	nhaz	x			✓
10.2 Mixed and undifferentiated materials	nhaz	x	x	x	(✓)
	haz	x			✓
10.3 Sorting residues	nhaz		x		✓
	haz		x		✓
11 Common sludges	nhaz	x			✓
12.1 Mineral waste from construction and demolition	nhaz	x			✓
	haz	x			✓
12.2, 12.3, 12.5 Other mineral wastes	nhaz	x			✓
	haz	x		x	(✓)
12.4 Combustion wastes	nhaz	x			✓
	haz	x			✓
12.6 Soils	nhaz	x			✓
	haz	x			✓
12.7 Dredging spoils	nhaz	x			✓
	haz	x			✓
12.8, 13 Mineral wastes from waste treatment and stabilised wastes	nhaz		x		✓

Legend:

- ✓: Unambiguous allocation to primary and secondary waste based on LoW codes is possible
- (✓): Approximate allocation to primary and secondary waste based on LoW codes is possible

The columns 3 and 4 in Table 25 indicate whether the respective EWC-Stat item/category covers LoW-codes that can unambiguously be assigned to primary waste (column 3) or to secondary waste (column 4). Column 5 indicates whether a waste category includes ambiguous LoW-codes that may encode primary or secondary waste depending on the origin of the waste. Finally, column 6 shows the assessment whether an EWC-Stat category can be assigned to primary or secondary waste on the basis of LoW codes alone. A possible assignment based exclusively on unambiguous LoW codes is marked with a tick "ü". An approximative assignment that includes ambiguous LoW codes is marked with a tick in brackets "(ü)". The main conclusions from the table are summarised in the following, with a focus on the priority waste flows marked with green shading in the table.

All EWC-Stat categories with only one mark either in column 3 (primary waste) or in column 4 (secondary waste) can be fully classified as either primary or secondary waste without the need for splitting. This concerns 23 waste items for primary waste and seven waste items for secondary waste. This certainly includes the three EWC-Stat categories dedicated to secondary waste, i. e. sludges and liquid wastes from waste treatment (03.3), sorting residues (10.3) and mineral wastes from waste treatment and stabilised wastes (12.8, 13). In view of the priority waste flows, it also includes the categories metallic wastes, mixed ferrous/non-ferrous (06.3), animal and mixed food waste (09.1), vegetal wastes (09.2) and household and similar wastes (10.1), which can be completely reported as primary waste.

EWC-Stat items/categories with a mark in both column 3 and column 4 but no mark in column 5 (ambiguous LoW codes) need to be split up into primary and secondary waste, but the split can be accurately done on the basis of the LoW-codes covered by the respective item/category. This includes five EWC-Stat items, including the priority waste flows paper and cardboard wastes (07.2), non-hazardous and hazardous wood wastes (07.5) and textile wastes (07.6).

Table 25 shows altogether sixteen EWC-Stat items that contain ambiguous LoW codes and can thus not be accurately determined based on LoW codes. However, eight of these waste items can be approximated because the contribution of the ambiguous codes on the category total is assumed to be low. With regard to the priority waste flows, this applies to the ferrous metallic wastes, (06.1), non-ferrous metallic wastes (06.2), glass wastes (07.1) and plastic wastes (07.4). Each of these four categories includes one LoW code from sub-chapter 16 01 that encodes waste both from dismantling (secondary waste) and from maintenance (primary waste) of end-of-life vehicles. It is assumed for all four categories that the contribution of waste from dismantling of ELVs is low compared to the waste materials from other sources, so that disregarding these waste codes for determining the share of secondary waste in the respective categories will still yield sufficiently good results. This assumption should be verified, if possible, based on national data. To improve the accuracy of the data, the amounts of waste from ELV dismantling can be determined based on other information and added to the LoW-based approximation.

There remain four EWC-Stat items/categories for which the LoW-based determination is not recommended. This includes the priority waste flow use oils (01.3). For these categories, an origin-based approach or other approaches have to be chosen.

3.3.2.2. Determination based on the origin of the waste

The origin of waste can be described by the technical processes or by the economic activities by which the waste is generated. The origin-based distinction between primary and secondary waste can be an option in cases where a distinction based on waste classification is not possible, e. g. for the EWC-Stat items/categories that include LoW-codes that may be primary or secondary depending on origin.

Technical processes

All waste that originates from treatment operations listed in Annex I and II of Directive 2008/98/EC (except operations R13 and D15) is a secondary waste by definition. In the case that data are collected at facility level and generated waste can be allocated to waste treatment processes, the produced wastes can be considered as secondary wastes. Such information is in particular useful to determine secondary wastes for which no specific LoW chapter 19 code exists and/or to cross check the accuracy of data based on waste classification.

In view of the limitations of the LoW-based determination approach presented in the previous chapter, data from treatment installations for waste oils and from dismantling facilities for end-of-life vehicles can be used to produce data on secondary waste oils and to fill data gaps with regard to secondary recyclable wastes from the treatment of ELV.

Economic activities

Waste treatment activities are classified in NACE Rev. 2 under division E38 "Waste collection, treatment and disposal activities; material recovery". Activities like dismantling of vehicles or electrical and electronic equipment may also be covered by NACE class 46.77 "Wholesale of waste and scrap".

In principle, it can be assumed that businesses/statistical units with a main economic activity in NACE E38 will produce predominantly secondary wastes and that waste generated in NACE E38 can therefore be counted as secondary waste, whereas waste from other economic activities can be considered as primary waste. However, there are several limitations to this approach:

- Businesses belonging to E38 will not only produce secondary waste but also primary waste, e. g. waste from offices or canteens.
- Waste treatment activities may be carried out by companies whose main economic activity is not classified under E38. For example, a company of the chemical industry may operate a hazardous waste incineration facility and the generated secondary wastes would possibly be reported under the chemical industry.
- The accuracy of the origin-based determination of secondary waste will depend on the statistical unit used for the data collection. In case of KAU or LKAU, the determination is expected to be more accurate than in the case of local units or at enterprise level.

The distinction between primary and secondary waste based on the NACE allocation is not considered as a preferable option but as a possible alternative in those cases where more precise data are not available.

3.3.2.3. Recommendations

Due to the fact that most of the LoW chapter 19 codes are covered by the specific secondary waste categories 03.3, 10.3 and 12.8_13, a significant part of the secondary waste generated and treated can be determined at the level of the EWC-Stat categories. For these categories, the required data are largely available from the data sets 1 and 2 and can be reported without much additional effort.

Mixed EWC-Stat categories, i.e. categories that include both primary and secondary wastes, have to be split up. This should preferably be done on the basis of the LoW codes. If this data is not available, information on the origin of the waste, i.e., on the technical process or the economic activity, may be used to derive the required data.

Please note that in view of the relevance of the data, the distinction between primary and secondary is most important for the priority waste streams metallic wastes (06.1, 06.2), glass wastes (07.1), paper and cardboard wastes (07.2), plastic wastes (07.5) wood wastes (07.5) and textile wastes (07.6).

3.3.3. Transformation for waste treatment

Waste treatment transforms the waste. The treatment may change the composition, material properties and/or the consistence of the waste and produces new output flows. This applies in principle to all waste treatment operations with the exception of landfilling, backfilling and other disposal, where possible output flows (e.g. landfill leachate) can be neglected compared to the input.

The transformation may consist of mechanical separation into different material components, incineration, biological or physico-chemical processes, dewatering or further processes. So far, dataset 2 reflects the sum of 'direct' (primary waste) inputs into 'final treatment' as defined by the WStatR (items 1 to 5 described in chapter 2.3.2) as well as the input of all material transformed into secondary waste which require further treatment by one of the 5 items covered as 'final treatment' in the WStatR. These total inputs to 'final treatment' according to WStatR include secondary

wastes produced by some 'final treatment' processes. For this reason, the questionnaire module covers not only the transformations from pre-treatment but also those of other processes with relevant outputs requiring further treatment.

The new questionnaire module shall map these transformation processes. In order to implement the balancing principle, it is necessary to document all output flows from waste treatment. This includes secondary wastes, but also losses and emissions (e.g. to air and water) and non-waste products that are usually not covered by waste statistics. In addition, the transformation processes must be mapped over several treatment steps.

This approach is implemented in the tables 3A to 3C of the voluntary dataset 4.

The types of treatment outputs and the transformation of material depend on the characteristics of the waste treated and on the type of treatment. The tables 3A to 3C of the dataset 4 were designed as follows:

- The outputs shall be filled only for priority input streams,
- Three groups of treatment processes shall be distinguished according to the R & D code of the treatment:
 - Pre-treatment (PRT): D8, D9, D13, D14, R12 ⁽⁷⁾ (Table 3A)
 - Thermal processes (RCV_E & DSP_I): R1, D10 (Table 3B)
 - Recycling (RCV_R): R2 to R11 (Table 3C)
- Output flows that are likely to be of less importance are highlighted in the questionnaire by grey shading.

The treatment categories disposal (landfill and other, DSP_L_OTH) & backfilling (RCV_B) were disregarded, as the outputs from these processes are insignificant compared to the inputs. In the following, proposals are made, how the material transformation can be estimated based on statistical data on input and output flows from waste treatment and where this requires the use of coefficients.

3.3.3.1. Basic concept

A possible approach for mapping the transformation processes is the use of transformation coefficients, i.e. factors that give the percentage of a specific waste category that is transformed into a certain output flow. The idea is that the coefficients describe the transformation of the respective waste category from the first to the final treatment of this category.

The most important source of information consists in the input-output balances of treatment facilities. The

⁽⁷⁾ D15 and R13 are covered in table 1 of dataset 4 as balance item; D11 is prohibited by EU legislation and international conventions.

whereabouts of the outputs should at least be distinguished by:

- Use as products,
- Disposal on land,
- Thermal processes,
- Further treatment for material recovery.

For the filling of the tables 3A to 3C, it is sufficient to differentiate only between outputs remaining in waste treatment, products and losses/emissions. However, it is possible that outputs remaining in waste treatment classified with the same EWC-Stat-code can be destined for several types of treatment. In this case, it is useful to be able to differentiate this by using one of the 'other' columns to repeatedly list a certain waste already listed and put a comment pointing at the fact that parts of this secondary waste stream are destined to a different treatment process.

Figure 10 illustrates the material flows to be considered for tables 3A to 3C. The blue boxes represent the groups of treatment operations covered by dataset 2 of the WStatR (Annex 2 – dataset on waste treatment). Dataset 2 covers all inputs in what is referred to as "final" treatment operations, i.e. recycling, incineration/energy recovery and landfilling/backfilling/other disposal. The inputs include the direct input of primary waste (grey arrows) as well as all secondary waste inputs (orange arrows) into these treatment operations. The red pre-treatment box and the corresponding table 3A cover the inputs and the treatment operations not covered by waste statistics. Tables 3A to 3C

aim to cover the following information not covered by dataset 2:

- the inputs to pre-treatment, which are explicitly excluded from reporting (only table 3A),
- the products and losses & emissions, which are out of scope for waste statistics, and
- the information on the primary waste by EWC-Stat-code from which the orange flows originate.

It can be expected that the treatment micro-data reflect the inputs of all EWC-Stat-coded wastes into treatment operations characterised by R & D-code, regardless of whether the treatment reflects the first treatment of primary waste or any other stage of treatment chains. For tables 3A to 3C, no differentiation between primary and secondary waste is made for the following reasons:

- It is expected that the inputs and outputs of the first treatment process cover the largest part of the material transformation and therefore the material transformation from the first treatment step will dominate the amounts for most treatment operations (except for special operations such as slag processing, which can be covered based on the waste category, EWC-Stat 12.8, 13);
- In practice, the minor amounts of secondary waste are treated together with primary waste, so that a separate allocation of the treatment-outputs to primary and secondary waste is not possible or at least challenging.

It is suggested to analyse the input and output flows from waste treatment, focussing on the priority waste streams and their major treatment operations as shown in Table 26.

FIGURE 10

Material flows relevant for Tables 3A to 3C and their relation to dataset 2 on waste treatment (Annex 2 WStatR)

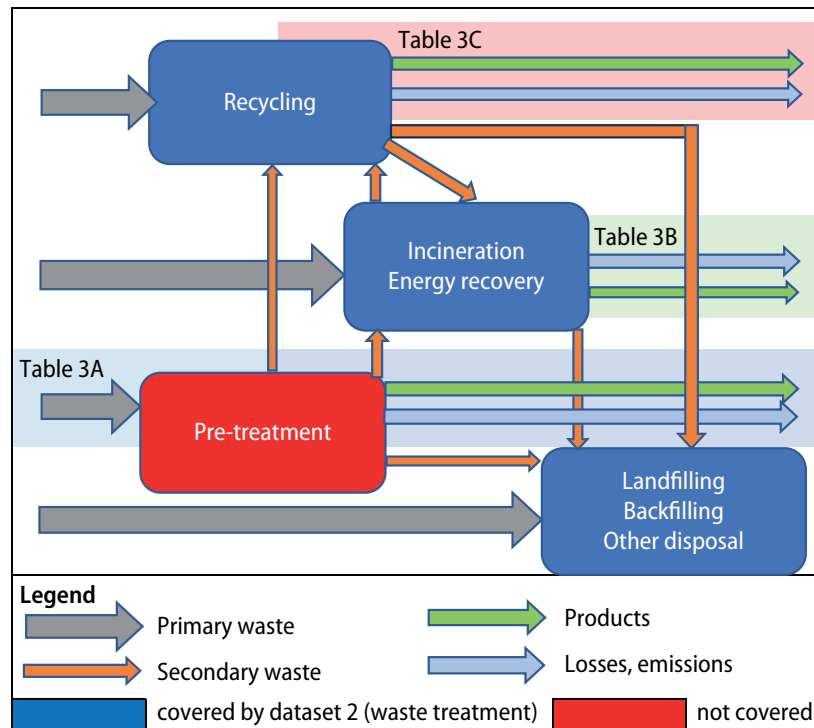


Table 26 illustrates the treatment operations predominantly used at the level of the EU27 for the priority items of tables 3A to 3C of the voluntary dataset 4, including pre-treatment. The darker the red shading, the higher the amounts treated by the operations represented by the different columns. The presentation in the table reflects the estimates of the flow model that was developed for the Eurostat project ‘Secondary raw materials and waste accounting’⁽⁷²⁾. It can be seen that for most of the priority waste streams, one treatment category dominates the first treatment and therefore most likely the whole treatment chain. For most of the priority waste items, mechanical treatment is required for material separation and sorting. In detail, these refer to:

- Sorting of recyclables (EWC-Stat 06.1 to 07.6), mixed and undifferentiated materials (EWC-Stat 10.2), and mineral waste from construction and demolition (EWC-Stat 12.1), and
 - Dismantling/Shredding of discarded equipment (EWC-Stat 08 excl. 08.1, 08.41), discarded vehicles (EWC-Stat 8.1), and batteries and accumulators (EWC-Stat 08.41).
- These processes typically refer to pre-treatment and are covered in table 3A of dataset 4. However, some of the processes might as well be classified under R2 to R11 and therefore being reported under recycling (RCV_R), e.g. shredding processes which are often classified under R4. Under the category Recycling, covered by table 3C of dataset 4, also falls biological treatment for animal and mixed food waste (EWC-Stat 09.1) and vegetal wastes (EWC-Stat 09.2). An exception are used oils (EWC-Stat 01.3), which are almost exclusively subject to oil regeneration and household and similar wastes, which is the only stream with mechanical biological treatment (MBT). For household and similar waste, sorting residues and wood waste, energy recovery (RCV_E, covered by table 3B) is more important than the other processes.

⁽⁷²⁾ Gonser, J., Böhm, C., Orsini, M., Femia, A., 2021: *Secondary raw materials and waste accounting, Task 1: waste accounts*. Study on behalf of Eurostat (Contract n° 2019.0376), Final report, July 2022

TABLE 26

First Treatment of waste in the EU27 based on the modelling data derived from WStatR data 2016

				First treatment EU27 (2016)						
				Table 3A PRT		Table 3C RCV_R			Table 3B RCV_E & DSP_I	
Waste Item	Code	Description	hazardous	Mechanical treatment	MBT	Oil regeneration	Biological treatment	Material Recovery	RCV_E	DSP_I
4	01.3	Used oils	haz							
13	06.1	Metallic wastes, ferrous	non-haz							
14	06.2	Metallic wastes, non-ferrous	non-haz							
15	06.3	Metallic wastes, mixed ferrous and non-	non-haz							
16	07.1	Glass wastes	non-haz							
18	07.2	Paper and cardboard wastes	non-haz							
20	07.4	Plastic wastes	non-haz							
21	07.5	Wood wastes	Total							
23	07.6	Textile wastes	non-haz							
25	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/ accumulators)	Total							
27	08.1	Discarded vehicles	Total							
29	08.41	Batteries and accumulators wastes	Total							
31	09.1	Animal and mixed food waste	non-haz							
32	09.2	Vegetal wastes	non-haz							
34	10.1	Household and similar wastes	non-haz							
35	10.2	Mixed and undifferentiated materials	Total							
37	10.3	Sorting residues	Total							
40	12.1	Mineral waste from construction and demolition	Total							

Abbreviations: MBT = Mechanical biological treatment, RCV_E = Energy Recovery, DSP_I = Incineration

It is important to note that the assignment of material transformation to the tables 3A to 3C depends on the classification of the treatment according to the R & D-codes.

3.3.3.2. Determination of Transformation coefficients

Input-output analysis at facility level from data collection from treatment facilities

In the ideal case, the outputs of waste treatment can be directly measured and related to the entire input. Examples:

- Facilities with exclusively one type of waste input: Secondary wastes and products can be measured and related to the respective waste (e.g. municipal waste incineration facility, paper sorting plant);
- A specific waste is treated in only one or a few specialised facilities.

As result, the material distribution in the outputs can be calculated from the quantities in the output related to the quantities of the input. The products leaving the waste regime and the secondary wastes remaining in waste treatment are outputs that can be directly measured, whereas the losses & emissions can be calculated as the difference between the sum of products and secondary wastes and the inputs at facility level. Of course, a bias can

occur in practice, when temporary storage of amounts pending treatment within the facilities is carried out. However, with a sufficient number of balanced facilities, it is likely that the effects are balanced out.

However, it is fairly common that at least parts of the waste streams are mixed with other waste streams during treatment. In this case, the direct measurement approach is not possible. In this case, those facilities could be selected from the dataset which treat large shares (90% or more) of the EWC-Stat-category of interest. The balances of these 'model' facilities can then be used to determine the shares of 'typical' outputs and their destination for the particular waste category. These 'typical' transformation coefficients of the selected facilities can then be applied to the total input of the EWC-Stat category treated in all facilities of the respective type of operation. In the following, this is explained in more detail with the example of paper and cardboard to mechanical separation.

Table 27 shows a fictive distribution of sorting facilities by groups of shares of paper and cardboard waste from the total input. In this case, all facilities with shares of 90-100% paper and cardboard input are selected as 'model' facilities. They represent 73% of all paper and cardboard sorted (4 450 of 6 100 kt) and 95% of the total input (4 700 kt) of the 'model' facilities.

TABLE 27

Fictive distribution of sorting facilities by groups of shares of paper and cardboard waste from the total input

Share of paper and cardboard wastes from input (grouped) [%]	Number of facilities	Input paper and cardboard waste [1 000 t]	Total Input including other wastes [1 000 t]	Considered as
0 - 90%	480	1 650	9 320	other facilities
90 - 100%	170	4 450	4 700	'model' facilities
Total	650	6 100	14 020	

In the next step, the outputs of the 'model' facilities are analysed and the amounts are distributed to the total sorted paper and cardboard in two steps as shown in Table 28.

TABLE 28

Fictive output streams of the ‘model’ plants and calculation of outputs for all sorted paper and cardboard, in 1 000 tonnes

EWC-Stat	Description	Reported outputs of ‘model’ facilities			Of which assigned to paper and cardboard share from input (95%)			Of which assigned to all sorted paper and cardboard (1/73%)		
		RCV_R	Product	RCV_E	RCV_R	Product	RCV_E	RCV_R	Product	RCV_E
07.2	Paper and cardboard waste	2 050	2 450	0	1 941	2 320	0	2 661	3 180	0
10.3	Sorting residues	0	0	200	0	0	189	0	0	260
Totals by category		2 050	2 450	200	1 941	2 320	189	2 661	3 180	260
Sum all outputs			4 700			4 450			6 100	

It can be seen that in the first step, the total output of the ‘model’ facilities is related to the 95% of paper and cardboard in the input to these facilities. In the second step the outputs allocated to paper and cardboard are grossed up to the 6 100 kilotonnes paper and cardboard treated in all sorting facilities.

In some cases (e.g. EWC-Stat 10.1 ‘household and similar waste’), several types of treatment need to be aggregated for the groups of treatment operations covered in tables 3A to 3C. For example, EWC-Stat. 10.1 is pre-treated by mechanical treatment and mechanical biological treatment.

Mechanical biological treatment (MBT) is usually designed to recover materials and to reduce the volume and the organic matter content of the waste which is sent to the final disposal. The biological treatment is intended to render inert any biologically active organic materials (typically called ‘stabilised residue’). The main output is stabilised material that is mostly landfilled. Further outputs include materials used as secondary fuels and separated recyclables (metals, plastics).

Contrarily, the main purpose of the mechanical treatment of household and similar waste is to prepare a combustible

material and to separate recyclables. The main outputs are refuse-derived fuels which are used as secondary fuels in waste-to-energy facilities, cement kilns and coal-fired power plants. Further outputs are recyclables (metals, paper, plastics).

In this case, where treatment types of different characteristics concerning their material flows need to be filled in in table 3A together. Table 29 illustrates, how these aggregated output flows are determined on the basis of transformation coefficients for each treatment type. The transformation coefficients (green shading) are determined for each treatment type and then related to the inputs. The coefficients were derived from the EEA-model ⁽⁷³⁾ for municipal waste for the treatment of residual municipal waste at EU level. The relation of MT to MBT was set to 1:9 in example A and vice versa in example B to illustrate the influence of the input flows for calculating the amounts of outputs and losses in table 3A. From the aggregated amounts, the material distribution in percent and the losses (difference to 100% of the input) then represent the weighed transformation amounts for the specific waste category.

⁽⁷³⁾ European Reference Model on Municipal Solid Waste Management, 2018 Version. <https://www.eionet.europa.eu/etcs/etc-ce/products/wastemodel> (downloaded 30.10.2020).

TABLE 29

Typical transformation coefficients derived from the EEA-model of two different treatment types for mixed MW and their use for the calculation of the amounts to be filled into table 3A

	EWC-Stat	Treatment type	Group	Input	RCV_R			DSP_L	RCV_E	Losses
					06.1	07.2	07.4	12.8, 13	10.3	
transformation coefficients	10.1	mech. treatment	PRT	n.a.	1,5%	2,5%	1,5%	0,0%	94,4%	0,0%
	10.1	MBT	PRT	n.a.	1,8%	0,0%	1,3%	62,0%	7,5%	27,4%
Example A European distribution	10.1	mech. treatment	PRT	10 000	150	250	150	0	9 450	0
	10.1	MBT	PRT	90 000	1 650	0	1 150	55 800	6 700	24 700
	10.1	PRT for table 3A total		100 000	1 800	250	1 300	55 800	16 150	24 700
Example B Fictive other distribution	10.1	mech. treatment	PRT	90 000	1 400	2 300	1 400	0	84 900	0
	10.1	MBT	PRT	10 000	180	0	130	6 200	750	2 740
	10.1	PRT for table 3A total		100 000	1 580	2 300	1 530	6 200	85 650	2 740

Note: RCV_R, RCV_E, DSP_L, represent outputs remaining in waste treatment.

In principle, the above modelling approach can be used to specify the whereabouts of outputs also for specific parts of EWC-Stat categories, when the LoW codes are available from the survey and it is known that specific groups of LoW codes within one EWC-Stat category are known to have significantly different treatment balances. Examples include the following:

- a differentiation can be done for facilities which predominantly treat secondary/primary waste by modelling separately for these two categories, e.g. by differentiating between primary and secondary list of waste codes (e.g. for paper and cardboard wastes: Primary codes 15 01 01 & 20 01 01; secondary code 19 12 01).
- For EWC-Stat. 10.2 ('mixed and undifferentiated materials', non-hazardous) could be sub-divided for reasons of facilitating analysis and the modelling. The category could be differentiated by packaging (15 01 05, 15 01 06), paper rejects (03 03 07, 03 03 08) and the rest of these materials, since the first two sub-streams are likely to have a characteristic balance.
- Similarly to EWC-Stat. 10.2, the category 12.1 ('mineral waste from construction and demolition') could be sub-divided into asphalt (17 03 01*, 17 03 02, 17 03 03*), mixed C&D waste (17 09 04) and the rest mineral C&D

waste as these sub-flows can be expected to have quite different treatment balances and output materials.

Finally, if no 'model' facilities can be identified, the flows can still be split according to the shares of the input flows by EWC-Stat or LoW as suggested in the guidance document on municipal waste of May 2017, page 8 ⁽⁷⁴⁾.

Input-output analysis at facility level from data collection from waste transports

If no input and output data from waste facilities are available, but rather the waste transporters are used as data providers, the modelling of treatment facilities' balances is in principle possible in a similar way as described above, if origin and destination are covered in the survey.

The survey should then cover data on the waste transports with the following variables:

- Facility ID of origin, or business ID from primary waste generator or other source of primary waste
- Facility ID of destination
- Amount
- Waste category (by EWC-Stat or LoW code)

For the facility of origin and destination, the ID is linked to information on the R & D code of the facility and therefore

⁽⁷⁴⁾ Eurostat – Unit E2 – Environmental statistics and accounts; sustainable development, Guidance on municipal waste data collection, May 2017. <https://ec.europa.eu/eurostat/documents/342366/351811/Municipal+Waste+guidance>

with the items covered by the tables 3A to 3C of the voluntary module.

With these set of collected data, all input flows to a certain facility can be analysed and differentiated between primary and secondary source. From the transport information of the waste moved from the same facility to another facility, the output data can be compiled and compared to the input data in the same way as demonstrated above for data from the treatment facilities.

Data from ELV monitoring

The Compliance monitoring for end-of-life vehicles according to Commission Decision 2005/293/EC provides a good basis for deriving data on the transformation of discarded vehicles (EWC-Stat 08.1) to secondary wastes. Tables 1 and 2 of the reporting formats require to report the outputs from de-pollution and dismantling (table 1) and from shredding (table 2). The treatment outputs have to be broken down by type of waste as displayed in Table 30 for de-pollution and dismantling and in Table 31 for shredding. The types of waste have to be reported either at LoW entry level, in which case the allocation to EWC-Stat categories is easily possible, or at the level of LoW aggregates.

The data to be reported reflect the amounts of ELV that arise and are treated in the Member State. The sum of the two tables should therefore reflect the total outputs of all ELV treated in a Member State. It has to be noted that for de-pollution and dismantling in table 1 only the quantity of the total output is mandatory. The data on the breakdown

by waste type can be reported on a voluntary basis. But for shredding in table 2, the total as well as the breakdown of the outputs are mandatory. The respective data should therefore be available in all Member States from the ELV monitoring system.

For the completion of the tables for data set 4, the monitoring for those output flows that can be unambiguously converted into EWC-Stat categories are particularly useful. The respective lines are printed in bold in Table 30 and in Table 31.

As concerns the shredding of ELV, the monitoring data show directly how the shredder input is transformed into ferrous metals, non-ferrous metals and sorting residues (light and heavy shredder fractions). For the sorting residues, however, the distinction between hazardous and non-hazardous shredder fractions is not directly available from the monitoring tables but has to be derived from other sources.

For table 1 on dismantling and depollution the situation is more difficult because the number of secondary waste types produced is much higher and the different waste types are partly reported in aggregated form and cannot be easily converted into EWC-Stat categories. Nevertheless, the data allow to determine the amounts of batteries and accumulators (EWC-Stat 08.41), glass (07.1), tyres (07.3) and plastics (07.4) that are separated in the course of de-pollution and dismantling. The outputs of chemical wastes (EWC-Stat 02A) and discarded equipment (08A) can at least be partly determined.

TABLE 30

Materials from de-pollution and dismantling of ELV (Table 1 of Commission Decision 2005/293/EC)

Type of output		Assignment to EWC-Stat categories
Code	Description	
W1606	Batteries and accumulators (LoW: 1606)	08.41 (!)
LIQ	Liquids (excluding fuel) (LoW: 1301 until 1305 + 1308 + 1406 + 160113 until 160115 + 160121 + 160122 + 160199)	01.1, 01.3, 02A, 08A, 10.2
W160107	Oil filters (LoW: 160107)	08A
W1601A	Other materials arising from depollution (excluding fuel) (LoW: 160108 until 160111 + 160121)	07.7, 08A, 12B
W1608	Catalysts (LoW: 1608)	02A

Type of output		Assignment to EWC-Stat categories
Code	Description	
W1601B	Metal components (LoW: 160117 + 160118)	06.1, 06.2
W160103	Tyres (LoW: 160103)	07.3
W160119	Large plastic parts (LoW: 160119)	07.4
W160120	Glass (LoW: 160120)	07.1
W1601C	Other materials arising from dismantling (LoW: 160112 + 160122 + 160199)	08.A, 10.2

(¹) LoW sub-chapter 1606 consists of LoW entries for batteries and accumulators that are assigned to EWC-Stat 08.41, and one LoW entry for 'separately collected electrolyte from batteries and accumulators' (16 06 06*), which is allocated to EWC-Stat 01.2.

TABLE 31

Materials from shredding of ELV (Table 2 of Commission Decision 2005/293/EC)

Type of output		Assignment to EWC-Stat categories
Code	Description	
W191001	Ferrous scrap (steel) from shredding (LoW: 191001)	06.1
W191002	Non-ferrous materials (aluminium, copper, zinc, lead, etc.) from shredding (LoW: 191002)	06.2
W1910A	Shredder Light Fraction (LoW: 191003 + 191004)	10.3
W1910B	Other materials arising from shredding (LoW: 191005 + 191006)	10.3

Please note: De-pollution and dismantling are generally pre-treatment operations. The respective waste flows shall therefore be reported table 3A of data set 4. Whether the data on the shredding of ELV shall be used for the completion of table 3A pre-treatment or in table 3C recycling depends on how the shredding of ELV is reported in data set 2 of the WStatR:

- If the shredding is reported as final treatment (R4) under recycling, the input is already covered by data set 2. In this case, the transformation of the ELV shall be reported in table 3C recycling.
- If the shredding is considered as pre-treatment operation (R12), the respective input is not yet covered by data set 2 and the data shall be entered in table 3A as pre-treatment.

Please note also that the EWC-Stat category discarded vehicles (08.1) is broader than the scope of the ELV monitoring. This needs to be considered when ELV monitoring data are used to complete data set 4. Furthermore, the deadline for the reporting on ELV is the

same as for WStatT reporting, so that it might be required to use ELV data of a previous reference year.

3.3.4. Imports and exports

Another essential issue for the link between waste generation and treatment is the collection of data on imports and exports of waste, since the current data collection on waste treatment does only cover information on waste treated in the country, i.e. the amounts of waste generated in the country minus exports and including imports. Thus, information on the amounts of waste imported and exported is important to allow for the calculation of the treatment of waste generated in the country, regardless of where the treatment takes place.

For the link between generation and treatment it makes a difference at which stage the waste enters or leaves the country. Therefore, the distinction between primary waste that enters/leaves the country as untreated waste and secondary waste should be differentiated.

The objective of this chapter is to identify potential sources of information that could be used to provide information on imports and exports and to recommend a methodology to obtain regular data.

The following sources exist for the collection of data:

- Surveys as part of the regular waste data collection,
- Data from Regulation on Waste Shipment,
- Estimations based on international trade and goods statistics,

The different approaches are described and discussed in the following chapters.

3.3.4.1. Survey on imports and exports as part of the regular waste data collection

Most countries collect data on imports and exports of waste as part of their regular waste data collection, i.e. as part of statistical surveys or administrative reporting obligations. The main advantages of this approach are the following:

- The data on imports and exports are embedded in the collection of data on waste generation and treatment, i.e. the data collection is based on the same definitions and classifications and relies on the same reporting units as for the collection of the other waste data. This contributes to the consistency with the generation and treatment data.
- Data are collected on all types of waste, in particular on green-listed recyclable wastes for which other data sources are difficult to find.
- Data quality is generally considered to be good because the reporting units are familiar with the definitions and classifications of waste statistics.
- The additional burden for the reporting units and for the data collecting institutions is usually low as the collected information forms part of the already existing regular data collection.

The coverage of the survey depends mainly on the reporting units from which the data is collected.

Waste collectors are a good information source for the destination of the primary waste collected regarding the destination. The coverage of the survey depends mainly on the reporting units from which the data is collected. Treatment facilities are crucial for the data collection on imports and exports. They usually know whether the

received wastes come from within the country or from abroad. Data from treatment facilities are thus likely to cover a significant part of the imported waste. Where the treated wastes is exported directly after treatment exported, i.e. without the involvement of other stakeholders (e.g. waste dealers), the treatment facilities will also be able to report the exports of waste.

Waste collectors are a good (additional) information source with regard to the destination of the primary waste collected regarding the destination of the waste, in particular in cases where the waste is exported without being treated in the country. A good data source for determination of imports and exports of waste are waste information systems that collect information on senders and receivers of waste and on the movements of waste, and thus enable the countries to track the waste through the waste treatment system. The fact that senders and receivers of waste shipments are known, improves the possibilities to verify data. Senders and receivers of waste can be contacted when additional information is needed, e. g. on the type of treatment.

Independent from the type of data source, i.e. statistical survey or administrative data source, it is recommended to collect information not only on the type and amount of waste exported but also on the type of treatment abroad. Although the final treatment of exported waste may not always be known to the reporting unit in the exporting country the effort should be made to collect this information.

3.3.4.2. Data of waste shipment regulation

The Regulation 1013/2006 on Waste Shipment ⁽⁷⁵⁾ (WSR) provides for a mechanism that allows to obtain some of the information on imports and exports that have to be included in Table 2 of dataset 4. The Regulation sets the framework for the control of transboundary movements of waste. It is the EU-implementation of the UN Basel Convention on the control of transboundary movements of hazardous waste and the OECD Decisions on the control of transboundary movements of wastes for recovery ⁽⁷⁶⁾.

The Regulation sets up comprehensive framework of control provisions. This framework covers all waste types and provides for procedures to be followed for shipments of waste for recovery and for disposal, both between Member States as well as with countries outside the EU.

⁽⁷⁵⁾ Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste (OJ L 190, 12.7.2006, p. 1), last amended by Commission Delegated Regulation (EU) 2020/2174 of 19 October 2020.

⁽⁷⁶⁾ OECD, Decision of the Council on the Control of Transboundary Movements of Wastes Destined for Recovery Operations, OECD/LEGAL/0266.

Certain types of shipment of waste are prohibited by the Regulation, e.g. the export of hazardous waste to countries outside the OECD. In certain cases the Competent Authorities for the execution of the Regulation must receive a notification prior to the envisaged shipment. In other cases such a notification is not required.

Under EU law on waste shipment, shipments of hazardous waste and waste destined for disposal are prohibited to non-OECD countries outside the EU. Shipments to OECD countries are generally subject to the prior notification and consent procedure which requires the prior written consent of all relevant authorities involved (origin, transit and destination). Shipments of “green-listed” non-hazardous wastes within the EU and OECD do not usually require the prior consent of the authorities, but information requirements apply. In the reporting according to the WSR, the imports and exports of the following three blocks of wastes can be included:

- Wastes classified as hazardous by Y1 to Y45 (Art. 1.1 a of the Basel convention) or by national classification of the party of export, import or transit (Art. 1.1b) (obligatory reporting to Basel Secretariate)
- Wastes that do not fall under Article 1 of the convention, but which are listed in Annex II of the convention (Y46 to Y48) are considered ‘other wastes’ that shall be controlled by the convention (obligatory reporting to Basel Secretariate). These are non-hazardous according to the Y-classification ⁽⁷⁷⁾ as follows:
 - Y46: Wastes collected from households
 - Y47: Residues arising from the incineration of household wastes
 - Y48: Plastic waste, including mixtures of such waste, with the exception of plastic waste that is hazardous (and is therefore controlled under Art. 1) or plastic waste ‘destined for recycling in an environmentally sound manner and almost free from contamination and other types of wastes...’
- The third part of the reporting refers to wastes that were notified under the WSR but are neither classified as hazardous, nor as “other waste” (Y46 to Y48) in accordance with the Basel Convention. This extension **is not** reported under Basel but only in the report under the WSR.

It is important to note that not all countries report imports and exports of waste notified on the basis of the WSR, but

only on the basis of Basel, as the WSR requires only to send a copy of the file reported to Basel also to the European Union (Art. 51.1 WSR – reports by Member States). Thus, the data on waste shipment have gaps in coverage in particular for non-hazardous wastes destined for recovery within the OECD, while the data on hazardous wastes can be expected to be fairly complete. Pilot studies have shown that also the waste covered under Y46 and Y47 have a good coverage as well. For Y48, it is too early to draw conclusions since this category is only effective as of reference year 2021.

3.3.4.3. Estimations based on international trade in goods statistics

For countries that have no suitable other data sources for the determination of waste imports and exports, data from International Trade in Goods Statistics (ITGS) may be used as basis for estimation, in particular for recyclable wastes that are traded freely as goods.

The estimation of waste imports and exports based on ITGS has been applied by Eurostat since several years to produce the Waste Management Indicators that depend on the availability of waste import/export data.

The main classification for the European ITGS is the Combined Nomenclature (CN) which has been used since 1988. The CN is based on the internationally used Harmonised Commodity Description and Coding System (HS), which is managed by the World Customs Organisation (WCO) and which classifies goods at the two, four and six-digit level according to their nature. The CN corresponds to the HS plus a further breakdown at eight-digit level defined to meet EU needs. It includes around 9 400 eight-digit codes and is subject to annual revisions. Based mainly on pilot projects carried out by EU Member States, Eurostat has compiled a list of about 150 CN codes covering waste and has assigned these codes to EWC-Stat categories. This list, referred to as “CN codes master list.xlsx”, is available upon request from Eurostat.

Table 32 shows for the year 2022 how many of the CN codes are assigned to each of the EWC-Stat categories. For the year 2022, the list contains 152 CN-codes that are assumed to cover only or mainly waste materials. The list of CN-codes is most detailed for recyclables wastes which usually have a monetary value. 90 CN-codes refer to metals (51 codes) and to other recyclables (39 codes).

⁽⁷⁷⁾ Under Y46, wastes classified under LoW 19 12 (wastes from the mechanical treatment of waste) dominate the reported amounts 2020, particularly refuse derived fuel (19 12 10) and ‘other waste (including mixtures) from mechanical treatment’ (19 12 12). The third most important waste is 20 03 01 (Mixed municipal waste). For Y47, the most important amounts reported by LoW are from sub-chapter 19 01 (Wastes from incineration or pyrolysis of waste). Depending on the allocated LoW code, the wastes can also be hazardous according to EU legislation (e.g. ly ash containing dangerous substances (190113*).

The estimation on the basis of this code list is generally assumed to provide a solid approximation of waste imports and exports at EU level and also at country level. However, the Combined Nomenclature is primarily designed to record and classify goods with a monetary value and not wastes with a low or with a negative value. This results in some fundamental limitations of this approach as summarized in the following:

- The Combined Nomenclature does not consequently and consistently distinguish between wastes and by-products. The use of CN-codes that cover both wastes and by-products may thus lead to overestimations of imported and exported wastes.
- For some types of goods, no distinction is made between used goods and end-of-life products. This is for instance the case for end-of-life cars, trucks and other vehicles (for more detail see below).
- Trade statistics, and in particular Intra-EU trade statistics, do not cover 100 % of the traded goods because of national reporting thresholds below which parties are exempted from providing information. The thresholds are defined by the countries; data coverage may thus vary from country to country. Although pilot studies from Member States indicate that the resulting data gap is low, the issue should be investigated by countries when using ITGS data.
- The Combined Nomenclature does not classify goods according to their hazardousness, as required for the completion of the tables in data set 4. For EWC-Stat categories that cover hazardous and non-hazardous wastes, an accurate assignment of CN codes will only be possible if the description of the CN code gives a clear indication of the hazardousness.
- Trade data provide no information on the type of treatment of the imported or exported waste in the country of destination. Therefore, further assumptions are needed to assign the shipped waste to the type of treatment. In case of imported waste, the assignment to the type of treatment can be based on the treatment of similar domestically produced waste. In case of exports the task is more challenging ⁽⁷⁸⁾.

Despite these limitations, the IGTS-based estimation is assumed to provide solid estimates for the total of imported and exported waste. However, the accuracy at the level of EWC-Stat categories varies in a broad range according to country analyses and the experience for the compilation of the WMI.

⁽⁷⁸⁾ For the compilation of the Waste Management Indicators, Eurostat has assigned each CN-code to the type of treatment that is assumed to be dominant treatment operation for the respective type of waste. This information is available in Eurostat's "CN code master list" and may be used in cases where no specific information is available.

The IGTS-based estimation seems to work best for the recyclable wastes, in particular for metals, paper and cardboard and plastics. For these EWC-Stat categories, the waste-related CN codes are quite specific as is reflected by the comparably high number of CN codes assigned. Other EWC-Stat categories are reflected less accurately.

Furthermore, there are nine EWC-Stat categories without any CN-codes assigned. For these categories, the respective amounts are either not covered by the IGTS-based estimate or they are reported under other EWC-Stat categories. More information on EWC-Stat specific quality issues is summarised in the following:

- EWC-Stat categories without any CN codes assigned may occur for one of the following reasons:
 - Waste is reported under a CN code together with products of the same material and the CN code is not considered for the estimation because the share of the products is assumed to dominate the covered materials. This situation most likely applies to mineral C&D wastes like concrete, bricks, tiles and ceramics (as covered by LoW sub-chapter 17 01), for which only product-related CN codes exist.
 - Wastes are reported together with a variety of other unspecified materials under CN codes for goods that are not "not elsewhere specified". Such CN codes are not included in the Eurostat CN code master list and wastes are thus not covered by the estimate. This situation most likely applies to soils and dredging spoils.
 - Wastes may be covered by a CN code that is assigned to another EWC-Stat category. This applies presumably to sorting residues (EWC-Stat 10.3) and to sludges and liquid wastes from waste treatment (03.3), which may be reported under CN codes assigned to EWC-Stat categories chemical wastes (EWC-Stat 02A) or household and similar wastes (EWC-Stat 10.1). In this case the amounts are included in the estimate but not properly allocated to the EWC-Stat category.
- For some EWC-Stat categories the coverage of the assigned CN codes is narrower or broader than that of the EWC-Stat category:
 - The EWC-Stat category discarded vehicles (EWC-Stat 08.1) includes all types of end-of-life vehicles, from motorbikes to passenger cars and trucks to trains, ships and aircraft. However, the only waste-related CN code

- assigned to this category refers to end-of-life vessels ⁽⁷⁹⁾. For other vehicles, the Combined Nomenclature distinguishes between new and used vehicles but not between used and end-of-life vehicles. Hence, the IGTS-based estimation does not yield meaningful results for this EWC-Stat category.
- For household and similar wastes (EWC-Stat 10.1), the list contains the CN code “Municipal Waste” (CN 3825 10 00). This CN code is labelled “waste of a kind collected from households, hotels, restaurants, hospitals, shops, offices, etc., road and pavement sweepings, as well as construction and demolition waste”. In principle, the CN code fits quite well to EWC-Stat category 10.1 but includes mixed construction and demolition waste which may lead to overestimations of 10.1 imports and exports.

When using the IGTS-based estimation, it has to be considered that the Combined Nomenclature is annually adjusted. Therefore, it is necessary to regularly check whether waste-related CN codes have been changed or

whether new relevant codes have been added. In recent revisions of the Combined Nomenclature, more attention has been paid to the need of monitoring the trade with waste. For electrical and electronic wastes, four new specific CN codes were introduced in the Combined Nomenclature as of reporting year 2022, which can be used to produce an estimate for the EWC-Stat category 08A discarded equipment. Before 2022, no CN codes were available for this waste category.

Overall, it can be concluded that ITGS data can be used for estimating imports and exports of waste if no other, more reliable data source is available. The quality of the estimates vary significantly across the different EWC-Stat categories and across countries. ITGS-based estimations may be a valid alternative in particular for green-listed recyclable wastes for which specific CN codes are available. It is highly recommended to systematically analyse and cross-check the produced data, where possible. The pilot projects of Austria and Slovenia can serve as a blue-print / good-practice example here.

TABLE 32

Number of CN-codes assigned by EWC-Stat category

EWC-Stat code	EWC-Stat description	NHAZ/HAZ	No. of CN-codes assigned
01.1	Spent solvents	haz	2
01.2	Acid, alkaline or saline wastes	nhaz/haz	:
01.3	Used oils	haz	1
01.4, 02, 03.1	Chemical wastes	nhaz/haz	7
03.2	Industrial effluent sludges	nhaz/haz	1
03.3	Sludges and liquid wastes from waste treatment	nhaz/haz	:
05	Health care and biological wastes	nhaz/haz	1
06.1	Metallic wastes, ferrous	nhaz	11
06.2	Metallic wastes, non-ferrous	nhaz	40
06.3	Metallic wastes, mixed ferrous and non-ferrous	nhaz	:
07.1	Glass wastes	nhaz	1
07.2	Paper and cardboard wastes	nhaz	6
07.3	Rubber wastes	nhaz	2
07.4	Plastic wastes	nhaz	5
07.5	Wood wastes	nhaz/haz	6
07.6	Textile wastes	nhaz	19

⁽⁷⁹⁾ CN 8908 00 00 Vessels and other floating structures for breaking up

EWC-Stat code	EWC-Stat description	NHAZ/HAZ	No. of CN-codes assigned
07.7	Waste containing PCB	haz	1
08 (excl. 08.1, 08.41)	Discarded equipment (excl. 08.1, 08.41)	nhaz/haz	4
08.1	Discarded vehicles	nhaz/haz	1
08.41	Batteries and accumulators wastes	nhaz/haz	14
09.1	Animal and mixed food waste	nhaz	6
09.2	Vegetal wastes	nhaz	6
09.3	Animal faeces, urine and manure	nhaz	:
10.1	Household and similar wastes	nhaz	1
10.2	Mixed and undifferentiated materials	nhaz/haz	:
10.3	Sorting residues	nhaz/haz	:
11	Common sludges	nhaz/haz	1
12.1	Mineral waste from construction and demolition	nhaz/haz	:
12.2, 12.3, 12.5	Other mineral wastes	nhaz/haz	1
12.4	Combustion wastes	nhaz/haz	14
12.6	Soils	nhaz/haz	:
12.7	Dredging spoils	nhaz/haz	:
12.8, 13	Mineral waste from waste treatment and stabilised wastes	nhaz/haz	1
TOTAL	Total waste	nhaz/haz	152

3.3.4.4. Recommendations

In the following, some recommendations are derived from the descriptions above. A summary of pros and cons of the different approaches is summarised in Table 33.

- If a dedicated national survey on imports and exports of waste exists, this is usually the preferable data source.
- An option is to combine the survey data with WSR data on notifiable wastes for the following reasons:
 - WSR data provide direct information on the type of treatment for imports and for exports,
 - WSR data cover direct waste exports from the waste generators which may not be covered by waste statistics (observed by AT which also noted that direct exports were low and the impact therefore not too big, but this may be different across countries)
- Whether WSR data are preferable to waste statistics data for notifiable wastes should be assessed by the countries. A general judgement is difficult here. Good practice examples for such an analysis are the pilot projects conducted by Austria and Slovenia on this topic. Both

countries have come to the conclusion to combine waste statistics data and data on notifiable wastes.

- It has to be noted that the combination of data from different sources always has its own challenges. It should be made sure that overlaps as well as gaps are avoided.
- Estimates based on ITGS data are an option for countries where no data on imports and exports for green-listed wastes are collected. The Eurostat CN code master list, which is used for the production of several indicators provides a solid basis for this approach.
- ITGS-based estimations can be combined with WSR data in order to improve the accuracy of the import and export data for hazardous and other notifiable waste. Attention has to be paid to avoid gaps and overlaps.
- ITGS-based estimations can also be combined with the WStatR data on waste treatment of the countries to which a waste is mostly exported in order to assess how this waste is treated, and then allocate this type of treatment to exports. But this only works for European exports, and only if there not too many countries to which the waste is exported.

TABLE 33

Data sources on imports and exports of waste – Advantages and disadvantages

Data source	Advantage	Disadvantage
Survey on imports and exports as part of the regular waste data collection	<ul style="list-style-type: none"> • Survey usually covers all types of waste, i. e. recyclable, green-listed wastes as well as notifiable wastes • Collection of import/export data is embedded in the collection of data on waste generation and treatment which benefits the consistency of the data. • Data quality is generally considered to be high. • Data are usually collected acc. to LoW or other waste classifications that are convertible into EWC-Stat categories. 	<ul style="list-style-type: none"> • Direct exports of wastes may not be covered by the survey, depending on the reporting units. • Information on the type of treatment may not be available for waste exports.
Waste Shipment Regulation data	<ul style="list-style-type: none"> • Data quality is generally considered to be high. • Data provide information on the type of treatment for imports and exports by R and D operations. • Data are collected according to LoW and thus be easily related to generation and treatment data and converted into EWC-Stat • Data cover direct exports by waste generators • No additional burden for data collection as the data are collected annually and are available in time for waste statistics reporting 	<ul style="list-style-type: none"> • Data are limited to notifiable wastes and provides no information on green listed waste
Estimations based on International Trade of Goods Statistics (ITGS)	<ul style="list-style-type: none"> • Provides data on green listed wastes • No additional burden for data collection as the data are collected annually and are available in time for waste statistics reporting 	<ul style="list-style-type: none"> • CN-codes may cover wastes and by-products at the same time, which may result in overestimations. • Suitable CN-codes are missing for some EWC-Stat categories. • No distinction between non-hazardous and hazardous waste. • Incomplete coverage of imports and exports of intra-EU trade due to reporting thresholds. • Allocation of CN-codes to EWC-Stat category partly not accurate. • No information on the type of treatment.

Table 34 summarises the conclusions on the basis of EWC-Stat codes. The table reflects the conclusions from early pilot studies on import and export documented in a report of the Commission to the Parliament and the

Council ⁽⁸⁰⁾, which was adjusted to the new EWC-Stat codes and to some changes in the meantime (e.g. better coverage of discarded equipment (EWC-Stat 8 (excl. 8.1 and 8.41)) by CN codes).

TABLE 34

Data sources on imports and exports of waste – recommendations by waste items

EWC-STAT				
Item N°	Code	Description	NHAZ/ HAZ	Comments
1	01.1	Spent solvents	HAZ	Covered by the WSR
2, 3	01.2	Acid, alkaline or saline waste	NHAZ	Partially covered by ITGS (non-hazardous). Covered by WSR (hazardous)
4	01.3	Used oils	HAZ	Covered by WSR
5, 6	01.4, 02, 03.1	Chemical wastes	NHAZ/ HAZ	Partially covered by ITGS (non-hazardous). Covered by WSR (hazardous)
7, 8	03.2	Industrial effluent sludges	NHAZ/ HAZ	Covered by WSR (non-hazardous and hazardous)
9, 10	03.3	Sludges and liquid wastes from waste treatment	NHAZ/ HAZ	Covered by WSR (non-hazardous and hazardous)
11, 12	05	Health care and biological wastes	NHAZ/ HAZ	Covered by WSR (non-hazardous and hazardous)
13	06.1	Metallic wastes, ferrous	NHAZ/ HAZ	Good coverage ITGS
14	06.2	Metallic wastes, non-ferrous	NHAZ/ HAZ	Good coverage ITGS
15	06.3	Metallic wastes, mixed ferrous and non-ferrous	NHAZ/ HAZ	Good coverage ITGS
16, 17	07.1	Glass waste	NHAZ/ HAZ	Good coverage ITGS (non-hazardous). Covered by WSR (hazardous).
18	07.2	Paper and cardboard waste	NHAZ	Good coverage ITGS.
19	07.3	Rubber waste	NHAZ	Most CN codes contain waste and products
20	07.4	Plastic waste	NHAZ	Good coverage ITGS.
21, 22	07.5	Wood waste	NHAZ/ HAZ	Partially covered by ITGS (non-hazardous) Partially covered by WSR (hazardous)
23	07.6	Textile waste	NHAZ	Good coverage ITGS.

⁽⁸⁰⁾ Report from the Commission to the European Parliament and the Council - Second report on the results of the pilot studies referred to in Article 4(3) and Article 5(1) of Regulation (EC) No 2150/2002 of the European Parliament and of the Council of 25 November 2002 on waste statistics, COM(2008) 501 of 1.8.2008

EWC-STAT				
Item N°	Code	Description	NHAZ/ HAZ	Comments
24	07.7	Waste containing PCB	HAZ	Covered by WSR
25, 26	08 (excl. 08.1, 08.41)	Discarded equipment (excl. 08.1, 08.41))	NHAZ/ HAZ	Partially covered by ITGS (non-hazardous). Covered by WSR (hazardous).
27, 28	08.1	Discarded vehicles	NHAZ/ HAZ	Partially covered by ITGS (non-hazardous). Covered by WSR (hazardous)
29, 30	08.41	Batteries and accumulator's wastes	NHAZ/ HAZ	Partially covered by ITGS (non-hazardous). Covered by WSR (hazardous)
31	09.1	Animal and mixed food waste	NHAZ	Most CN codes contain waste and products
32	09.2	Vegetal wastes	NHAZ	Most CN codes contain waste and products
33	09.3	Animal faeces, urine and manure	NHAZ	Covered by WSR
34	10.1	Household and similar waste	NHAZ	Covered by WSR
35, 36	10.2	Mixed and undifferentiated materials	NHAZ/ HAZ	Covered by WSR (non-hazardous and hazardous)
37, 38	10.3	Sorting residues	NHAZ/ HAZ	Covered by WSR (non-hazardous and hazardous)
39	11	Common sludges	NHAZ	Covered by WSR
40, 41	12.1	Mineral waste from construction and demolition	NHAZ/ HAZ	Partially covered by ITGS (non-hazardous). Covered by WSR (hazardous)
42, 43	12.2, 12.3, 12.5	Other mineral wastes	NHAZ/ HAZ	Partially covered by ITGS (non-hazardous). Covered by WSR (hazardous)
44, 45	12.4	Combustion wastes	NHAZ/ HAZ	Good coverage ITGS (non-hazardous). Covered by WSR (hazardous).
46, 47	12.6	Soils	NHAZ/ HAZ	Partially covered by ITGS (non-hazardous). Covered by WSR (hazardous)
48, 49	12.7	Dredging spoils	NHAZ/ HAZ	Partially covered by ITGS (non-hazardous). Covered by WSR (hazardous)
50, 51	12.8, 13	Mineral waste from waste treatment and stabilised wastes	NHAZ/ HAZ	Covered by WSR (non-hazardous and hazardous)

3.3.5. Determination of losses and emissions

The variable 'losses / emissions' is required in the tables 3A to 3C for the priority waste streams in order to balance the input into the respective treatment with the quantity of produced secondary wastes and products.

To collect or derive data on losses and emissions may be challenging. Possible methods and data sources include the following:

- Input-output analysis of treatment facilities for specific waste streams. This should be a valuable data source in cases where facilities treat only one waste category so that the produced outputs can be directly related to input. Data for such an analysis should usually be available from waste treatment surveys as the questionnaires/reporting forms usually ask for the inputs and outputs of the waste treatment facilities (see also chapter 3.3 on transformation coefficients).
- Collection of data on the water content or emissions via the survey questionnaires.

- Emission factors from GHG calculations.
- Modelling approaches.

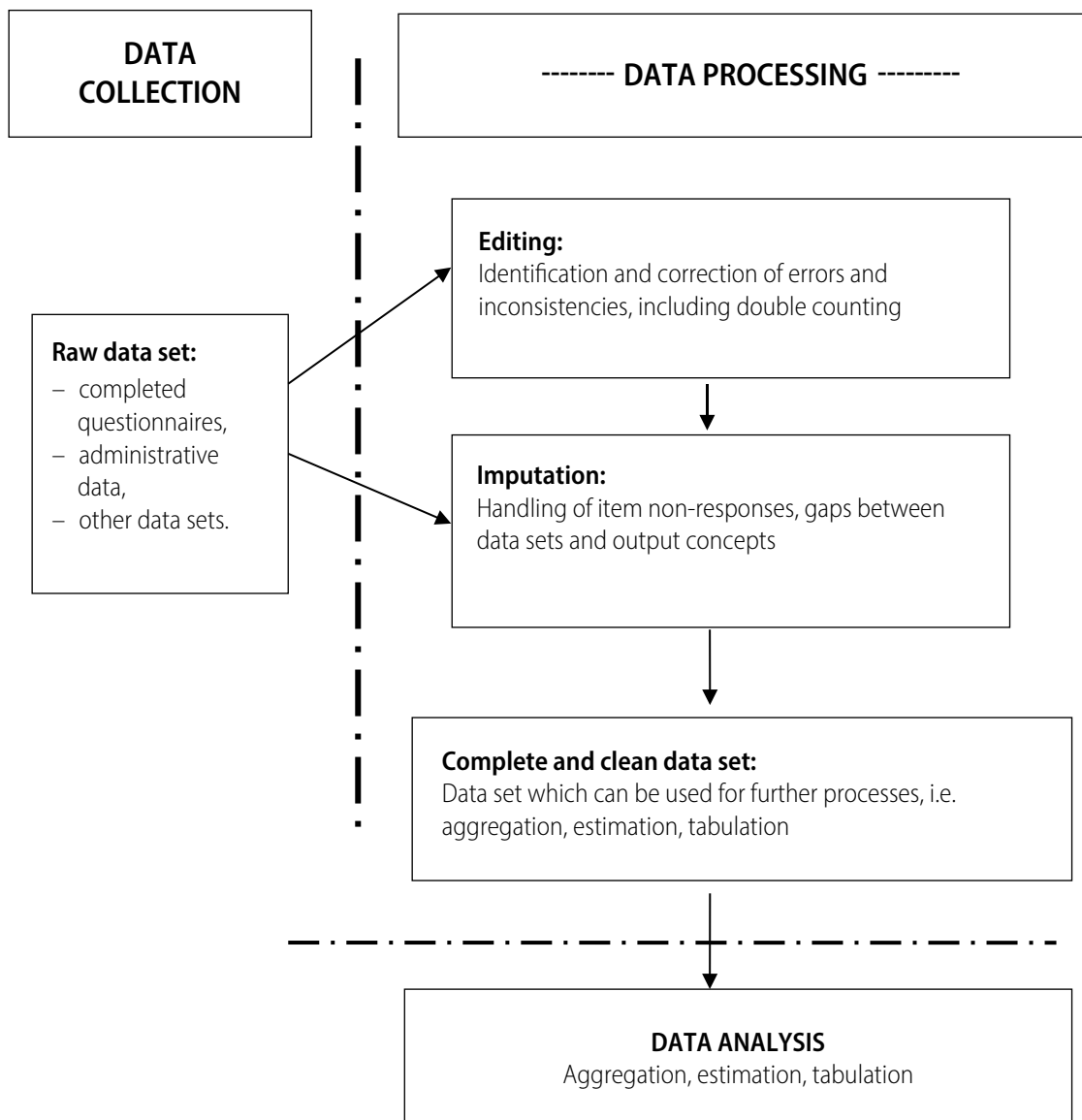
If no data on losses / emissions are available, it is recommended to calculate the value as difference between the waste input and the output of secondary wastes and products, and to check the resulting value for plausibility by means of the data sources mentioned above.

3.4. Data processing

Data processing is carried out by Statistical Offices in accordance with fixed rules which are based on a wealth of experience. This section of the manual deals with all the subjects which have a special relevance to waste statistics.

FIGURE 11

Elements of data processing and differences vis-à-vis data collection and analysis



It must be pointed out that neither the distinction between the concepts of data collection and data processing, nor the content of these concepts is natural or evident. Data collection can be restricted to the collection of responses from units, while data processing can be restricted to the pure technical handling of the raw data matrix created from these responses.

More complex and extended definitions are applied in this manual. As described in Sections 3.1 and 3.2, data collection in the field of waste statistics does not only refer to the collection of responses from units but also includes the use of data sets which have already been collected and prepared for different objectives. Data collection is defined in this manual as the system or process of generating the basic data set. The foregoing Chapters on data collection therefore also describe the problems associated with collection methods and specify the principles which should be applied when considering problems which relate to coverage and quality.

The definition of data processing in this manual is based on the definition contained in the Eurostat Handbook on the Design and Implementation of Business Surveys. According to that definition, "processing" takes place at an early stage: "The starting point for the processing stage is the information as collected from respondents. Processing and analysis can be said to comprise all operations, applying for "promotion" to the level of the intended statistical output as specified" ⁽⁸¹⁾. The Handbook focuses on survey methodology as a method of data collection. The present manual indicates that other methods are also possible, which means that it also deals with other subjects. In addition to the processes of editing and imputation as they relate to surveys, the manual also discusses the problem of double counting, which can occur, in particular, when other methods are used or when a number of sources need to be combined.

3.4.1. Data editing

Data editing is the application of checks to identify missing, invalid or inconsistent entries, or data records which might contain errors ⁽⁸²⁾. Editing includes checks on completeness, logical checks on the coherence of related variables and checks for data consistency.

The process of editing can be defined as a process which is used to identify (potential) errors in the data material or data matrix received from respondents. The editing of data

involves correcting the information received from respondents or data suppliers. Data editing can (and must) take place at several points in the process of information generation: at the beginning, when the information is supplied, at the end before the completed data sets are delivered to final clients like Eurostat and also in the middle, when different data sets are incorporated. The data editing process, which is by far the most important process, takes place at the beginning and is therefore given priority in this manual. Data editing can take place during or after data entry.

A distinction can be made between the following basic editing processes:

- Completeness check with regard to sample survey (How should non-respondents be handled?)
- Completeness or routing check with regard to questionnaire (Have all the questions which should have been answered been answered?)
- Data validation (Are answers permissible and plausible?)

3.4.1.1. Completeness check with regard to sample survey

Generally speaking, replies will not be received from all the units selected. There can be various reasons for this:

- a. the enterprise no longer exists and has "shut up shop",
- b. the address, name or ownership of the enterprise has changed;
- c. the enterprise is not able or willing to reply and has therefore not replied (yet).

The cases indicated in (a) and (b) occur in every survey. They relate to the fact that none of the registers are ever complete at any given time. However, the percentage of "wrong" addresses in a sample survey reflects the quality of the register. The quality report should therefore include not only the percentage of non-replies which can be attributed to mistakes in the register but also information on the further handling of these cases.

Case (c) deserves special attention:

- Enterprises which are not willing to provide information can either be forced to do so or be excluded from the sample. Although information which is provided as a result of enforcement measures is of inferior quality, every effort should be made to encourage enterprises which do not reply to comply with their reporting obligation.

⁽⁸¹⁾ p. 141

⁽⁸²⁾ Eurostat Working Group "Assessment of quality in statistics": Glossary of quality terms, Luxembourg, 2/3 October 2003.

Measures usually include reminders in writing and by phone in accordance with a clear time schedule. In the event of non-compliance, enforcement measures can be taken in line with national legislation.

- Assistance should be provided to enterprises which are not able to answer the questionnaires. A number of explanatory documents on waste classifications are available. Enterprises should familiarise themselves with the EU waste classifications as this will also help to improve European integration in practice.

3.4.1.2. Completeness or routing check with regard to the questionnaire

If all questions which should be answered have been answered, the routing check can be carried out automatically. An automatic check can be carried out only if the questionnaire is based on precise logic. If an automatic routine is applied, then only those replies which are identified as incompatible need to be handled manually.

Data validation (Are answers permissible and plausible?)

Several methods are used to test whether data are permissible and plausible:

- Data can be compared with historical data and data from comparable enterprises.
- Data should not exceed certain boundaries (negative figures are impossible, fraction amounts cannot be higher than the total, etc.).

The possibilities for the detection of errors depend on the sources and methods available at the national level. Herewith some suggestions for the table on waste generation:

1. In an economic activity (NACE) a waste type does not occur in the sample.

Please reflect on the content of this economic activity. Is this waste type impossible in this activity, then a zero value should be inserted and no flag added to the cell. If you are aware of important waste streams in the units not sampled, please note this in the Quality Report.

2. In a combination of economic activity (NACE) and waste type almost all units report zero, but a few have a positive waste value.

Please reflect on the application of the classifications. If the waste stream is impossible or highly improbable in the economic activity, an error might have occurred in either the application of the economic activity or the classification by waste type. If more detail is available in either the NACE classification or in the waste classification, this will assist in the interpretation of the situation.

3. In a combination of economic activity (NACE) and waste type almost all units report a positive, but a few have a zero waste value.

The case is similar to the one above. Could we imagine businesses in this economic activity without the generation of this specific waste stream?

4. The waste value for a combination of economic activity (NACE) and waste type is dominated by one or a few units

This is only a natural result if the economic activity is dominated by one or a few large enterprises. For the detection of outliers the size of the enterprises should be taken into account. Positive outliers might be the result of misclassification (of either economic activity or waste type); it could also be an error in the reporting measure (kilograms or tonnes).

All the examples above could be generalised in the analysis of waste profiles within an economic activity; this means that all waste types of the enterprises within a NACE category are evaluated together, not only one isolated waste type. In the illustration below the manufacture of pulp, paper and paper products contains 7 enterprises (named 1 to 7). For these enterprises the distribution of the total generation of waste over the waste types is presented. In this example the profile of enterprise 4 clearly does not fit in the general pattern; probably a more formal Chi-squared test is possible to detect the outliers. The enterprise could be classified in the wrong way according to the NACE, but it could also have an activity quite different from the other enterprises in the group, but still fitting in the broad NACE category.

TABLE 35**Illustration: waste profiles of enterprises in the manufacture of pulp, paper and paper products (%)**

Waste types	Enterprises						
	1	2	3	4	5	6	7
1	7	8	6	15	7	8	6
2	12	11	11	5	13	11	11
3	11	11	13	0	10	11	13
4	0	0	0	5	0	0	0
5	20	24	22	15	20	13	22
6	5	4	4	0	5	5	4
7	5	2	4	24	5	2	4
8	0	0	0	3	0	0	0
9	37	35	38	18	37	35	37
10	1	3	1	2	1	3	2
11	1	1	0	2	1	1	0
12	1	1	1	6	1	1	1

In some cases the detected errors can be corrected in the individual record (based on extra information available or collected). The general procedure for detected errors is to set either the waste value or the NACE code as missing and treat the missing value in the imputation procedure.

3.4.2. Data imputation

Although data editing will undoubtedly increase the response rate, some data will still remain missing. A distinction can be made between two types of missing data: unit non-response and item non-response.

Unit non-response is handled in the editing process. Remaining unit non-responses are managed in the surveying process by recalculating weights (reweighting). Imputation refers only to item non-response.

Item non-responses can be handled in two ways:

- ignore the missing values: restrict the analysis to forms which have been completed in full (complete case analysis) or use all the information available (available case analysis);
- impute the missing values (imputation can range from simple and intuitive methods to sophisticated methods).

As regards statistics on waste generation, imputation can be difficult, but it is sometimes unavoidable if large generators of waste cannot deliver complete information. Item non-response also can be introduced in the processing of data because of detected errors.

Imputation models can be based on:

- expert knowledge (this waste stream cannot occur in that economic activity; waste stream 1 should be less than waste stream 2);
- observation of the same enterprise in a previous period;
- observation of similar enterprises in the same period (or even similar enterprises in a previous period).

If the number of imputations is large, the results will become dependent on the imputation method. Where relevant the number of imputations and the imputation method should be reported in the Quality Report.

3.4.2.1. Double counting or overlapping

Double counting in relation to waste generation

Double counting of waste generation primarily occurs when several data sources are used and integrated. Here are two examples of double counting:

- (A) Household waste is estimated via the household survey and (B) the additional survey of waste generation by economic activities also includes waste collectors. Double counting arises when waste collectors are assumed to be the generators of the quantities of waste they have collected.
- (A) Agricultural waste is estimated via waste factors applied to agricultural structure data and (B) household waste is determined via waste collectors which also provide their services to farms (farm households). Double counting arises when farmers put some of their farming waste into the bin which is emptied by the household waste collectors.

However, double counting can also arise when only one source is used: If enterprises, when questioned about their waste generation, include waste which they have taken in from other enterprises, then this waste will be counted twice. This type of double counting, which is similar to double counting of waste treatment, can be avoided by ensuring that the questions in the questionnaire are specific. If attention is drawn to the fact that enterprises should only report waste which has been generated by them (N.B. waste must not be reported by waste traders), then double counting can be avoided. There is always a risk of double counting if waste collectors and transporters are used as an (additional) source of information.

The subject of double counting is also discussed briefly in the section of the manual which deals with the “strategic” considerations relating to each of the possible methods of data collection and in the section on the design of the questionnaire (Section 3.1). Proposals are made as to how double counting may be avoided.

Double counting in the case of multi-step treatment

Double counting can occur when waste undergoes two or more treatment processes in different treatment facilities which are covered by Annex II of the Waste Statistics Regulation. The Regulation tries to minimise double counting by excluding preparatory operations from the scope of Annex II. However, this does not eliminate the problem completely. In the following section, the problem is discussed from the point of view of disposal operations, on the one hand, and recovery operations, on the other.

Disposal operations

The situation concerning disposal operations is comparatively simple. As outlined in Section 2.3 of the manual, Annex I of Directive 2008/98/EC lists five

preparatory treatment operations which are followed by other disposal operations. These are:

- biological treatment (D8);
- chemical-physical treatment (D9);
- blending, mixing, and repackaging of waste (D13 and D14);
- temporary storage (D15).

The remaining operations, i.e. waste incineration, landfilling and discharge into the environment, can be considered as final treatment steps. Hence, for disposal operations, the distinction between pre-treatment and final treatment is relatively clear. Provided that the treatment facilities are correctly assigned to the D codes, double counting can be largely avoided.

In principle, this is not true of waste incineration. Incineration can be considered to be thermal pre-treatment which generates secondary waste (slag ashes, residuals from air exhaust treatment, etc.); this secondary waste is recovered or landfilled subsequently. In the latter case, the waste is counted twice as waste which is disposed of. In this case, however, double counting is deliberate and does not have to be eliminated.

Recovery operations

In the case of recovery operations, the situation differs in several ways. First of all, Annex II of Directive 2008/98/EC does not define preparatory operations for recovery as clearly as Annex I on disposal. The operations R12 ‘Exchange of wastes’ and ‘Temporary storage of waste’ (R13) are excluded from the scope of the Waste Statistics Regulation. The exclusion of R12 means that for instance facilities for de-pollution, dismantling and sorting (see Section 2.3) are not covered by waste treatment statistics. However, the distinction between pre-treatment and ‘final’ treatment operations covered by Annex II of the Waste Statistics Regulation is not very clear for recovery and will not prevent double counting.

The chain of treatment processes for recovery is also more complex and more versatile than for disposal. The number of treatment steps varies for different types of waste.

The issue of double counting must therefore be taken into consideration during data collection and processing.

As pointed out in Section 3.2.1, facility registers used for the selection of reporting units should contain information which makes it possible to assign a treatment facility to a specific step in the treatment chain, i.e. to determine the level of treatment carried out. This information must be coded in such a way that it can be used for the selection of

reporting units. This information can be used to reduce double counting by reliably excluding pre-treatment facilities which are not covered by the survey.

It was also pointed out previously that the data collected on the quantities of waste treated should provide information on the origin and destination of the waste. In order to avoid double counting, it is particularly important to know whether the treated waste comes directly from the waste generator as a primary waste or is a secondary waste

originating from a treatment facility. Furthermore, the destination of the generated waste should be specified by giving the name, address and registration number of the receiving treatment plant and the type of treatment (R or D code).

This information can be used to ensure that quantities of waste which have been counted twice are identified and eliminated from the data.

4

The quality report

4.1. Legal basis and content of the quality report

In order to take advantage of the sources available at national level and take proper account of differences in (economic) structure, the Member States are left to decide which methods of data collection are most suitable. However, this is not conducive to the drawing up of harmonised waste statistics. The quality report, which each Member State is expected to submit together with the data, seeks to supply the information necessary for assessing the quality of statistics at both national and Community level. In many Member States, different parties are involved in the collection of data. The Member States must decide themselves which organisation will coordinate the submission of the quality report (and the submission of data).

The national quality reports will also be used to draw up a quality report at EU level. Eurostat is required to report to the European Parliament and the Council on the quality of statistics and the burden on businesses (Article 8(1) of the Waste Statistics Regulation). The national quality reports will be used as a basis for the European report.

The content of the quality report for waste statistics is laid down in Commission Regulation (EC) No 1445/2005. The Regulation contains an Annex where the contents are described in detail in two Parts. Part I of the quality report presents a general description of the data and gives an overview of the methods applied. Part II of the report follows the standard elements used to define quality in the European Statistical System. This chapter is strictly structured according to the order in which the contents are described in the Regulation or refers to the numbering of the elements within the Annex of the Regulation.

The quality reports to be submitted, however, have to be structured according to the ESS Standard for Quality Reports Structure (see chapter 3.2). This structure differs from that laid down in the abovementioned regulation. For this reason, the numbering of all elements described according to the new structure is mentioned throughout this document.

Many elements are set out in the aforementioned Commission Regulation and in this manual. Depending on the methods used in each Member State, various elements will not apply or will be less relevant. Please select the elements which apply to your Member State and adjust them where necessary and indicate “not applicable” or “not relevant” to the elements which are not applicable or not relevant in your country, as appropriate. Although information is required on all seven of the elements used to define quality, priority should be given to the elements “accuracy” and “comparability”.

Two sets of key variables for the quality report are defined in the Annex of Regulation 1445/2005. For the generation of waste, the key variables are hazardous waste generated by households, non-hazardous waste generated by households, hazardous waste generated by enterprises (all of which are NACE categories) and non-hazardous waste generated by enterprises. The key variable hazardous waste generated by households is added for completeness and symmetry; it is not particularly important in itself.

For the treatment of waste, the key variables consist of “hazardous”/“non-hazardous” combined with four waste treatment operations (the two disposal operations are combined).

An overview of the required contents of the quality report is given in the table overleaf. It is structured according to the

order of the contents as described in the Annex of Regulation 1445/2005.

Contents of quality report acc. to COM REG 1445/2005		Explanation
1	File name of the quality report	WASTE_WSTARSI_A_XX_2022_0000 where XX is the country code, indicate your country's quality report for a reference year, 2022 in this case.
Part I: Description of the data		
2	Identification	(a) Country name and reference year. (b) Description of data sets submitted; the transmission format defines the three data sets which must be submitted. The description should be quite general at this stage and should refer to any derogations which apply to the submission of (parts of the) data sets. (c) Transmission date.
3	Contact information (WSTARSI 1)	Name of the contact person/coordinator in the Member State and contact details (phone number and e-mail address, institution and function).
4	Institutions involved and sustainability of data collection (WSTARSI 3.1.1)	Description of the parties involved/sources used in the collection of data. How do the parties and sources relate to the domains of the Waste Statistics Regulation? What is the legal basis of the data source? How is continuity assessed? (see Table 36)
5	Methods applied (mostly WSTARSI 3.1)	The tables in Section 4.3 may be helpful with a view to describing the methods in a systematic way: (a) Table 38 on classifications used (WSTARSI 3.2.1) (b) Table 37 (WSTARSI 3.1.2.) and Table 39 to Table 41 on waste generation by businesses (WSTARSI 3.1.3., 3.1.4., 3.1.5.) (c) Table 43 on waste generation by households (WSTARSI 3.1.6.) (d) Table 44 to Table 45 on the collection of data on waste treatment (WSTARSI 3.1.9.). (e) Table 42 on the coverage of extractive waste (WSTARSI 13.3.1.4.).
6	Major Changes (WSTARSI 15.2. Comparability - over time)	Any changes which have taken place since the previous reference year should be reported here, together with an assessment of their impact on data quality. Special attention should be paid to comparability over time. No reference needs to be made to the data collected through the Joint Questionnaire. Also, changes expected in the next reference year should be reported, again with an assessment of the impact on data quality.
7*	Wet matter for sludges (WSTARSI 18.5.2.)	Table 46 where the amounts in wet matter have to be provided for the waste categories W032, W033, W11 and W127, which are delivered in dry matter in the submitted data files.
8*	Data validation (WSTARSI 18.4)	In this section, the countries are asked to provide the results of their own data validation, either based on the standard validation rules (see chapter 6.1) or by their own approach.

Part II: Report on the quality attributes		
1	Relevance (WSTARSI 12)	Description of the primary users and of political requirements with regard to waste statistics at national level (WSTARSI 12.1 – user needs, WSTARSI 12.2 – user satisfaction).
	Completeness (WSTARSI 4.3)	<p>Member States should explicitly identify any data gaps in their data sets (restricted breakdown, missing values).</p> <p>The Eurostat production system requires complete data sets. If a data cell is missing, the data line should still be supplied, with a special value to explain why this cell is not available (see also Chapter 5: missing values):</p> <ul style="list-style-type: none"> • a real zero, which must be represented by “0”; • value not available, coded as “M”. <p>Specify the number of special values per set.</p> <p>Explanations should be given for the “M” values. Information should be provided on how to overcome the deficits; Table 47, Table 48. The value “0” should also be used if a specific combination does not occur, e.g. as Luxembourg does not have a fishing industry, it should enter “0” for the quantity of waste generated by the fishing industry.</p>
2	Accuracy (WSTARSI 13)	
2.1	Sampling errors (WSTARSI 13.2)	
		<p>The information required on sampling methods (sampling frame, sampling scheme, stratification and sample volumes) is covered in Table 37 to Table 45. Table 49 contains the information on the coefficient of variation for the key variables. In the quality report, information on the coefficient of variation is required for each key variable. The coefficient is defined as the standard error of the estimated amount of waste divided by the total amount of waste in the key variable. To facilitate comparison between countries, the amount of waste in the denominator should include not only waste amounts estimated using sample surveys but also waste amounts derived from administrative sources. If a derogation applies to part of the key variable, the total refers only to the items included in the data.</p> <p>The coefficient will be reported in percentages with one decimal position. For further explanation, see Table 49.</p>
2.2	Non-sampling errors (WSTARSI 13.3)	
2.2.1	Coverage errors (WSTARSI 13.3.1)	<p>For Annex I on waste generation: description of the method(s) applied to achieve coverage of 100%: Table 37.</p> <p>For Annex II on waste treatment: description of the waste treatment facilities which are excluded from reporting and the basis for this exclusion: Table 50.</p> <p>Finally, a description should be provided of the main cause of misclassification, i.e. problems of undercoverage and overcoverage in the collection of data.</p>

2.2.2	Measurement errors (WSTARSI 13.3.2)	<p>Instruments to reduce potential risks and avoid errors</p> <p>Application of statistical units:</p> <p>Description of the statistical units selected; have they been applied in accordance with the rules of the Statistical Business Register or in accordance with other procedures?</p> <p>Precision of quantities:</p> <p>The core values are measured in kilotonnes of waste. What is the precision of the original measurement? What validation procedures are applied to detect errors in measurement units (for instance reporting in kilograms, where tonnes were expected)?</p> <p>If the basic data is collected in volumes (cubic metres), where and how is the conversion to tonnes done?</p> <p>Data collection instrument:</p> <p>Has the questionnaire been validated, e.g. by a focus group or data collection experiments?</p> <p>Incentives for over-reporting or under-reporting in sources of administrative data: identify the advantages and disadvantages of inclusion in administrative records.</p>
2.2.3	Processing errors (WSTARSI 13.3.4)	<p>Please summarise the processing steps between the collection and production of statistics.</p> <p>List of processing errors identified and their extent.</p> <p>Presentation of processes put in place to control and correct processing errors.</p> <p>Coding of waste category:</p> <p>Description of how coding is handled and of the validation routines established (e.g. use of waste profiles for certain economic activities).</p> <p>NACE category (source category):</p> <p>Is the NACE code taken from the statistical business register, is it applied in accordance with business register procedures, or what other procedure is followed?</p> <p>Type of treatment operation:</p> <p>Is the type of treatment operation established in accordance with the explanations in the handbook or in accordance with some other procedure?</p> <p>Region:</p> <p>How is the regional code applied to statistical units which carry out activities in more than one region?</p>
2.2.4	Non-response errors (WSTARSI 13.3)	<p>Response rate at the level of the 19 NACE groupings and households; Table 39 and Table 43.</p> <p>Description of the handling of non-responses (unit and item non-responses) in surveys; Table 39 and Table 43.</p>

2.2.5	Model-assumption errors (WSTARSI 13.3)	<p>Description of models, sources used, scope, assumptions connected with the model application and expected errors and how to cope with them.</p> <p>Results from sensitivity analysis, e.g. different factor lists from different countries or institutions which seem to be reasonable and well-justified should be analysed with regard to potential effects.</p>
3	Timeliness and punctuality (WSTARSI 14)	<p>The update flag in the transmission format can be used to flag cells as provisional (see Chapter 5: flags). The Waste Statistics Regulation did not make provision for this option. If any cell is flagged as provisional, provide:</p> <ul style="list-style-type: none"> • the number of provisional cells per set; • an explanation; • a plan for the revision of the data. <p>Description of the key data collection steps in the process of establishing the data sets in a time schedule; Table 51</p> <p>Description of the key data processing steps (e.g. starting and finishing dates for completeness, coding and plausibility checks, data validation and non-disclosure measures) in a time schedule; Table 51.</p> <p>Description of the key publication steps (e.g. when the advance and detailed results were calculated and disseminated) in a time schedule.</p> <p>Punctuality of data transmission to Eurostat will be evaluated in accordance with the Waste Statistics Regulation, giving details of periodicity and deadlines for data transmission. An explanation should be provided for any delay. The report should also give details of the measures taken to avoid delays in future.</p>
4	Accessibility and clarity (WSTARSI 10)	<p>The NSIs should give details of:</p> <ul style="list-style-type: none"> • dissemination policy on waste statistics; • measures and tools to establish/improve clarity; • consistency of the statistics disseminated nationally with the data reported pursuant to the Waste Statistics Regulation; • relevant confidentiality policy; • the total number of cells, with confidentiality flags per data set and type of confidential flag; for further explanations, see Chapter 5: flags.
5	Comparability (WSTARSI 15.1-15.2)	<p>To facilitate the comparability of national data generated using different methodologies, the (potential) restrictions with regard to coverage and precision of the data should be mentioned:</p> <ul style="list-style-type: none"> • What is the reporting unit (for sample surveys and for administrative sources)? • How is the regional comparability of data on waste treatment facilities validated? What statistical unit is used? How are mobile waste treatment facilities handled? • Comparability over time, anticipated changes. Give details of changes in definitions, coverage or methods since the previous Waste Statistics Survey and evaluate the consequences (refer to Part I).

6	Coherence (WSTARSI 15.3-15.4)	<p>Member States are invited to comment on consistency with:</p> <ul style="list-style-type: none"> • trade statistics; • environment-economic accounting, including national accounts; • the production of structural indicators. <p>It is proposed that Member States identify differences in the application of statistical units and classifications.</p> <p>Additional remarks on this by Member States are welcomed. Consistency with national waste statistics is covered by Item 4 (accessibility and clarity) (WSTARSI 10).</p>
7	Burden on respondents (WSTARSI16)	<p>An evaluation of the burden on respondents in physical terms (time required for response) and the actual number of respondents from businesses and households separately. For administrative sources: the burden on respondents resulting from additional questions for statistical purposes; Table 52.</p>

4.2. Quality reporting in ESS-MH

The quality reports are compiled and transferred to Eurostat via the ESS-MH. ESS-MH, the European Statistical System Metadata Handler, is the web-based tool for editing and submitting statistical quality reports to Eurostat. The underlying structure implements the WSTARSI (ESS Standard Quality Report Structure), which is a general SDMX standard for quality reports.

In short, ESS-MH replaced the Word templates for quality reporting that were used before. According to Regulation (EC) No 223/2009 of the European Parliament and of the Council of 11 March 2009 on European statistics and according to ESSC decision (2015/27/EN), SIMS⁽⁸³⁾ is established as the standard for quality reports and metadata. Hence, metadata has to be sent either in SDMX-ML format (SDMX structured metadata file) or the ESS-Metadata-handler may be used, because it creates an SDMX-ML file from the inserted information.

The tables from the old template for the quality reporting are still referenced in this document in order to facilitate the transfer of metadata into the Metadata Handler for countries that use the Metadata Handler the first time and in order to be compliant with the provisions of COM REG 1445/2005.

Using ESS-MH requires an ECAS user ID, which you already have if you use eDAMIS for data transmission and/or access CircaBC for accessing documents.

How to access ESS-MH

To start ESS-MH, log in at <https://webgate.ec.europa.eu/estat/spe/metaconv/>

After your ECAS authentication, you will find a list of metadata files. The file names

WASTE_WSTARSI_A_XX_2020_0000

where XX is the country code, indicate your country's quality report for a reference year, 2020 in this case.

Structure of the report in ESS-MH

The focus in the quality report is on data collection methods, standard quality attributes (relevance, accuracy, timeliness etc.) and statistical processing.

A detailed documentation of the mapping of the WSTARSI structure and the WStatR quality report template is available in the Excel file "mapping WSTARSI - Waste QR.xlsx", along with a detailed description of all concepts in the WSTARSI structure, available on CircaBC through the following link:

<http://circabc.europa.eu/w/browse/20f35593-ae0e-43d8-815c-9f7db3dce1d6>

One constraint to ESS-MH is that some of the tables embedded in the former Word template cannot be easily transferred into the web-based form in ESS-MH. Therefore, there is an additional Excel file with five worksheets taken from the former template. These refer to section 12.1 of the ESS-MH structure. The correspondence is as follows.

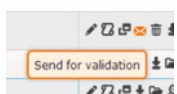
- Annex 1: Description of methods for determining waste generation (Table 37)

⁽⁸³⁾ SIMS: Single Integrated Metadata Structure.

- Annex 2: Waste generation in the economy - sample survey (Table 39)
- Annex 3: Waste Generation in the economy on the basis of information on waste treatment (Table 40)
- Annex 4: Waste generation in the economy on the basis of models or other methods (Table 41)
- Annex 5: Determination methods for waste generated by households (Table 43)

You can add the annexes to the quality report in ESS-MH by clicking on tab “3 – Annexes” in ESS-MH and then selecting the file(s) to attach to your report.

Submitting the quality report



When you have finished editing the quality report, please save it first and then click on “Send for validation” in the list of metadata files.

4.3. Tables and best-practice examples

The following section sets out proposals for the tables to be completed and included in the quality report. The tables provide more detailed information for the quality report which is to be submitted by the Member States. The following section provides a kind of checklist of the items which the Member States should include. A common format will help Eurostat to evaluate reports and to incorporate the information at European level.

Only those tables should be completed which are relevant, i.e. which refer to the methods and methodologies applied.

Section 4.2.1 contains the tables which relate to Part I of the quality report contents as required by COM REG 1445/2005 covering the description of the methods applied. Section 4.2.2 contains specific tables for Part II of the same

Regulation on the specification of some of the quality elements.

4.3.1. Part I: Description of the methods applied

This section provides a number of tables which show the methods applied:

- Table 36 gives an overview of the institutions involved in the collection of data and distribution of tasks (**WSTARSI 3.1.1.**);
- Table 38 gives an overview of classifications used (**WSTARSI 3.2.1.**);
- Table 37 and Table 39 to Table 41 give details of the methods applied to estimate waste generated by businesses (**WSTARSI 3.1.2.**);
- Table 43 provides information on the methods applied to waste generated by households (**WSTARSI 3.1.6.**);
- Table 42 shows the information on the coverage of extractive waste (**WSTARSI 13.3.1.4.**);
- Table 44 and Table 45 detail the methods used to estimate the amount of waste treated (**WSTARSI 3.1.9, 3.1.7**);
- Table 46 presents the waste categories for sludges (W032, W033, W11 and W127) where the amounts in wet matter have to be provided (**WSTARSI 18.5.212.**)

Some tables are illustrated with examples that are taken from quality reports of Member States for the years 2004 or 2006. Accordingly, the examples are based on the WStatR 2002 and do not consider the revisions of WStatR 2010. Nevertheless, the examples were maintained because they are considered as helpful.

4.3.1.1. Description of the parties involved in the data collection

TABLE 36

Institutions involved in the collection of data and distribution of tasks (WSTARSI 3.1.1.)

Name of institution	Description of key responsibilities

Table 36 should be used to list the parties involved and their relationship to the different areas covered by the WStatR.

EXAMPLE 1

Finland (QR 2018), Institutions involved and distribution of tasks

Name of institution	Description of key responsibilities
The Ministry of Environment	<p>Legislative and specification work</p> <p>Organizing waste registers in accordance with the requirements of the WFD</p> <p>Waste classification and treatment codes;</p> <p>Decision on classification of waste</p> <p>Implementing the LoW to national legislation and practises</p> <p>Specification of waste recovery and treatment codes</p> <p>Co-ordinating the use and development of VAHTI/YLVA -Compliance Monitoring Data system (2017- VAHTI is discontinued, duties transferred to the YLVA-system)</p>
Statistics Finland	<p>Co-ordinating statistical data collection</p> <p>Aggregating data from different sources</p> <p>WStatR reporting and Quality report</p>
The Finnish Environment Institute	<p>Monitoring the state of the environment. Administrative register of permitted soil extraction (NOTTO) NOTTO is also used by Centres for Economic Development, Transport and the Environment.</p> <p>Monitors international waste shipments and acts as the correspondent pursuant to the Waste Shipment Regulation.</p>
Centres for Economic Development, Transport and the Environment	The Centre for economic development, transport and the environment for Pirkanmaa supervises compliance with provisions on producer responsibility on a national level. Producer responsibility concerns tyres, paper products, packaging, electrical and electronic equipment, batteries and accumulators.
Thule Institute, Oulu	Research of material flows of Finnish industry
The Natural Resources Institute of Finland LUKE	An Annual survey regarding forestry and wood use in Finland, an Annual survey concerning Finnish game and fisheries, an Annual survey regarding the agricultural sector in Finland
The Finnish Safety and Chemicals Agency (Tukes)	Register of mineral extraction in Finnish mining and quarrying industry.

Name of institution	Description of key responsibilities
Environmental Permit Authorities	<p><i>Regional State Administrative Agencies</i> issue environmental permits for major waste treatment facilities, such as landfills, waste incineration plants, hazardous waste treatment sites and large-scale waste recovery or final treatment plants. Keeps the Administrative register of waste permits.</p> <p><i>Centres for economic development, transport and the environment</i> guide and monitor the waste management in municipalities. The centres monitor compliance with environmental permits and prepare regional waste management plans. They also register professional waste carriers and transporters in the waste management database.</p>
Municipalities and waste treatment consortiums	<p><i>Municipalities</i> are responsible for the management of domestic waste. In many municipalities, waste management duties have been transferred to local waste companies, who organise most of the municipal waste management, including transportation, landfills, composting and incineration plants and waste guidance.</p> <p>Municipal waste management authority is responsible for the public administrative duties related to waste management, such as deciding on the municipal waste tariff and the waste treatment system. If several municipalities have co-operated to form a regional waste management company, the municipalities must also set up a joint organ to handle the administrative duties.</p> <p>Municipal environment protection authorities can have one or several municipalities under their responsibility. The authorities issue waste permits to smaller operations, including the storage of hazardous waste and end-of-life vehicles. They also accept notifications of professional waste carriers in the waste management register. Municipal authorities supervise the compliance of businesses and the public with the Waste Act, including the obligation to belong to an organised waste management system, appropriate waste collection and the prohibition on litter.</p>
The Finnish Transport Safety Agency (Trafi)	Register of vehicles decommissioned from traffic
The HSY Helsinki Region Environmental Services Authority	Survey regarding the generation of municipal waste in households and service sector
Statistics and research Åland (ÅSUB)	Preparing Åland autonomous area statistics and ÅSUBs own quality report
Paperinkeräys Oy	<p>This enterprise is authorized to organize the collection of printing and writing paper.</p> <p>Producer responsibility organisation</p>
Finnish Packaging Recycling RINKI Ltd	Organisation responsible for providing producer responsibility organisation's data on packaging and packaging waste to the <i>Centre for Economic Development, Transport and the Environment of Pirkanmaa</i>
KIVO ry - Finnish Solid Waste Association	Represents Finnish regional and municipal waste management companies

4.3.1.2. Data set 1: waste generation by waste category (EWC-STAT) and economic activities (NACE)

General description of methodology

TABLE 37

Description of methods determining waste generation (WSTARSI 3.1.2.)

Waste item	Source									
	1	2	3	4	5	16	17	18	19
1										
2										
3										
....										
49										
50										
51										

The sources are the businesses (18 NACE groupings) and households which generate waste. The waste types are the 51 waste categories for which data is required under the Waste Statistics Regulation. Table in 3.1.2 subchapter of the WSTARSI contains all items for activities and waste categories.

The aim of this table is to provide an overview of the methods applied. The two examples below will help to clarify the idea.

EXAMPLE 2

Spain (QR 2018), Description of methods for determining waste generation

		activity item number																				
		NACE Rev. 2 →																				
Waste item	EWC-Stat Ver. 4		Hazardous	01_03	04_09	10_12	13_15	16	17_18	19	20_22	23	24_25	26_30	31_33	34_35	36+37+39	38	41_43	G-U exclude d 46.77	46.77	HH
	Code	Description		INDIRECT ESTIMATION BASED	SAMPLE SURVEY															COMBINED ESTIMATION: PRTR	COMBINED ESTIMATION: PRTR	SAMPLE SURVEY +INDIRECT ESTIMATION BASED ODELS
1	1.1	Spent solvents	H																			
2	1.2	Acid, alkaline or saline wastes	H																			
3	1.2	Acid, alkaline or saline wastes	H																			
50	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H																			
51	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H																			

EXAMPLE 3

Sweden (QR 2018), Description of methods determining waste generation

Country: **Sweden**, 2018

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
NACE	01-03	05-09	10-12	13-15	16	17-18	19	20-22	23	24-25	26-30	31-33	35	36	37	39	38	41-43	G-U, excl. 46.77	HH	
01.1H		Mix of methods	Environmental reports	Environmental reports, Web survey	Reuse of data	Mix of methods	Environmental reports, Web survey	Environmental reports	Environmental reports, Web survey	Environmental reports, Web survey	Environmental reports, Web survey	Environmental reports, Web survey	Reuse of data	Mix of methods	Reuse of data	Sewage sludge from official statistics, other waste factors	Reuse of data	Mix of methods, principale environment reports	Mix of methods, principally information in environmental reports from facilities that receive C & D waste	Mix of methods	Mix of methods
1.2																					
01.2H																					
:																					
:																					
:																					
:																					
:																					
:																					
12.8.13																					
12.8H, 13H																					

TABLE 38

Description of classification used (WSTARSI 3.2.1)

Name of classification(s) used	Description of the classification(s) (in particular compatibility with WStatR requirements)
Economic activities	
Waste types	
Recovery and treatment operations	

Information should be provided on the classifications used for data collection and on the compatibility of the classifications with WStatR requirements.

EXAMPLE 4**Denmark (QR 2018), Description of classifications used**

	Name of classification(s) used	Description of the classification(s) (in particular compatibility with WStatR requirements)
Economic activities	Dansk branchekode 07	The first 4 figures in the Danish code refers to the NACE rev.2 code, so they are directly compatible with WStatR requirements
Waste types	European List of Waste	Converted into EWC-stat codes with conversion key
Recovery and treatment operations	R and D operations	Used as described in Directive 2006/12/EC

Determination of waste generation by (sample) survey**TABLE 39****Estimation of waste generation in the economy on the basis of a sample survey (WSTARSI 3.1.3.)**

Description of the sample survey	Item 1 (01_03)				Item 2 (04_09)				...	Item 19 (HH)				Total
	1	2	..	N	1	2	..	n	...	1	2	..	n	
1 Number of statistical units per strata and item in accordance with the available register(s)													
2 Number of statistical units selected for a sample survey and questionnaires sent out														
3 Number of non-responses (No answers, non-usable answers; non identifiable units)														
4 Part of 3: Number of incorrect register data (Non existing statistical units, non identifiable units)														
5 Number of statistical units used for the calculation of totals														
6 Raising factor														

Table 39 gives details of the sample survey carried out to determine waste generation by economic activities. This table should be used if kind-of-activity units (KAUs) are selected as the sampling unit. If local units (LUs) or enterprises are selected, then the table must be adapted accordingly. The Waste Statistics Regulation requires either the kind-of-activity unit, or the local unit to be used as the statistical unit; as indicated in Chapter 2, the kind-of-activity unit is considered preferable (see Section 2.2.2).

The numbers 1 to n (in the second row) refer to the strata selected. Strata can be created by differentiating between employment classes (size of enterprises) and/or economic activities (further breakdown of NACE grouping). The stratification selected, which can include several steps, should be shown/explained in the table.

The columns in the table must be adjusted in accordance with the stratification selected and the scope of the sample survey, e.g. the sample survey can be restricted to manufacturing industry or to selected economic activities or can encompass the whole economy. 3.1.3. part of WSTARSI contains again all items for activities.

The table should indicate the register from which the sample is taken and the sample survey itself. The number of statistical units available in the register per stratum (row 1) and the number of statistical units selected (row 2) should be indicated first. Rows 3 and 4 refer to non-responses. In such cases, a further differentiation could be made between initial non-responses (3a) and final non-responses (3b) to illustrate action taken to “resolve” non-responses. This differentiation is optional. Row 5 should give the number of statistical units per stratum. These statistical units should be used to calculate totals (row 6).

EXAMPLE 5

Slovenia (QR 2016), Estimation of waste generation in the economy on the basis of a sample survey

Country: Slovenia Reference year: 2016					
Stratum by NACE Rev. 2 division	Stratum by size groups (number of employees)	Number of statistical units selected within in cut-off survey and questionnaires sent out)	Number of responses (no answer; non-usable answer, non-identifiable units)	Number of incorrect register data (non existing statistical units, non-identifiable units)	Number of statistical units used for the calculation of the totals
A	2	11			11
	3	36		5	31
	4	19	5		14
B	1	1			1
	2	5			5
	3	17	1		16
C	4	10	4		6
	1	104	1		103
	2	438	19	1	418
	3	1 103	181	1	921
	4	892	217	4	671

Country: Slovenia Reference year: 2016					
Stratum by NACE Rev. 2 division	Stratum by size groups (number of employees)	Number of statistical units selected within in cutt-off survey and questionnaires sent out)	Number of responses (no answer; non-usable answer, non-identifiable units)	Number of incorrect register data (non existing statistical units, non-identifiable units)	Number of statistical units used for the calculation of the totals
D	1	9			9
	2	13			13
	3	10			10
	4	23	4		19
E	1	5			5
	2	51			51
	3	55	3		52
	4	90	16	1	73
F	1	10			10
	2	51	8		43
	3	416	114		302
	4	524	207	2	315

Determination of waste generation in the economy on basis of information on waste treatment

TABLE 40

Estimation of waste generation in the economy on the basis of information on waste treatment (WSTARSI 3.1.4.)

		Description of the method					
1	Scope of the indirect determination (waste types and economic sectors covered)						
2	Number of waste treatment facilities selected by items	Item 1 Incineration (R1)	item 2 Incineration (D10)	Item 3a Recycling (R2 – R11)	Item 3b Backfilling	Item 4 Landfilling (D1,D5,D12)	Item 5 Other disposal (D2,D3,D4,D6,D7)

Description of the method	
3	Method(s) applied for differentiation by waste sources
4	Restrictions of the applied methods
4.1	Waste streams not covered
4.2	Problems of source attachment
4.3	Other problems

Table 40 shows the proportion of waste generation covered by indirect calculation on the basis of waste treatment and how the method is applied.

Row 1 indicates what proportion of waste generation is covered by information concerning waste treatment. This can be done by referring to selected parts of the economy or to selected waste streams. This should be consistent with Table 37.

Row 2 identifies the number of waste treatment facilities included in the calculation. The numbers are expected to be equal to the number of facilities in Table 50. Any differences should be explained.

Rows 3 to 4.3 provide a more detailed description of the methods applied. Does the original data set contain quantities of waste classified by the List of Waste, by the European Waste Classification for Statistics (EWG-Stat) or by a national classification? On what basis is waste which has been treated transformed into waste which has been generated? How are non-specific wastes distributed across sources and how are imported wastes excluded?

If the method is applied only to waste generated by households, this table can be ignored and Table 43 should be used. The differentiation between waste generated by household and waste generated by businesses is covered in Table 43; it does not need to be included in this table.

EXAMPLE 6

Norway (QR 2018), Annex 3 to section 12.1: Waste Generation in the economy on the basis of information on waste treatment

Description of the method																									
1	Scope of indirect determination Metals, all sectors																								
2	Number of waste treatment facilities selected by items: <table border="1"> <thead> <tr> <th>Item 1</th> <th>Item 2</th> <th>Item 3a</th> <th>Item 3b</th> <th>Item 4</th> <th>Item 5</th> </tr> <tr> <td>Incineration</td> <td>Incineration</td> <td>Recycling</td> <td>Backfilling</td> <td>Landfilling</td> <td>Other disposal</td> </tr> <tr> <td>(R1)</td> <td>(D10)</td> <td>(R2-R11)</td> <td></td> <td>(D1, D5, D12)</td> <td>(D2, D3, D4, D6,D7)</td> </tr> <tr> <td>19</td> <td>3</td> <td>188</td> <td>0</td> <td>113</td> <td>-</td> </tr> </thead> </table>	Item 1	Item 2	Item 3a	Item 3b	Item 4	Item 5	Incineration	Incineration	Recycling	Backfilling	Landfilling	Other disposal	(R1)	(D10)	(R2-R11)		(D1, D5, D12)	(D2, D3, D4, D6,D7)	19	3	188	0	113	-
Item 1	Item 2	Item 3a	Item 3b	Item 4	Item 5																				
Incineration	Incineration	Recycling	Backfilling	Landfilling	Other disposal																				
(R1)	(D10)	(R2-R11)		(D1, D5, D12)	(D2, D3, D4, D6,D7)																				
19	3	188	0	113	-																				
3	Method(s) applied for differentiation by waste sources Metals are determined from data collected from businesses buying scrap metals for reuse. Metals are also determined from import/export database. Determined using six-digit HS-based commodity classification codes.																								

Description of the method		
4	Restrictions of the applied methods	Goods totalling less than 1000 NOK are not in the import/export registers
4.1	Waste streams not covered	
4.2	Problems of source attachment	
4.3	Other problems	

Description of the estimation of waste generation in the economy on the basis of administrative sources

Obviously there is a big variety of possible administrative sources. An administrative data source is established by an institution which is **regularly** collecting and preparing information from enterprises or institutions.

Data sets may stem from:

- public institutions (e.g. EPA)
- associations / organisations established by the public sector to organise/handle specific parts of waste management

- others, such as reporting obligations under Community legislation

Important points to be considered when describing the data quality:

- Continuity of the source
- Validity of information
- Possibility to influence so that the administrative data can be better applied for waste statistics.

Determination of waste generation in the economy on the basis of other methods

TABLE 41

Estimation of waste generation in the economy on the basis of models or other methods (WSTARSI 3.1.5.)

Description of the models		
1	Scope of the model (waste types and economic sectors covered)	
2	Basic data for the estimations (production figures etc.)	
3	Description of the model and the factors applied	
4	Routines applied or foreseen to guarantee sufficient quality (periodical revision of factors, focused surveys for verification etc.)	
Description of other information sources		
5	Scope for the OTHER information sources (waste types and economic sectors covered)	
6	Description of the other information source which is not fitting to the type of information sources mentioned above	

Table 41 is similar to Table 40 in that it shows the proportion of waste generation covered by other methods and how these methods are applied. Within this table, a distinction is made between methods based on modelling and other methods. Member States which apply other methods should consider what relevant information to include in the table.

The information provided in rows 1 and 5 should also be reflected in Table 37.

If these other methods are used only for waste generated by households, this table can be ignored and Table 43 should be completed. The differentiation between waste generated by households and waste generated by businesses is covered in Table 43; it does not need to be included in this table.

EXAMPLE 7

Spain (QR 2018), Estimation of waste generation by models and other methods

Spain Reference year 2018 Annex 4 to section 12.1: Waste generation in the economy on the basis of models or other methods

Description of the models		
1	Scope of the model (waste types and economic sectors covered)	All waste types as required by WStatR and NACE codes: A, F, G to U (excluded 8422, for which direct information is available every year)
2	Basic data for the estimations (production figures etc.)	Production indicators for NACE A, and employee figures from Labour Force Survey and Structural Business Survey
3	Description of the model and the factors applied	Waste generation per employee, breakdown by waste type and strata. Waste generation according to the production indicators.
4	Routines applied or foreseen to guarantee sufficient quality (periodical revision of factors, focused surveys for verification etc.)	Waste factors are updated in years where the results of the surveys are available. Usually every two years.
Description of other information sources		
5	Scope for the OTHER information sources (waste types and economic sectors covered)	Data from MITERD is used for waste category 08
6	Description of the other information source which is not fitting to the type of information sources mentioned above	

Determination of extractive waste generation

TABLE 42

Coverage of waste statistics with regard to extractive waste ⁽¹⁾ (WSTARSI 13.3.1.4.)

Coverage	Topsoil	Overburden	Waste-rock	Tailings (non-haz.)
Completely covered				
Partially covered				
Generally excluded				

(¹) Please mark with an X whether the listed materials are completely covered, partially covered or generally excluded from waste statistics.

Differences in the coverage of waste statistics with regard to topsoil, overburden, waste rock and tailings may result in huge differences of the reported extractive waste generation across countries. Please specify which waste materials from mining and quarrying are covered by waste

statistics in your country by completing Table 42. Please specify why extractive waste is partially or generally excluded from waste statistics, where applicable.

Determination of waste generated by households

TABLE 43

Determination methods for waste generated by households (WSTARSI 3.1.6.)

1 Indirect determination via waste collection	
1.1	Description of reporting unit applied (waste collectors, municipalities)
1.2	Description of the reporting system (regular survey on waste collectors, utilisation of administrative sources)
1.3	Waste types covered
1.4	Survey characteristics (1.4a – 1.4d)
	a) Total no. of collectors /municipalities (population size)
	b) No. of collectors/municipalities selected for survey
	c) No. of responses used for the calculation of the totals
	d) Factor for weighting
1.5	Method applied for the differentiation between the sources household and commercial activities
1.6	Percentages of waste from commercial activities by waste types
1.7	Population served by a collection scheme for mixed household and similar waste, in %
2 Indirect determination via waste treatment	
2.1	Specification of waste treatment facilities selected
2.2	Waste types covered
2.3	Method applied for the differentiation between the sources household and commercial activities
2.4	Percentages of waste from commercial activities by waste types

Table 43 focuses on the methods applied in order to estimate the amount of waste generated by households. The various methods are identified in different parts of the table. An important distinction is made between waste

generated by households, on the one hand, and waste generated by businesses, on the other.

In row 2.1, the number of treatment facilities is expected to be in line with the corresponding figures in Table 50 on waste treatment installations.

EXAMPLE 8

Sweden (QR 2018), Determination methods for waste generated by households

1 Indirect determination via waste collection		
1.1	Description of reporting unit applied (waste collectors, municipalities)	<p>The data about waste generation from households is retrieved from different trade organisations and producer's responsibility. These organisations make their own inquiries:</p> <ul style="list-style-type: none"> • Swedish Waste Management collects data from all municipalities about household waste (including household waste from business) generation and treatment. • Swedish Waste Management also collects data of collected household waste from household (inquiry to the municipalities) • In Sweden, there are several producer responsibility organisations (here referred as material companies) which are responsible for different types of packaging materials. The material companies have provided data about generated and recycled packaging waste. • El-Kretsen (producer's responsibility organisation for WEEE) reports collected and treated amounts of WEEE. Remark: we have assumed that 08 Discarded equipment from household mainly consists of WEEE. <p>– The national corporation of Swedish pharmacies have earlier collected data about medical wastes, but due to reorganisation no data was available after 2016.</p>
1.2	Description of the reporting system (regular survey on waste collectors, utilisation of administrative sources)	Data is retrieved from the sources above, registers and from experts.
1.3	Waste types covered	EWC stat codes: 01.3; 02; 06.3; 07.1; 07.2; 07.3; 07.4; 07.5; 08.1; 08.41; 08; 09.1; 09.2; 10.1; 11; 12.1
1.4	Survey characteristics (1.4a – 1.4d)	
	a) Total no. of collectors / municipalities (population size)	290 municipalities
	b) No. of collectors/municipalities selected for survey	290 municipalities
	c) No. of responses used for the calculation of the totals	Unknown. The calculation is performed by Swedish Waste Management and the number of responses varies between types of wastes.

1		Indirect determination via waste collection
	d) Factor for weighting	Unknown. The calculation is performed by Swedish Waste Management and the number of responses, and hence the weighting factors, vary between types of wastes.
1.5	Method applied for the differentiation between the sources household and commercial activities	In most types of "household waste" also commercial waste is included. We have made a judgement from case to case of the amount from households. Discussions have been held with experts from each data source.
1.6	Percentages of waste from commercial activities by waste types	Different for each type of EWC-Stat code. For EWC-Stat 10.1, 22% of the collected waste is assumed to be generated by commercial activities and hence 78% is reported in the household sector. For item 06.3, 07.1, 07.4 and 07.6, 90% is reported in the household sector and for 12.1 the fraction is 50%.
1.7	Population served by collection scheme for mixed household and similar waste, in %	100

4.3.1.3. Data sets 2 and 3: treatment of waste

General description of methodology

The methodological description builds the basis for the assessment of the quality attributes in Part II of the report. The description should therefore be comprehensive, clear and consistent.

For waste treatment three questions have to be answered:

- How are the relevant facilities identified?
- How are the data on treated quantities collected?
- How are the data on number and capacity of treatment facilities collected?

Identification of relevant treatment facilities

Information is usually drawn from one or more administrative or statistical registers. The QR should list all registers that are used and for each of the registers the QR should specify:

- type of the register and responsible institution
- legal basis
- the coverage of register
- frequency and procedure of updating the register

The QR should also describe the selection procedure.

TABLE 44

Registers used for identification of treatment operations (WSTARSI 3.1.9.)

Identification of register(s) used (name; responsible institution)	Description of register(s) (coverage; frequency and procedure of updating, ..)

EXAMPLE 9

Finland (QR 2018) Registers used for identification of waste treatment operations

Identification of register(s) used (name; responsible institution)	Description of register(s) (coverage; frequency and procedure of updating, ..)
The VAHTI/YLVA Compliance Monitoring Data System, owned by the Ministry of Environment and executed by ELY-keskusten sekä TE-toimistojen kehittämis- ja hallintokeskus (KEHA) PL 1000, 50101 Mikkeli	Enterprise Register based on permits according to the Articles 9 and 10 of the WFD Covers i.e. generation and treatment of waste Updated frequently, covers most of the permitted actions
Business Register of Statistics Finland	Utilisation of Business Register for the identification of (selected) waste treatment operations
The Finnish Transport Safety Agency (Trafi) Vehicle Register)	Register of vehicles decommissioned from traffic was used to determine the amount of treated ELVs
The Mining and Quarrying register by The Finnish Safety and Chemicals Agency (Tukes)	Register includes mining and quarrying premises in Finland. Data are collected annually, by type of mining and mineral. Includes information about treatment of mineral wastes
Population Register Centre's Building and Dwelling Register	Register includes information about the amount of households.

Table 44 gives details of the registers used to gather information on waste treatment. This table should include not only the registers from which information is taken directly but also the registers which are used to draw up a list of addresses for a survey.

Problems relating to the completeness of various sources and their integration should be explained. Are there major incentives for under-registration or over-registration? Are all activities and size-classes included? Where several registers are used, how are overlaps avoided?

Data collection on treated quantities

TABLE 45

Determination of treated waste quantities (WSTARSI 3.1.7.)

Description of data sources and methods by treatment categories					
Item 1 Incineration (R1)	Item 2 Incineration (D10)	Item 3a Recycling (R2 – R11)	Item 3b Backfilling	Item 4 Landfilling (D1, D5, D12) I	Item 5 Other disposal (D2, D3, D4, D6, D7)

Table 45 gives an overview of the methods and sources used to produce the data sets on waste treatment.

EXAMPLE 10**Ireland (QR 2018), Data sources for determination of treated waste quantities**

Country IRELAND Reference year: 2018					
Item 1 Incineration (R1)	Item 2 Incineration (D10)	Item 3a Recycling (R2 – R11)	Item 3b Backfilling	Item 4 Landfilling (D1, D5, D12) I	Item 5 Other disposal (D2, D3, D4, D6, D7)
EPA waste statistics survey returns		EPA waste statistics survey returns	EPA waste statistics survey returns	EPA waste statistics survey returns	EPA waste statistics survey returns
PRTR/EPR returns	PRTR/EPR returns	PRTR/EPR returns	PRTR/EPR returns	PRTR/EPR returns	PRTR/EPR returns
CSO sample survey returns	CSO sample survey returns	CSO sample survey returns			CSO sample survey returns
		Urban wastewater regulation reporting.			
		NWCPO compiled data from local authority authorised waste facilities.	NWCPO compiled data from local authority authorised waste facilities.		

Specific issues - Wet matter for sludges**TABLE 46****Wet matter for sludges (WSTARSI 18.5.2)**

EWC-Stat	Description	HAZ/NHAZ	Wet/Dry	Amount (t)
03.2	Industrial effluent sludges	R	Wet	
03.2	Industrial effluent sludges	S	Wet	
03.3	Sludges and liquid wastes from waste treatment	R	Wet	
03.3	Sludges and liquid wastes from waste treatment	S	Wet	
11	Common sludges (excl. dredging spoils)	R	Wet	
12.7	Dredging spoils	R	Wet	
12.7	Dredging spoils	S	Wet	

Although the data on sludges are requested only in dry matter since the 2008 data collection, please use Table 46 to indicate the amounts of waste generated for the NACE total in tonnes of wet matter. This will be important to review the conversion factors that have been used to impute missing data in the past.

4.3.2. Part II: Report on quality attributes

This section provides several tables to help to describe the quality attributes:

- Table 47 and Table 48 describe the missing data (WSTARSI 12.3.2. and 12.3.2);

- Table 49 describes the total and the coefficients of variation for the key aggregates (**WSTARSI13.2.1.**);
- Table 50 describes the coverage of waste treatment facilities and the criteria used for their exclusion (**WSTARSI 3.1.8**);
- Table 51 helps in describing the followed time schedule of the whole process (**WSTARSI14.1.1.**);
- Table 52 help to report on the burden on respondents (**WSTARSI16.1**).

This section is structured on the quality attributes: relevance, accuracy, timeliness and punctuality, accessibility and clarity, comparability, consistency and burden on respondents.

4.3.2.1. Relevance (WSTARSI 12)

A summary, including a description of primary users and of political requirements with regard to waste statistics at the national level, should be provided under points 4.1 (user needs) and 4.2 (user satisfaction).

Member States should indicate the degree of completeness of the data sets under point 4.3 (completeness). They should identify the variables and/or breakdowns required by the Regulation on waste statistics which are not available (e.g. the cell value is shown as 'M' in the transmitted data set). For cases not covered by a derogation an explanation is required. In the case of cells indicated as missing, steps must also be taken to rectify the deficiency. Table 47 and Table 48 could be used for this purpose.

TABLE 47

Description of missing data in data set 1 on waste generation (WSTARSI 12.3.2.)

Description of missing data (waste category, economic activity, ..)	Explanation	How to overcome the deficit

TABLE 48

Description of missing data in data sets 2 and 3 on treated waste quantities and capacities (WSTARSI12.3.2.)

Description of missing data (waste category, treatment category, region, ..)	Explanation	How to overcome the deficit

4.3.2.2. Accuracy (WSTARSI 13)

Sampling errors (WSTARSI 13.2.)

Reference should be made to Part I for a delineation of the relevant survey area. Information should be provided for the following aspects:

- sample frame applied,
- sampling scheme applied,
- stratification (e.g. specify whether by size-class, NACE group, etc.),
- sample volumes: specify the number of enterprises in a population and the number in the survey (per stratum if relevant),

- coefficient of variation for the total amount of waste generated and the breakdown into four key aggregates. The denominator of the coefficient is the total amount of waste generated in the relevant aggregate; this includes the strata not estimated using sampling methods. In order to estimate the variation, the level of non-response should be taken into account,
- coefficient of variation for the total amount of waste treated and the breakdown into eight key aggregates. The denominator of the coefficient is the total amount of waste treated in the relevant aggregate, including the strata not estimated using sampling methods. In order to estimate the variation, the level of non-response should be taken into account.

TABLE 49

Total and coefficients of variation for the key aggregates (WSTARSI 13.2.1.)

Country: _____ Reference year: _____	Hazardous waste [1000 tonnes]	Non-hazardous waste [1000 tonnes]	Coefficient of variation: hazardous waste [%]	Coefficient of variation: non-hazardous waste [%]
Key aggregate				
Waste generation				
Waste generated by households:				
Waste generated by businesses:				
Waste treatment				
Waste used as fuel (incineration in the form of recovery R1):				
Waste incinerated (incineration in the form of disposal D10):				
Waste recovered (R2 – R11):				
Waste disposed of (landfilling (D1, D5, D12) and other disposal operations (D2, D3, D4, D6, D7)):				

In the quality report, information on the coefficient of variation is required for each key aggregate. The coefficient is defined as the standard error of the estimated amount of waste divided by the total amount of waste in the key aggregate. To facilitate comparison between countries, the amount of waste in the denominator should include not only waste amounts estimated using sample surveys but also waste amounts derived from administrative sources. The coefficient should be given as a percentage with one decimal position.

Two examples for the key aggregate “hazardous waste generated by businesses”:

1. A sample survey is used for the entire area covered by the key aggregate. The estimated amount of hazardous waste is 300 kilotonnes with a standard error of 30 ktonnes. The coefficient of variation for the key aggregate is $30/300 * 100\% = 10.0\%$.
2. Part of the key aggregate is estimated by means of a sample survey (manufacturing industry) and part of it is counted from administrative sources (other industries).

The amount of hazardous waste generated by manufacturing industry is estimated to be 200 ktonnes on the basis of a sample survey with a standard error of 20 ktonnes. The amount of hazardous waste generated by other industries is counted from administrative sources; it totals 100 ktonnes. For the sample area, the coefficient of variation would be $20/200 \times 100\% = 10.0\%$. For the key aggregate as a whole, however, the coefficient would be $20/300 \times 100\% = 6.7\%$. We would ask you to report on the key aggregate as a whole.

If the key aggregate is derived entirely from administrative sources, the coefficient of variation equals zero (0).

Modelling can sometimes be used to calculate standard errors; these standard errors should be taken into account when calculating the coefficient of variation.

When calculating the standard error, the total design of the data collection must be taken into account: allocation, stratification, application of various estimation techniques. The quality report only requires the summary of this in the coefficient of variation for the key aggregate. Please retain more detailed calculations for clarification or future reference.

In many statistical textbooks, you will find that the coefficient of variation is defined for the sample mean only: the standard error of the sample mean divided by the sample mean. For the sample area, this produces exactly the same result as directly calculating the coefficient of the total amount of waste. If the total population of manufacturing enterprises in our example were 100, then the average amount of hazardous waste per enterprise would be 2 ktonnes and the standard error 0.2 ktonnes, giving a coefficient of variation of 10.0%. It is a matter of multiplying both numerator and denominator by the same factor, leading to the same result. The results are different if part of the key aggregate is not estimated through a sample survey. The coefficient of variation of the mean would depend on the total number of businesses in the non-sampling part. So please be careful to use the correct formula.

Totals for waste generation (and for treatment) should be calculated by using dry figures for sludge items (sludge items for waste generation are numbers 7, 8, 9, 10, 39, 48 and 49). This should apply not only to the calculation of the coefficient of variation, but also to the calculation of the total waste generated or treated.

EXAMPLE 11

Sweden (QR 2018), Totals and coefficients of variation for the key aggregates in 2018

Country: Sweden Reference year: 2018		Total hazardous waste (key aggregate) (1000 tonnes)	Total non-hazardous waste (key aggregate) (1000 tonnes)	Coefficient of variation hazardous waste (%)	Coefficient of variation non-hazardous waste (%)
Generation of waste					
1	Households	426.913	4.078.218	0	0
2	Enterprises	2.941.003	138.673.530	1	0
Recovery and disposal of waste					
1	Incineration with energy recovery R1	403.770	8.528.672	0	0
2	Incineration as a means of disposal D10	129.928	4.216	0	0
3	Recovery R2-R11	372.532	16.852.093	0	0
4	Landfilling D1, D3, D4, D5, D12 Land treatment and release to water D2, D6, D7	671.704	104.613.001	0	0

Non-sampling errors (WSTARSI 13.3)

Coverage errors (WSTARSI 13.3.1)

- For Annex I on waste generation: description of the method(s) applied to reach 100% coverage;
- For Annex II on waste treatment: description of the waste treatment facilities which are excluded from reporting and the reason for their exclusion;
- Description of how the amount of commercial waste from enterprises/shops included in household waste is assessed; what method is used to estimate pure household waste;
- Description of the main problems of misclassification, under-coverage and over-coverage encountered in collecting the data.

TABLE 50**Coverage of waste treatment facilities and criteria for exclusion (WSTARSI 3.1.8.)**

	No. of facilities included	No. of facilities excluded	Reasons for exclusion of facilities and other comments
Item 1 Incineration (R1)			
Item 2 Incineration (D10)			
Item 3a Recycling (R2-R11)*			
Item 3b Backfilling			
Item 4 Disposal I (D1, D5, D12)			
Item 5 Disposal II (D2, D3, D4, D6, D7)			

Table 50 identifies the number of waste treatment installations which are included in or excluded from the compilation of data. There can be several reasons for excluding waste treatment operations: because they treat only internal waste, because they are pre-treatment facilities or because the capacity is below a nationally

defined threshold, etc. The Member States should always give the reason for the installations being excluded. Where possible, information should be provided on the number of installations excluded; this information will be useful for further harmonisation.

EXAMPLE 12**Estonia (QR 2012), Coverage of waste treatment facilities**

	No. of facilities included	No. of facilities excluded	Reasons for exclusion of facilities and other comments
Item 1 Incineration (R1)	92	0	No facilities were excluded
Item 2 Incineration (D10)	2	0	No facilities were excluded
Item 3a Recycling (R2-R11)	304	0	No facilities were excluded
Item 3b Backfilling	39	0	No facilities were excluded
Item 4 Landfilling (D1, D5, D12)	15	0	No facilities were excluded
Item 5 Other disposal (D2, D3, D4, D6, D7)			Not relevant in 2012

Measurement errors (WSTARSI 13.3.2)

- Which statistical units are applied in which part of the data set? What is the outcome of the assessment of potential errors in the application of statistical units?
- Errors in precision of quantities: the manner in which weighing and subsequent recording is carried out and the validation procedures applied to detect weighing errors should be described. What is the outcome of the error detection procedures in place?
- A description of the information quality of the data collection instrument should be given. For instance, in the case of sample surveys with a questionnaire: was the questionnaire validated in a focus group? For administrative data: are there incentives in the reporting unit or in the administration itself for over-reporting, under-reporting or lags?

Processing errors (WSTARSI13.3.4.)

- Summary of the processing steps between collection and production of statistics, including measures to detect and rectify processing errors;
- Listing of processing errors identified, their extent and impact;
- Coding errors in the coding of waste category, NACE-category, type of treatment operation and region. A description should be given of how the coding is carried out and what validation procedures are applied to detect coding errors. What is the outcome of the error detection procedures in place?
- Percentage of the category “waste generated by households” which actually originates from businesses. How is this misclassification assessed?

Non-response errors (WSTARSI13.3.3.)

- Response rate at the level of the key aggregates;
- Description of the handling of non-responses (unit and item non-responses) in surveys;
- Determination of expectancy of errors resulting from non-responses.

Model assumption errors (WSTARSI13.3.5.)

- Description of models, assumptions connected with the model application and expected errors and how to cope with them;
- Results of sensitivity analysis;
- Sources used (refer to description of sources in Part I).

4.3.2.3. Timeliness and punctuality (WSTARSI 14)

- Description of the key data collection steps in the process of establishing the data sets in a timetable;
- Description of the key data processing steps (e.g. starting and finishing dates for completeness, coding and plausibility checks, data validation and non-disclosure measures) in a timetable;
- Description of the key publication steps in a timetable (e.g. when are the advanced and detailed results calculated, validated and disseminated).

Punctuality of data transmission to Eurostat will be evaluated according to the Regulation on waste statistics, which specifies the periodicity and deadlines for data transmission. An explanation should be given for any delay. In addition, the report should state what measures have been taken to avoid delays in future.

TABLE 51

Time schedule of the whole process (example) (WSTARSI 14.1.1.)

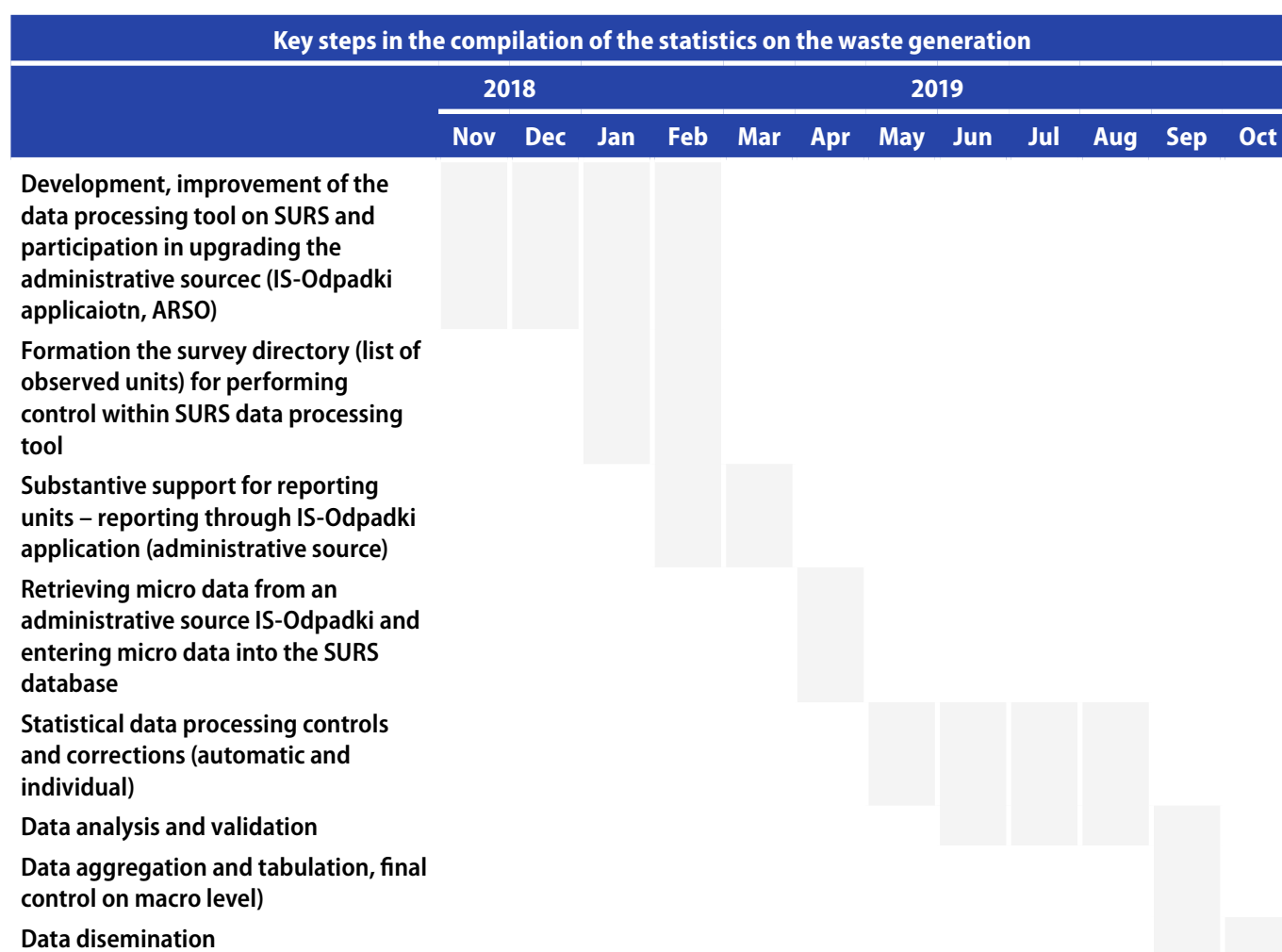
Country: _____	Time period (from month/year to month/year)
Reference year: _____	
Development of sampling strategy:	
Development and testing of questionnaires:	
Selection of enterprises and sending out of questionnaires:	
Data processing (editing and imputation):	
Data analysis and validation:	
Key publication activities:	

This is merely an example of a rough description of the time schedule for the entire process (a simple sample survey). The actual processes in the Member States will generally be much more complex, as they will combine and involve several methods. The actual process should be described in

a limited number of steps (no more than 10). Table 51 will be useful for identifying ways in which the timeliness of waste data can be improved. It will also help to improve planning at European level.

EXAMPLE 13

Slovenia (QR 2018), Key steps in the compilation of the statistics on the waste generation and treatment for r. y. 2018



4.3.2.4. Accessibility and clarity (WSTARSI 10)

The national reporting organisation (identified in Part I of the quality report) should describe

- the policy on dissemination of waste statistics,
- the measures and tools to establish/improve clarity,
- the relevant confidentiality policy.

4.3.2.5. Comparability (WSTARSI 15.1 -15.2)

- In order to assess the comparability between national data generated using different methodologies, it is necessary for the impact of restrictions with regard to coverage and precision of the data to be clarified (based on elements of accuracy above).

- How is the regional comparability of data on waste treatment facilities validated? What statistical unit is used? How are mobile waste treatment facilities handled?
- Comparability over time: both changes relative to the previous reference period and anticipated changes in the next reference period should be reported. Details of changes in definitions, coverage or methods should be specified (refer to Part I). An evaluation of the consequences should be carried out.

4.3.2.6. Coherence (WSTARSI 15.3-15.4)

Environment statistics:

- The coherence of national dissemination with the data reported under the Regulation on waste statistics.

There is no need to report on coherence with:

- OECD/Eurostat Joint questionnaire,
- Specific waste reporting obligations (end-of-life vehicles, waste from electrical and electronic equipment, packaging and packaging waste, waste shipment, etc.),
- Integrated pollution prevention and control (IPPC) reporting,

- Reporting to European Environmental Agency. The Commission (Eurostat) will deal with this directly.

Socio-economic statistics:

Member States are invited to comment on coherence with:

- Trade Statistics,
- Environment-Economic Accounting including National Accounts,
- Production of structural indicators.

The comments on these items could include the identification of differences in the application of statistical units and classifications.

4.3.2.7. Burden on respondents (WSTARSI 16)

An evaluation should be made of the burden on respondents in physical terms (time required for response) and of the actual number of respondents. For administrative sources, the burden on respondents resulting from additional questions for statistical purposes should be evaluated. The following Table 52 might be used for this purpose.

TABLE 52

Burden on respondents (WSTARSI16.1)

Survey / Source	Type and total number of respondents	Actual no. of respondents	Time required for response	Measures taken to minimise the burden

EXAMPLE 14**Example 14: Norway (QR 2018), Cost and Burden**

Survey / Source	Type and total number of respondents	Actual no. of respondents	Time required for response	Measures taken to minimise the burden
KOSTRA - Household waste statistics	Municipalities, 423 and Inter-municipal companies, 66	477	20 minutes/per unit (national average)	Improved online reporting for KOSTRA.
Waste from service industries 2018	The statistics are compiled on data from customer registers gathered from waste collectors, 18	17	300 minutes/unit	
Waste statistics for the manufacturing industries 2015	Establishments in manufacturing (sample: 1582)	1366	80 minutes/unit	Data reported to the Norwegian Environment Agency are gathered and prefilled in the questionnaires. Only about 1300 got a form to fill out from Statistics Norway. The rest had already reported to the Norwegian Environment Agency.

5

Transmission of data

From a technical point of view, data transmission involves using a tool to send data to Eurostat and define the format of the data file. In order to ensure that data can be exchanged as effectively as possible within the statistical system, it is important that the proper file names and file structure are applied. Section 5.1 briefly describes eDAMIS, Eurostat's set of data transmission tools to be used by all data providers. Section 5.2 gives an overview of the reporting forms for data transmission. Section 5.3 describes the file naming convention, and finally section 5.4 explains details on how to compile the data to be reported.

5.1. The standard transmission tool (eDAMIS)

The standard transmission tool currently used within the European Statistical System is eDAMIS (electronic Dataflow Administration and Management Information System). It has been developed as a 'single entry point' which ensures that files can be transmitted securely, and which creates a log file to document all files which have been delivered. The system confirms to the sender that the files have been delivered properly (acknowledgement). For data files which adhere to naming conventions, a formal check can be carried out automatically:

- on the file structure;
- on correct items in the classification;
- on correct values for the data variables;
- on the appropriate metadata flags.

Rapid feedback can thus be obtained on possible errors in the data files.

This immediate check is only the first step in the Eurostat validation procedure. This first step cannot be used to compare information over time, across countries or across different data files for the same year or for the same country. The first check is carried out only at the level of the records; it cannot be used to calculate aggregates, to compare data with other records or to count the total number of records. Eurostat performs these checks at a later stage of the production process. The immediate check is nevertheless important as it ensures that major errors are identified straight away. More information on the immediate checks is provided in chapter 6.2.3.

An additional advantage of the system is that it operates independently of individuals (changes in tasks, holidays or illness) both at the statistical offices and at Eurostat.

Almost all national statistical offices have installed the eDAMIS tools, but ministries and environmental protection agencies also play a role in waste statistics. These organisations have two options:

- *Via the national statistical office:* transmitting the files to the NSI who will send them to Eurostat via eDAMIS.
- *Directly at Eurostat:* using the [eDAMIS web portal](#). This is a web server running at Eurostat for the direct reception of files from data providers.

Detailed guidance on how to use eDAMIS is available at the 'eDAMIS 4 Migration Info Space': <https://webgate.ec.europa.eu/fpfis/wikis/display/EDAMIS4MIG/EDAMIS+4+Migration+Info+Space>

The quality report shall not be provided by eDAMIS but via the ESS-Metadata Handler (see chapter 4).

5.2. Reporting forms (Excel workbooks)

Since reference year 2018, new data tools based on EXCEL are used for reporting. The structure of the reporting tables is nearly identical to the web-forms used until reference year 2016. Different from the previously used webforms, the data aggregations, which will be published by Eurostat are included in the new forms. This makes it possible for the Member States to implement primary and secondary confidentiality if needed.

There are three EXCEL workbooks available for the data entry:

- WASTE_GEN on waste generation,
- WASTE_TRT on waste treatment
- WASTE_FAC on regional data.

The EXCEL-workbook WASTE_FAC contains two tables, one covering data, which was included in the former REGIO_1 table and one covering data, which was included in the former REGIO_2 table.

The figure on the population served by a collection scheme for mixed household and similar waste (according to Annex I, Section 3 of the WStatR) is not requested in the data entry tables for technical reasons. Please report this figure in your quality report. The quality reports shall be submitted by the ESS-Metadata Handler, not by eDAMIS (see chapter 4).

The workbooks are available for download at the Eurostat website. They contain automated checks for immediate data validation. The respective validation rules are included in the workbook in a separate sheet (see also chapter 6). After the filling of the questionnaire is finished, the countries are asked to start the immediate validation by clicking the respective validation button. For this purpose, you find a button "Validate questionnaire" in the upper right corner of the sheet "Basic instructions". The immediate validation will then be carried out. The validation results are displayed in the table "ErrorLog" in the questionnaire. The identified errors need to be corrected before submitting the questionnaire to Eurostat.

All valid data cells in the questionnaire must contain either a value (including a real zero value) or an explanation for the missing value. Zero may be a valid number if it is known e.g. that a certain type of waste was not generated in a certain NACE activity. An empty cell should indicate nonavailability of data. If a cell is left empty, it must be combined with a country specific footnote, explaining, why the value is not known. Missing values should however be avoided as much as possible; estimates can be flagged with the E flag.

5.3. File naming convention

The Regulation on Waste Statistics stipulates that three data sets (Excel-workbooks) must be transmitted for each reference year. The data must be transmitted in a system independent way and in accordance with a commonly agreed interchange standard.

The three data sets must be named as follows:

- Generation of waste = GEN
- Treatment of waste = TRT
- Number and capacity of recovery and disposal operations; coverage of waste collection scheme by NUTS 2 region = FAC

A file must be transmitted for each data set. The file name consists of six parts:

Domain	5	Value: WASTE
Set	3	GEN, TRT, FAC
Periodicity	1	Value: 2 for data sent every second year
Country code	2	Two-letter country code
Year	4	Reference year (e.g. 2020)
Period	4	Value: 0000 (zero, zero, zero, zero) for annual data

The naming convention is a general provision to be used in all statistical domains; it therefore does not contain any elements which are not relevant to current waste statistics (domain, periodicity and period).

The parts of the file name are separated by an underscore. A text-based format will be used.

Examples of file names:

WASTE_GEN_2_BE_2018_0000	generation of waste from BELGIUM for 2018
WASTE_GEN_2_CZ_2020_0000	generation of waste from the CZECH REPUBLIC for 2020
WASTE_TRT_2_DK_2018_0000	treatment of waste from DENMARK for 2018
WASTE_TRT_2_DE_2020_0000	treatment of waste from GERMANY for 2020
WASTE_FAC_2_ES_2020_0000	number and capacity of recovery and disposal operations from SPAIN for 2020

5.4. Conventions for data reporting

This section outlines several conventions to be followed for the compilation of the three data sets, giving examples and explanations.

Waste generation and waste treatment

The values are given in tonnes per year. Data can be entered with decimal positions, but the value should be given with significant digits only. In the case of small countries and hazardous waste with a high environmental risk, a high level of precision is required.

Number and capacity of recovery and disposal facilities

The data set on the number and capacity of recovery and disposal facilities is broken down into NUTS 2 regions. The aggregate for the country as a whole is also required. If a country consists of only one NUTS 2 region, then only the results for the country total have to be transmitted.

The number of facilities cannot be confidential.

Missing values and flags

The values in this set have different measures: the number of facilities and the capacity measured in tonnes per year or cubic metres. In the case of incineration and co-incineration facilities (R1, D10), the capacity has to be measured in tonnes. For landfills the rest capacity has to be provided in m³.

Missing values and flags

Missing values

All valid data cells must contain either a value (including a real zero value) or an explanation why no value is provided. Zero may be a valid number if it is known e.g. that a certain type of waste was not generated in a certain NACE activity. An empty cell should indicate nonavailability of data. If a cell is left empty, it must be combined with a country specific footnote, explaining, why the value is not known. Missing values should however be avoided as much as possible

Status flags (standard footnotes)

In the questionnaires the following flags may be used:

B: Break in series
E: estimated
P: provisional

The status flags can be combined where more than one flag is needed.

Please note that the Waste Statistics Regulation does not make any provision for the submission of provisional data. However, reporting provisional data may be useful if a country is unable to submit some of the data. Please note that flagging some of the data cells as provisional with flag P does not exempt the country from the obligations laid down in the Regulation; they must be followed by a revision.

Confidentiality flags

Confidential data should be transmitted to Eurostat properly flagged as confidential. What is regarded as confidential depends on the national confidentiality policy for statistical data. In general, data from public authorities are not regarded as confidential; also the secondary use of public information for statistical purposes will not be regarded as confidential. Confidentiality issues usually occur when the National Statistical Institute does a (sample) survey and the identity of respondents can be disclosed by the presentation of the data. This will happen, for instance, if the data cell is based on information from one or two respondents. Another example is when one or two respondents dominate the data value.

The countries should also indicate the cells which should be treated as confidential in order to avoid disclosure through derivation: secondary confidentiality. If the data cell identified by combination A, X were to be regarded as confidential, simply deleting this value from the table would still disclose the value, as it could be calculated from the row total, the column total and the general total. To guarantee confidentiality, more data cells must be suppressed in all dimensions defining the multidimensional table (e.g. NACE, EWC-Stat). There is no highly satisfactory way of doing this. A general strategy is to choose cells with low values and to avoid hiding any totals as this would require hiding more totals. In the example given, the following three cells could be an option: A, Y; B, X; B, Y. When choosing suppression partners to hide the confidential cell, please bear in mind:

- the environmental impact of the information;
- the availability of totals over sources or over waste streams.

EXAMPLE TABLE 52

Secondary confidentiality

	A	B	C	Total
X	1	2	3	6
Y	4	5	6	15
Z	7	8	9	24
Total	12	15	18	45

Eurostat will use confidential data to calculate aggregates and indicators without disclosing the confidential data as supplied by the Member States.

Valid flags for marking confidential data in the questionnaire are:

C: primary confidentiality

D: secondary confidentiality

The Member States are asked to give a brief description of their confidentiality policy in their quality report.

The CASC project, led by Statistics Netherlands, has developed a comprehensive website on statistical disclosure control: <https://research.cbs.nl/casc/index.htm>. The software T-Argus for the treatment of secondary confidentiality in tabular data and a 'Handbook on Statistical Disclosure Control' are available for download.

Please note: The aim of compiling waste statistics should be to produce and disseminate data at most detail level for individual countries and for the EU. Whereas confidentiality

is very important for data protection, it reduces the usefulness of the results. Countries should therefore properly check whether confidentiality is really legally necessary before setting confidentiality flags.

Data revision

If some of the data have to be revised, the country should always provide the complete data set, i.e. the complete Excel workbook, containing the revised data but also the data that remain unchanged, as the production system in Eurostat will always check the completeness and coherence of data sets. The revised cells shall not be flagged as there is no revision flag available in the questionnaire.

A revision does not necessarily mean that the data value has to change but may consist of a change of flag or the elimination of a flag. E.g. because a provisional value is now accepted as final, or a confidential value is now regarded as non-confidential.

If data for reference year 2016 or for earlier years that were submitted via web forms shall be revised, an extra EXCEL-workbook has to be created. Please note that the old eDAMIS web forms are inactive and can no longer be used. The new workbooks are not prefilled with the current data for these years. In case prefilling is needed, e.g. if only a small number of values shall be revised, Eurostat should be contacted.

6

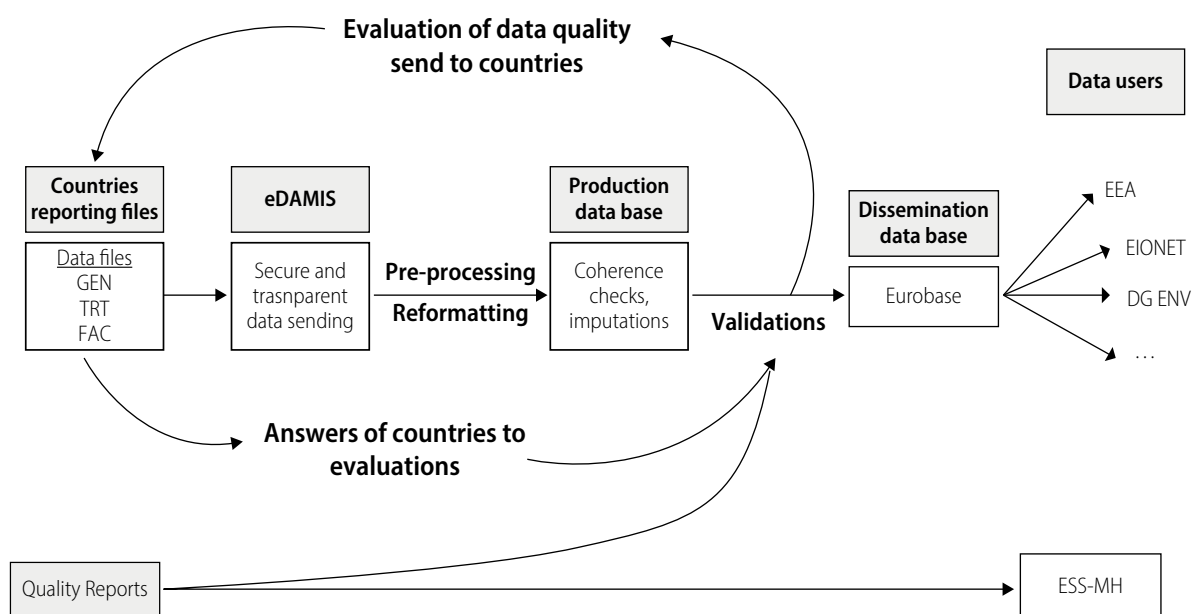
Quality control and dissemination of results

This chapter deals with the control of data quality and the dissemination of data. Figure 12 presents the main steps

that occur between data reception and dissemination by Eurostat.

FIGURE 12

Schematic presentation of the structure of the chapter



The first part of this chapter explains the standard validation rules which the countries are encouraged to apply during their preparation of the data, and the results of which could be presented in the quality report. The second part

describes, how data are pre-processed, reformatted, uploaded in the production data base, validated and exported to the dissemination data base. The third part of this chapter deals with the dissemination of the results.

6.1. Standard validation rules

A set of standard validation rules was introduced at the WG meeting 2014. The standard validation rules shall help to increase the efficiency of the validation process and accelerate the publication of the data. The countries are asked to apply the validation rules prior to data submission and document the findings in section 12.4 of their quality report. This approach is intended to reduce the effort for data validation both, on the side of the countries and on the side of Eurostat.

All standard validation rules are intra-country checks. The comparison across countries and the impact of country data on the EU aggregates are performed by Eurostat in the frame of the quick validation (see 6.2.3.2) and the in-depth validation (see 6.2.3.3).

The standard validation rules comprise four categories of tests:

1. Comparison over time
2. Relation between generation and treatment
3. Identification of implausible treatment operations
4. Comparison of treated amounts vs. treatment capacities

Most of the rules are based on the comparison of data to previous values. The comparison over time shall be carried out at different levels, e.g. by economic activities, by waste categories and by treatment operations. The SVR proposes thresholds for changes from the previous year to indicate in which cases data should be reviewed. Whenever significant deviations compared to the previous year are observed, it makes sense to visually check the whole time series in order to make sure that the previous value was not the cause of the observation.

The standard validation rules include a table that shall help to identify implausible treatment combinations that will be questioned by Eurostat in the course of the quick and in-depth validation. When applying this test, the countries should also consider the information in chapter 2.3.4 of this Manual.

The implementation and documentation of the standard validation rules is voluntary. However, the application and the documentation of the validation results in the countries' quality reports will help to speed up the validation process after data delivery due to the avoidance of clarification requests.

The standard validation rules are adjusted regularly and in consultation with the countries on the basis of the experience gained. Information on the standard validation rules is available at CircaBC ⁽⁸⁴⁾

6.2. Quality control: data collection, validation and feedback

6.2.1. Arrival of the data and the Quality Report in the eDAMIS system

The standard transmission tool eDAMIS was described in Chapter 5 from a Member States point of view. It allows the secure transfer of data from Member States to Eurostat and allows tracking the delivery dates.

The Eurostat domain manager receives a notification of the data delivery by email. The file is automatically copied into a dedicated folder. If the sender has used the file name convention (see Chapter 5), then the eDAMIS system will recognize the file; only a version number will be added. If the file name is not in line with the naming convention, the eDAMIS system renames the file on the basis of information on the data set, the country of the sender and the indicated reference year.

Mistakes in the file name do occur, especially mixing up the reference year (the year the data refer to, which should be in the file name) and the year of data delivery. The Eurostat project manager has no tools to correct wrong file names and has to request the eDAMIS team to do the correction. As a result of a wrong year in the filename, a wrong version number might be produced.

From the Eurostat perspective the main advantages of the eDAMIS system are that the delivery is independent of an individual mailbox and that the system can produce overviews monitoring the delivery of the data. The file traffic can be monitored by all users, both the senders in the Member States and the Eurostat project managers. For monitoring the file traffic select Reports/Traffic monitor/Data file traffic. You have to specify the data set or domain, the country of group of countries and the period; then press the button 'view'. The result is a complete overview of files delivered within the scope of the selection criteria.

⁽⁸⁴⁾ https://circabc.europa.eu/ui/group/b01d2930-990e-44fb-9121-a9a6b00a1283/library/d883cfd3-51b2-4ca1-aa9c-c9fd5bc68897?p=1&n=10&sort=modified_DESC

6.2.2. Imputations; calculation of new aggregates

In order to compute aggregates, some missing values are to be imputed. As long as some country files are missing, the EU-aggregates cannot be calculated. It is an option to impute a complete country file; this could be considered if the expected delay is considerable, the impact of the country on the EU total is fairly small and a good basis for the imputation is available. Such imputations have been done on the basis of a previous year. The imputation method is to be discussed with the Member State. The imputations will not be published at country level; the EU-aggregates containing imputed country values will be flagged as Eurostat estimated (s).

The following EU-aggregates are calculated for the data: EU27 (from 2020), EU28 (2013-2020), and EA19 (from 2015, where EA is Euro Area).

6.2.3. Validation and feedback to reporting countries

Data validation after submission of data to Eurostat is carried out in three steps. The first step is an immediate validation, processed in the Questionnaire. This is followed by a quick validation, an evaluation of the delivery, which has to be sent to the countries within two months after the data delivery. The third step is a more in depth validation with no strict deadline.

6.2.3.1. Immediate validation, processed in the Questionnaire

The immediate validation implemented in the Excel-questionnaire files comprises the following types of checks:

- Completeness of mandatory data;
- Compliance with defined arithmetic rules.

The check for mandatory data makes sure that all mandatory cells (white cells) in the reporting tables are filled in. If mandatory cells are left empty, the program checks whether an explanation why the data is missing was provided by means of the "Explanatory footnote" was provided.

The arithmetic rules mainly check whether aggregates reported in the questionnaire are equal to the sum of the elements that build the aggregates. This is checked for the following aggregates:

- Total waste over all EWC-Stat categories (TOTAL), separately for hazardous and non-hazardous waste,
- Total waste excluding major mineral wastes (TOT_X_MIN),
- Primary waste (PRIM),
- Secondary waste (SEC)
- Total waste over all economic activities and households (TOTAL_HH)
- The treatment aggregates 'Disposal – Landfill and other (DSP_L_OTH) and 'Recovery – Recycling and Backfilling (RCV_R_B)

The detailed validation rules are available in the Excel-questionnaires (sheet 'Validation rules'). The compliance with the validation rules can be checked by clicking the button 'Validate questionnaire' in the sheet 'Basic instructions'. If the rules on mandatory data or the rule that all reported values must be numbers equal or greater than 0 is violated the web-form cannot be sent. The other rules show the calculated sum from the values implemented into the form.

6.2.3.2. Quick validation and evaluation report

The quick evaluation results in an evaluation of the delivery as specified in the Regulation on the quality report (EC) No 1445/2005 (Official Journal L229/6 of 6.9.2005). The evaluation is done on the basis of five criteria:

1. Complete data sets (discusses missing data sets, missing values, undercoverage)
2. Complete quality report (discusses the description of the methods and the quality attributes; whether the report offers an interpretation for the developments over time)
3. Timeliness
4. Proper application of definitions and classifications
5. The application of sound statistical methods

In this phase the validation concerns mainly the internal coherence of the new data and the developments over time. The analysis is at a very aggregate level. Eurostat tries to detect important breaks in the series and looks for explanations in the quality report that the country has supplied.

The countries are expected to react on the evaluation and send updates if necessary.

The feedback to the countries is also used by Eurostat to monitor countries' compliance with the Regulation on waste statistics. Every year at the end of the summer the Eurostat board of directors receives an overview of the

compliance with statistical regulations in all domains and decide on the proper follow up.

The checks carried out in the course of the quick evaluation addresses mainly the following aspects: .

- Completeness of mandatory data;
- Comparison over time;
- Check of waste type versus hazardousness definition;
- Plausibility of waste treatment operations, following the explanations in chapter 2.3.4.1;
- Arithmetic checks of aggregates (not covered by the immediate checks);
- Plausibility of relation between waste facilities and waste treatment / treated waste quantities;
- Invalid combinations of flag codes;
- Non-permissible marking of data as confidential.

Peculiar values do not automatically result in a question to the respective country. If the value, e.g. an extreme growth rate, is not explained, Eurostat may compare to other statistics in order to find an explanation. E.g. if in a certain industry a strong increase of waste generation is displayed, it is checked in enterprise statistics whether the value added shows as well a strong increase. The comparison of waste generation with waste treatment is of value only for wastes which are unlikely to be shipped or receive waste from other waste categories.

6.2.3.3. In-depth validation

All the previous checks could and should be done at the level of the country because they have the micro data and they have the detailed knowledge on the local situation. Parts of these checks are repeated at the European level, just to avoid some obvious mistakes. The real content part of the in-depth validation concerns the comparison of patterns and developments over countries, but also to have a closer look at the inner-country aspects. This validation is not only technical, but also a matter of craftsmanship requiring sound knowledge of the subject matter to interpret the relevance of differences.

The in depth-validation will be done after the publication of the country data in the dissemination database; the advantage is that others can be involved in the validation process. Especially the EEA and the Topic Centre have given useful comments. The publication of the (non-confidential) data makes it also easier to involve consultants in the validation process.

The checks of the in-depth validation are categorised into the following categories:

1. Intra-country tests:
 - a) Comparison with other reporting obligation tests: these tests aim at checking the Comparison with other reporting obligation tests: these tests aim at checking the coherence between numbers reported by the country pursuant WStatR and other reporting obligations (see separate section below)
 - b) Coherence tests: these tests make sure that the following statements are true:
 - i. The ratio waste generated/waste treated is stable over time in the country's reporting for each waste item
 - ii. The treatment pattern (e.g. mainly incineration with energy recovery) for a given waste item is similar to that of the last reporting year
 - iii. The number of facilities is not marked as confidential
 - iv. The amounts of waste being landfilled are coherent with the remaining capacity of the landfills as reported by the country
 - c) Plausibility test: this test checks if non-mineral hazardous waste reported in other disposal is limited to very specific cases.
2. Inter-country tests: these tests analyse the comparability of data between countries by looking at:
 - a) The way countries allocate their wastes to the different NACE sectors
 - b) The most important waste reported by a country in a given NACE and whether it is among the three most important wastes commonly reported in this NACE by the other countries
 - c) The treatment operation suggested for a given waste by a country is coherent with treatment operations commonly reported by other countries for this NACE
3. Inner cells of generation and treatment tables validation tests using both intra- and intercountry tests: these tests analyse the statistical soundness of intra-country time-series (at the aggregate or waste level) as well as the comparison between countries for the last reporting year of the indicator 'waste item/number of employees in the NACE'.

The in-depth validation process can be seen as a wrap-up of the whole data collection, validation and dissemination process which not only serves to increase data quality, but also to collect information on detected particularities and documentation of their reasons (Country factsheets). It builds an important basis for country specific information which is a primary source to investigate in case of requests by data users.

Comparison with other reporting obligation (Cross-checks)

The WStatR-data are cross-checked with the data from the following reporting obligations:

- Directive on packaging and packaging waste (94/62/EC)
- Directive on waste electrical and electronic equipment (WEEE) (2002/96/EC)
- Directive on end-of-life vehicles (ELV) (2000/53/EC)

The validation rules applied and the underlying assumptions and limitations are summarised in the following.

Packaging waste

For packaging waste, the cross-check is based on the comparison of the variable 'recycling' for glass wastes, paper and cardboard wastes, plastic wastes, metallic wastes and wood wastes between data reported under the WStatR and data reported under the Packaging Directive.

The cross-check between WStatR data and packaging waste data compares:

- the recycling (RCV_R) of the waste types listed above according to the WStatR with

- the recycling of packaging waste within the country (RCY_NAT) according to the Packaging Directive.

The comparison is done separately for each of the materials. For each material, the packaging waste should be a subset of the total waste. The recycling of packaging waste should therefore always be lower than the total recycling of the same material reported under the WStatR.

Countries are asked for explanation where the following validation rule was violated:

Recycling of waste (WStatR) > Recycling of packaging waste (PPW Directive)

For the materials glass, paper/cardboard and plastic, it is furthermore assumed that the share of packaging accounts for a significant share of the total waste. It is therefore checked whether the share of recycled packaging waste falls below a certain threshold within the recycled total of the materials (see Table 53)

Table 53 summarises the relevant aspects when comparing recycling data from the WStatR with data on packaging recycling.

TABLE 53

Comparison of recycling within the country for each (packaging) material

	WStatR	Packaging Directive
Variable (data set; code)	Total material-specific waste recycled within the country (WStatR _{recycling}) (env_wasrt, RCV_R)	Packaging waste recycled within the country (Pack _{recycling}) (env_waspac, RCY_NAT)
Description	<ul style="list-style-type: none"> – includes all material-specific waste recycled in the country, regardless of the place of origin – includes recycling of non-packaging wastes of the respective material 	<ul style="list-style-type: none"> – includes all domestically generated packaging waste recycled in the country – amounts exclude imports of packaging waste for recycling
Relation in theory	The treatment operations covered are the same for both data sources. Considering that the WStatR covers a broader spectrum of waste types (packaging and non-packaging materials), and includes waste imports for recycling, the recycled amounts according to the WStatR (WStatR _{recycling}) should generally be higher than the packaging waste recovered (Pack _{recycling}). The share of the packaging amounts within the recycled material is expected to be different for each packaging material.	
Validation rule	$Pack_{recycling} / WStatR_{recycling} < 100\%$ for all materials $Pack_{recycling} / WStatR_{recycling} > 30\%$ for glass $Pack_{recycling} / WStatR_{recycling} > 10\%$ for paper and plastics	

Waste electrical and electronic equipment (WEEE)

Waste electrical and electronic equipment (WEEE) as defined in Directive 2012/19/EC is included in the category EWC-Stat 08 Discarded equipment (excl. 08.1 Discarded vehicles and 08.41 Batteries and accumulators waste). The EWC-Stat category 08 (excl. 08.1, 08.41) covers all List of Waste-codes that refer to WEEE (with the exception of PCB-containing equipment and equipment containing free asbestos) and includes LoW-codes from maintenance / dismantling of ELV.

The cross-check between WStatR and WEEE compares:

- the generation of discarded equipment (08 excl. 08.1, 08.41) acc. to the WStatR with

- the total collection of WEEE according to Directive 2012/19/EC.

The generation of discarded equipment according to WStatR covers hazardous and non-hazardous equipment from all economic activities and households (TOTAL_HH).

The total collection of WEEE covers a) all EEE categories and b) equipment collected from households and other sources.

Countries are asked for explanation where the following validation rule was violated:

Discarded equipment generated (WStatR) > Total WEEE collected (WEEE Directive)

The rationale and the limitations of the cross-check are summarised in Table 54.

TABLE 54

Comparison of generation of discarded equipment (WStatR) and total WEEE collected (WEEE Directive)

	WStatR	WEEE-Directive
Variable (data set; code)	Discarded equipment generated (env_wasgen, TOTAL_HH)	Total WEEE collected (env_waselee, COL)
Description	<ul style="list-style-type: none"> – represents discarded equipment from all sources (TOTAL_HH) that is separately collected or separated in waste treatment plants. – includes electrical and electronic equipment plus waste from maintenance / dismantling of ELV and single-use cameras – may include double-counted amounts due to pre-treatment steps 	<ul style="list-style-type: none"> – represents the total amount of WEEE as defined in the WEEE Directive that is separately collected from households and from other sources
Relation in theory	Due to the broader definition / coverage of the EWC-Stat category 08 Discarded equipment and the possibility of double counts, the generation data according to the WStatR should exceed the collected WEEE amounts reported under the WEEE-Directive.	
Validation rule	Discarded equipment generated (WStatR) > Total WEEE collected (WEEE Directive)	

End-of-Life Vehicles (ELV)

The EWC-Stat category 08.1 Discarded vehicles covers end-of-life vehicles as defined by the ELV-Directive 2000/53/EC (passenger cars, small trucks, ..) but also any other vehicles like for instance heavy trucks and off-road

machinery. Hence, the coverage of the category is 08.1 is broader than the ELV definition of the ELV-Directive.

The cross-check between WStatR-data and ELV-data compares:

- the generation of discarded vehicles (08.1) acc. to the WStatR with

- the total weight of end-of-life vehicles reported under the Directive 2000/53/EC

The generation of discarded vehicles according to WStatR covers hazardous and non-hazardous vehicles from all sectors (TOTAL_HH).

The total weight of ELV reported under the ELV-Directive represents the amount of ELV taken out of operation and

handed over to treatment facilities within the reference year.

Countries were asked for explanation where the following validation rule was violated:

Discarded vehicles (08.1) generated (WStatR) > Total weight of ELV (ELV Directive)

The rationale and the limitations of the cross-check are summarised in Table 55.

TABLE 55

Comparison of generation of discarded vehicles (WStatR) and total weight of end-of-life vehicles (ELV Directive)

	WStatR	ELV Directive
Variable (data set; code)	Discarded vehicles generated (env_wasgen, TOTAL_HH)	Total weight of ELV (env_waselvt, GEN)
Description	<ul style="list-style-type: none"> represents all types of discarded vehicles, i.e. includes vehicles not covered by the ELV-Directive (e.g. trucks, off-road vehicles, etc.) may include double counts resulting from the multi-step treatment of discarded vehicles (de-pollution, dismantling, shredding, recycling) 	<ul style="list-style-type: none"> represents the amount of ELV taken out of operation and handed over to treatment facility within the reference year.
Relation in theory	Due to the broader definition / coverage of the EWC-Stat category 08.1 Discarded vehicles and the possibility of double counts, the generation data according to the WStatR should exceed the total weights reported under the ELV-Directive.	
Validation rule	Discarded vehicles generated (WStatR) > Total weight of ELV (ELV Directive)	

6.3. Dissemination of results

6.3.1. Data publication

6.3.1.1. Publication in the dissemination database (Eurobase)

The production database is used to export data in Eurostat's dissemination data base (Eurobase). The data on reference year t are to be delivered to Eurostat before end of June year t+2; the available new data at country level are uploaded in September t+2, and complete data including EU-aggregates are available in November t+2. After the complete publication data are revised only twice a year

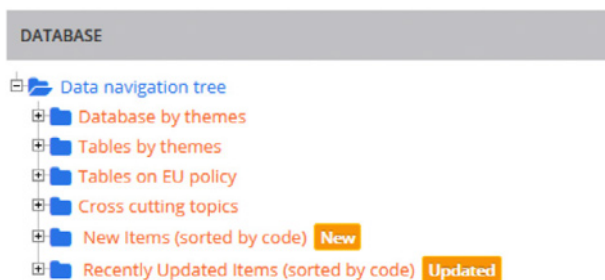
(July, December), unless important errors urgently need correction.

The waste statistics data can be accessed through two major points:

- The central database section: <https://ec.europa.eu/eurostat/data/database>, or
- The dedicated site for waste data: <https://ec.europa.eu/eurostat/web/waste/data>

Central database section

The central database section at the Eurostat website is organised by the main categories shown below:



The section 'database by themes' contains several databases linked to the Regulation on waste statistics as illustrated below: one on generation of waste and one on the treatment of waste, one on the treatment facilities and their capacity, as well as three other databases which are derived from the waste treatment database, all of them named 'Management of waste...'. Waste statistics is in the folder 'Environment and Energy, Environment, Waste, Waste generation and treatment'.



The 'tables by themes' offer summary information of the more detailed information in the databases. The tables are technically linked to the database, so that an update in the database will also appear in the table.

Further tables derived from WStatR can be found in the folder 'Tables on EU policy'. These tables refer to indicators derived from the WStatR data and are described below.

The upload of new data also might require an update of the metadata. The metadata is linked to the dissemination database; the metadata are accessible via the document icon 

behind the folder. The metadata describe the coverage of the data (periods, countries), sources and methods and some quality information.

6.3.1.2. Dedicated site for waste data

The tables and databases on the dedicated website for waste are the same as shown above and can be accessed through the following links.

Databases: <https://ec.europa.eu/eurostat/web/waste/data/database>

Tables: <https://ec.europa.eu/eurostat/web/waste/data/main-tables>

6.3.2. Indicators

Waste-related indicators are used to measure and track trends in waste generation and certain aspects of EU waste management. They provide information on progress towards EU policy objectives and help EU countries compare their environmental performance. WStatR-based indicators are used in several Eurostat indicator sets, namely as EU Sustainable Development Goals (SDGs) indicator, as resource efficiency indicators (REIs) and in the set of Circular Economy Indicators (CEI)

6.3.2.1. Generation of waste excl. major mineral wastes

The indicator 'generation of waste excl. major mineral wastes' serves as a proxy for trends in total waste production and is used in all three indicator sets mentioned above. The indicator reflects waste originating from all economic activities and households, thus including waste generated from both production and consumption.

The indicator excludes the following mineral waste flows:

- Mineral waste from construction and demolition (EWC-Stat 12.1)
- Other mineral wastes (12.2,12.3, 12.5)
- Soils (12.6)
- Dredging spoils (12.7).

These waste flows, of which 90% originate from mining and construction activities, are the main drivers of total waste generation and show a high variation over time and across countries. The exclusion of these waste flows enhances comparability across countries and reflects general trends of waste generation more accurately than statistics on total waste. The indicator shows the amount of waste generated annually in the EU as a whole and in individual countries, expressed in kilos per inhabitant.

6.3.2.2. Management of waste excluding major mineral waste

Based on same concept as described above, the waste management indicators measure how waste generated in the EU as a whole and in individual countries is finally treated, whether in the EU or abroad. The indicator set reflects the treatment rates of the waste produced in a given country by type of treatment (i.e. by the 6 treatment categories of the Waste Statistics Regulation). Indicators are expressed in volumes of treated waste by treatment category as a proportion of the total amount of waste treated.

The indicator set is based on waste treatment data collected under the Waste Statistics Regulation. In addition, foreign trade statistics (COMEXT data or national data on waste imports/exports) are used to show the amounts of waste exported and imported. Waste exports are added to the waste treated in the EU / in individual EU countries, while imports are deducted

The indicator covers both non-hazardous and hazardous waste from all economic sectors and from households. However, it excludes mineral wastes and soil, over 90% of which come from mining and construction. Data and information on WStatR-based indicators and further waste-related indicators can be accessed in the Eurostat database section 'tables by themes' and on the Eurostat dedicated website for waste data.

6.3.3. Other organisations using waste statistics

Important users of data compare developments at national level with other countries and analyse the causes and

consequences. In this paragraph we limit ourselves to the European and the broader international environment.

Eurostat collects waste data to monitor the effects of European waste policies. Four European organisations collaborate in the domain of environment: Directorate General Environment (DG ENV), the European Environment Agency (EEA), the Joint Research Centre (JRC) and Eurostat. In this collaboration the collection, validation and publication of data on waste is an important task of Eurostat.

Linked to the EEA are the European Topic Centre on Waste and Materials in a Green Economy (ETC/WMGE) and the European Environment Information and Observation Network (EIONET).

In the broader international context, the United Nations and the OECD are important. Eurostat tries to avoid double data collection and checks the coherence of data at international level.

Some useful links:

EIONET: <https://www.eionet.europa.eu/etcs/etc-wmge/products>

DG Environment: https://ec.europa.eu/environment/topics/waste-and-recycling_en

EEA: <http://www.eea.europa.eu/themes/waste>

6.3.4. Examples of publications

The main results of waste statistics and the trends observed are regularly published in the 'Statistics Explained' articles listed below, which are available at the Eurostat website ⁽⁸⁵⁾:

- [Waste Statistics](#)
- [Waste Management Indicators](#)

Information from WStatR-based indicators can be found, inter alia, in the Eurostat publications 'Energy, transport and environment statistics'.

⁽⁸⁵⁾ <https://ec.europa.eu/eurostat/web/waste/publications>

Annex I – Relevant legislation and guidance documents

Legal Acts

Commission Regulation (EU) No 1179/2012 of 10 December 2012 establishing criteria determining when glass cullet ceases to be waste under Directive 2008/98/EC of the European Parliament and of the Council (OJ L 337, 11.12.2012, p. 31–36)

Commission Regulation (EU) No 715/2013 of 25 July 2013 establishing criteria determining when copper scrap ceases to be waste under Directive 2008/98/EC of the European Parliament and of the Council (OJ L 201, 26.7.2013, p. 14–20)

Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste (OJ L 182, 16.07.1999, pp. 1–19), last amended by Directive (EU) 2018/850 of the European Parliament and of the Council of 30 May 2018 amending Directive 1999/31/EC on the landfill of waste (OJ L 150, 14.6.2018, p.100)

Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture (OJ L 181, 04.07.1986, p. 6), last amended by Regulation 807/2003/EC (OJ L 122, 16.05.2003, p. 36), last amended by Directive (EU) 2018/853 of the European Parliament and of the Council of 30 May 2018 (OJ L 150, 14.6.2018, p.155)

Council Regulation (EEC) No 3037/90 of 9 October 1990 on the statistical classification of economic activities in the European Community, last amended by Regulation (EC) No 1893/2006 of the European Parliament and of the Council of 20 December 2006 (OJ L 393, 30.12.2006, p.1).

Council Regulation (EEC) No 696/93 of 15 March 1993 on the statistical units for the observation and analysis of the production system in the Community, last amended by Regulation (EC) No 1137/2008 of the European Parliament and of the Council of 22 October 2008 (OJ L 311, 21.11.2008, p.1).

[Council Regulation \(EU\) No 333/2011 of 31 March 2011 establishing criteria determining when certain types of](#)

[scrap metal cease to be waste under Directive 2008/98/EC of the European Parliament and of the Council \(OJ L 94, 8.4.2011, p. 2–11\)](#)

Decision 2000/532/EC concerning the list of wastes (OJ L 226, 6.9.2000, p.3), as last amended by Council Decision 2001/573/EC, last amended by Commission Decision 2014/955/EU of 18 December 2014. (OJ L 370, 30.12.2014, p.44).

Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles (OJ L 269, 21.10.2000), last amended by Commission Delegated Directive (EU) 2020/363 of 17 December 2019 amending Annex II to Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles as regards certain exemptions for lead and lead compounds in components (OJ L 67, 5.3.2020, p. 119–121).

Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC (OJ L 102, 11.4.2006, p. 15), last amended by Regulation (EC) No 596/2009 of the European Parliament and of the Council of 18 June 2009 (OJ L 188, 18.7.2009, p. 14)

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing Directives (OJ L 312, 22.11.2008, p. 3) last amended by Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 (OJ L 150, 14.6.2018, p.109)

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Recast) (Text with EEA relevance) (OJ L 334, 17.12.2010, p. 17)

Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste. OJ L 190, 12.7.2006, p. 1–98

Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health

rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation) (OJ L 300, 14.11.2009, p. 1), last amended by Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 (OJ L 170, 25.06.2019, p.1)

Regulation (EC) No 2150/2002 of the European Parliament and of the Council of 25 November 2002 on waste statistics (OJ L 332, 9.12.2002, p.1), last amended by Commission Regulation (EU) No 849/2010 of 27 September 2010 (OJ L 253, 28.9.2010, p.2).

Regulation (EC) No. 1059/2003 of the European Parliament and the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS), last amended by Commission Delegated Regulation 2019/1755 of 8 August 2019 (OJ L 270, 24.10.2019, p.1). Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) (OJ L 243, 24.9.1996, p. 31), last amended by Regulation (EC) No 596/2009 of the European Parliament and of the Council of 18 June 2009 (OJ L 188, 18.7.2009, p. 14)

Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (recast) (OJ L 169, 25.6.2019, p. 45), last amended by Commission Delegated Regulation (EU) 2021/277 of 16 December 2020 (OJ L 62, 23.2.2021, p. 1)

Regulation (EU) 2019/2152 of the European Parliament and of the Council of 27 November 2019 on European business statistics, repealing 10 legal acts in the field of business statistics (OJ L 327, 17.12.2019, p. 1–35)

Guidance Documents

Commission notice on technical guidance on the classification of waste (2018/C 124/01), European Commission, 2018

Communication from the Commission to the Council and the European Parliament on the Interpretative Communication on waste and by-products, COM(2007) 59 final, 21.2.2007

European Statistical System (ESS) handbook for quality and metadata reports — 2020 edition. Manuals and guidelines, Eurostat

Handbook on the Design and Implementation of Business Surveys. Edited by Ad Willeboordse, Eurostat, 1998

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Annex II – Set of deliverables

Set 1. Waste generation by waste category (EWC-STAT) and economic activities (NACE), tonnes/year

Waste item	Activity item number		NACE Rev. 2 →																						
	EWC-Stat Ver. 4		Hazardous	Dry	01_03	04_09	10_12	13_15	16	17_18	19	20_22	23	24_25	26_30	31_33	34_35	36+37+39	38	41_43	G-U excl.	46.77	46.77	HH	Total
	Code	Description																							
1	01.1	Spent solvents	H																						
2	01.2	Acid, alkaline or saline wastes																							
3	01.2	Acid, alkaline or saline wastes	H																						
4	01.3	Used oils	H																						
5	01.4, 02, 03.1	Chemical wastes																							
6	01.4, 02, 03.1	Chemical wastes	H																						
7	03.2	Industrial effluent sludges		D																					
8	03.2	Industrial effluent sludges	H	D																					
9	03.3	Sludges and liquid wastes from waste treatment		D																					
10	03.3	Sludges and liquid wastes from waste treatment	H	D																					
11	05	Health care and biological wastes																							

Waste item	Activity item number		NACE Rev. 2 →																	Total				
	EWC-Stat Ver. 4		Hazardous	Dry	01_03	04_09	10_12	13_15	16	17_18	19	20_22	23	24_25	26_30	31_33	34_35	36+37+39	38		41_43	G-U excl. 46.77	46.77	HH
	Code	Description																						
12	05	Health care and biological wastes	H																					
13	06.1	Metallic wastes, ferrous																						
14	06.2	Metallic wastes, non-ferrous																						
15	06.3	Metallic wastes, mixed ferrous and non-ferrous																						
16	07.1	Glass wastes																						
17	07.1	Glass wastes	H																					
18	07.2	Paper and cardboard wastes																						
19	07.3	Rubber wastes																						
20	07.4	Plastic wastes																						
21	07.5	Wood wastes																						
22	07.5	Wood wastes	H																					
23	07.6	Textile wastes																						
24	07.7	Waste containing PCB	H																					
25	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/accumulators)																						
26	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/accumulators)	H																					
27	08.1	Discarded vehicles																						
28	08.1	Discarded vehicles	H																					
29	08.41	Batteries and accumulators wastes																						
30	08.41	Batteries and accumulators wastes	H																					

Waste item	Activity item number		NACE Rev. 2 →																					
	EWC-Stat Ver. 4		Hazardous	Dry	01_03	04_09	10_12	13_15	16	17_18	19	20_22	23	24_25	26_30	31_33	34_35	36+37+39	38	41_43	G-U excl. 46.77	46.77	HH	Total
	Code	Description																						
31	09.1	Animal and mixed food waste																						
32	09.2	Vegetal wastes																						
33	09.3	Animal faeces, urine and manure																						
34	10.1	Household and similar wastes																						
35	10.2	Mixed and undifferentiated materials																						
36	10.2	Mixed and undifferentiated materials	H																					
37	10.3	Sorting residues																						
38	10.3	Sorting residues	H																					
39	11	Common sludges		D																				
40	12.1	Mineral waste from construction and demolition																						
41	12.1	Mineral waste from construction and demolition	H																					
42	12.2, 12.3, 12.5	Other mineral wastes																						
43	12.2, 12.3, 12.5	Other mineral wastes	H																					
44	12.4	Combustion wastes																						
45	12.4	Combustion wastes	H																					
46	12.6	Soils																						
47	12.6	Soils	H																					
48	12.7	Dredging spoils		D																				
49	12.7	Dredging spoils	H	D																				

Waste item	Activity item number																			TA					
	EWC-Stat Ver. 4		NACE Rev. 2 →																		Total				
	Code	Description	Hazardous	Dry	01_03	04_09	10_12	13_15	16	17_18	19	20_22	23	24_25	26_30	31_33	34_35	36+37+39	38			41_43	G-U excl. 46.77	46.77	HH
50	12.8, 13	Mineral waste from waste treatment and stabilised wastes																							
51	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H																						
TN		Total, non-hazardous																							
TH		Total, hazardous	H																						
TT		Total, general																							

Set 2. Waste treatment by waste category (EWC-STAT) and treatment category, tonnes/year

Waste item	Treatment item number				1	2	3a	3b	4	5
	Treatment categories →		Hazardous	Dry	Energy recovery (R1)	Waste incineration (D10)	Recycling (R2 – R11)	Backfilling	Landfilling (D1, D5, D12)	Other disposal (D2, D3, D4, D6, D7)
	EWC-Stat Ver. 4									
	Code	Description								
1	01.1	Spent solvents	H							
2	01.2	Acid, alkaline or saline wastes								
3	01.2	Acid, alkaline or saline wastes	H							
4	01.3	Used oils	H							
5	01.4, 02, 03.1	Chemical wastes								
6	01.4, 02, 03.1	Chemical wastes	H							
7	03.2	Industrial effluent sludges		D						
8	03.2	Industrial effluent sludges	H	D						
9	03.3	Sludges and liquid wastes from waste treatment		D						
10	03.3	Sludges and liquid wastes from waste treatment	H	D						
11	05	Health care and biological wastes								
12	05	Health care and biological wastes	H							
13	06.1	Metallic wastes, ferrous								
14	06.2	Metallic wastes, non-ferrous								
15	06.3	Metallic wastes, mixed ferrous and non-ferrous								
16	07.1	Glass wastes								
17	07.1	Glass wastes	H							

Waste item	Treatment item number				1	2	3a	3b	4	5
	Treatment categories →		Hazardous	Dry	Energy recovery (R1)	Waste incineration (D10)	Recycling (R2 – R11)	Backfilling	Landfilling (D1, D5, D12)	Other disposal (D2, D3, D4, D6, D7)
	EWC-Stat Ver. 4									
Code	Description									
18	07.2	Paper and cardboard wastes								
19	07.3	Rubber wastes								
20	07.4	Plastic wastes								
21	07.5	Wood wastes								
22	07.5	Wood wastes	H							
23	07.6	Textile wastes								
24	07.7	Waste containing PCB	H							
25	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/accumulators)								
26	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/accumulators)	H							
27	08.1	Discarded vehicles								
28	08.1	Discarded vehicles	H							
29	08.41	Batteries and accumulators wastes								
30	08.41	Batteries and accumulators wastes	H							
31	09.1	Animal and mixed food waste								
32	09.2	Vegetal wastes								
33	09.3	Animal faeces, urine and manure								
34	10.1	Household and similar wastes								
35	10.2	Mixed and undifferentiated materials								
36	10.2	Mixed and undifferentiated materials	H							

Waste item	Treatment item number				1	2	3a	3b	4	5
	Treatment categories →		Hazardous	Dry	Energy recovery (R1)	Waste incineration (D10)	Recycling (R2 – R11)	Backfilling	Landfilling (D1, D5, D12)	Other disposal (D2, D3, D4, D6, D7)
	EWC-Stat Ver. 4									
Code	Description									
37	10.3	Sorting residues								
38	10.3	Sorting residues	H							
39	11	Common sludges		D						
40	12.1	Mineral waste from construction and demolition								
41	12.1	Mineral waste from construction and demolition	H							
42	12.2, 12.3, 12.5	Other mineral wastes								
43	12.2, 12.3, 12.5	Other mineral wastes	H							
44	12.4	Combustion wastes								
45	12.4	Combustion wastes	H							
46	12.6	Soils								
47	12.6	Soils	H							
48	12.7	Dredging spoils								
49	12.7	Dredging spoils	H							
50	12.8, 13	Mineral waste from waste treatment and stabilised wastes								
51	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H							
TN		Total, non-hazardous								
TH		Total, hazardous	H							
TT		Total, general								

Set 3. Number and capacity of recovery and disposal operations (per NUTS 2 region) and population served by collection scheme (national)

<i>Treatment item number</i>	1	2	3a	3b	4											
<i>Treatment categories →</i>	Energy recovery (R1)	Waste incineration (D10)		Recovery (R2 – R11)	Backfilling	Landfilling (D1, D5, D12)										
		no. of facilities	capacity t/a			no. of facilities	capacity t/a	Landfills for haz. waste			Landfills for non-haz. waste			Landfills for inert waste		Landfills total
no. of facilities	rest capacity ³			closed	no. of facilities			rest capacity ³	closed	no. of facilities	rest capacity ³	closed	no. of facilities	rest capacity ³		
<i>Regions, NUTS 2 level</i>	no. of facilities	capacity t/a	no. of facilities	capacity t/a	no. of facilities	no. of facilities	rest capacity ³	closed	no. of facilities	rest capacity ³	closed	no. of facilities	rest capacity ³	closed	no. of facilities	rest capacity ³
Region 1																
Region 2																
Region 3																
...																
...																
...																
National total																

Shaded cells: No data required.

Annex III – Voluntary questionnaire module

TABLE 1

First treatment of primary waste

Waste item	Code	Description	Hazardous	Primary waste generation and storage balance			Annex 2 treatment operations									
				1	2	3	4	5	6	7	8	9	10	11		
				Domestically generated waste	Diff. between GEN and TRT due to delay and changes of stock	Total primary waste input to treatment (= 1 - 2)	PRT	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	Export for treatment		
1	01.1	Spent solvents	H		0											
2	01.2	Acid, alkaline or saline wastes			0											
3	01.2	Acid, alkaline or saline wastes	H		0											
4	01.3	Used oils	H		0											
5	01.4, 02, 03.1	Chemical wastes			0											
6	01.4, 02, 03.1	Chemical wastes	H		0											
7	03.2	Industrial effluent sludges			0											
8	03.2	Industrial effluent sludges	H		0											
11	05	Health care and biological wastes			0											
12	05	Health care and biological wastes	H		0											
13	06.1	Metallic wastes, ferrous			0											

Waste item	Code	Description	Hazardous	Primary waste generation and storage balance			Annex 2 treatment operations											
				1	2	3	4	5	6	7	8	9	10	11				
				Domestically generated waste	Diff. between GEN and TRT due to delay and changes of stock	Total primary waste input to treatment (= 1 - 2)	PRT	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	Export for treatment				
14	06.2	Metallic wastes, non-ferrous			0													
15	06.3	Metallic wastes, mixed ferrous and non-ferrous			0													
16	07.1	Glass wastes			0													
17	07.1	Glass wastes	H		0													
18	07.2	Paper and cardboard wastes			0													
19	07.3	Rubber wastes			0													
20	07.4	Plastic wastes			0													
21	07.5	Wood wastes			0													
22	07.5	Wood wastes	H		0													
23	07.6	Textile wastes			0													
24	07.7	Waste containing PCB	H		0													
25	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/accumulators)			0													
26	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/accumulators)	H		0													
27	08.1	Discarded vehicles			0													
28	08.1	Discarded vehicles	H		0													
29	08.41	Batteries and accumulators wastes			0													
30	08.41	Batteries and accumulators wastes	H		0													
31	09.1	Animal and mixed food waste			0													

Waste item	Code	Description	Hazardous	Primary waste generation and storage balance			Annex 2 treatment operations										
				1	2	3	4	5	6	7	8	9	10	11			
				Domestically generated waste	Diff. between GEN and TRT due to delay and changes of stock	Total primary waste input to treatment (= 1 - 2)	PRT	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	Export for treatment			
32	09.2	Vegetal wastes			0												
33	09.3	Animal faeces, urine and manure			0												
34	10.1	Household and similar wastes			0												
35	10.2	Mixed and undifferentiated materials			0												
36	10.2	Mixed and undifferentiated materials	H		0												
39	11	Common sludges			0												
40	12.1	Mineral waste from construction and demolition			0												
41	12.1	Mineral waste from construction and demolition	H		0												
42	12.2, 12.3, 12.5	Other mineral wastes			0												
43	12.2, 12.3, 12.5	Other mineral wastes	H		0												
44	12.4	Combustion wastes			0												
45	12.4	Combustion wastes	H		0												
46	12.6	Soils			0												
47	12.6	Soils	H		0												
48	12.7	Dredging spoils			0												
49	12.7	Dredging spoils	H		0												

Legend:

Items in bold: PRIORITY-ITEMS

0 Values calculated (e.g. totals or taken directly from other sheets)

Abbreviations:

PRT	Pre-treatment (D8, D9, D13, D14, R12)*
RCV_E	Energy recovery (R1)
DSP_I	Waste incineration (D10)
RCV_R	Recycling (R2 – R11)
RCV_B	Backfilling
DSP_L	Landfilling (D1, D5, D12)
DSP_OTH	Other disposal (D2, D3, D4, D6, D7)

(*) D15 and R13 are covered in table 1 as balance item, D11 is prohibited by EU legislation and international conventions.

TABLE 2

Imports and exports for treatment

Waste item	Code	Description	Hazardous	Annex 2 treatment								Annex 2 treatment								
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
				Total import for treatment (primary and secondary)	PRT	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	Total export for treatment (primary and secondary)	of which: Secondary waste exported for treatment	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	
1	01.1	Spent solvents	H										0							
2	01.2	Acid, alkaline or saline wastes											0							
3	01.2	Acid, alkaline or saline wastes	H										0							
4	01.3	Used oils	H										0							
5	01.4, 02, 03.1	Chemical wastes											0							
6	01.4, 02, 03.1	Chemical wastes	H										0							
7	03.2	Industrial effluent sludges											0							
8	03.2	Industrial effluent sludges	H										0							
9	03.3	Sludges and liquid wastes from waste treatment											0							
10	03.3	Sludges and liquid wastes from waste treatment	H										0							
11	05	Health care and biological wastes											0							
12	05	Health care and biological wastes	H										0							
13	06.1	Metallic wastes, ferrous											0							
14	06.2	Metallic wastes, non-ferrous											0							
15	06.3	Metallic wastes, mixed ferrous and non-ferrous											0							

Waste item	Code	Description	Hazardous	Annex 2 treatment								Annex 2 treatment								
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
				Total import for treatment (primary and secondary)	PRT	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	Total export for treatment (primary and secondary)	of which: Secondary waste exported for treatment	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	
16	07.1	Glass wastes											0							
17	07.1	Glass wastes	H										0							
18	07.2	Paper and cardboard wastes											0							
19	07.3	Rubber wastes											0							
20	07.4	Plastic wastes											0							
21	07.5	Wood wastes											0							
22	07.5	Wood wastes	H										0							
23	07.6	Textile wastes											0							
24	07.7	Waste containing PCB	H										0							
25	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/accumulators)											0							
26	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/accumulators)	H										0							
27	08.1	Discarded vehicles											0							
28	08.1	Discarded vehicles	H										0							
29	08.41	Batteries and accumulators wastes											0							
30	08.41	Batteries and accumulators wastes	H										0							
31	09.1	Animal and mixed food waste											0							
32	09.2	Vegetal wastes											0							
33	09.3	Animal faeces, urine and manure											0							

Waste item	Code	Description	Hazardous	Annex 2 treatment								Annex 2 treatment								
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
				Total import for treatment (primary and secondary)	PRT	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	Total export for treatment (primary and secondary)	of which: Secondary waste exported for treatment	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	
34	10.1	Household and similar wastes											0							
35	10.2	Mixed and undifferentiated materials											0							
36	10.2	Mixed and undifferentiated materials	H										0							
37	10.3	Sorting residues											0							
38	10.3	Sorting residues	H										0							
39	W11	Common sludges											0							
40	12.1	Mineral waste from construction and demolition											0							
41	12.1	Mineral waste from construction and demolition	H										0							
42	12.2, 12.3, 12.5	Other mineral wastes											0							
43	12.2, 12.3, 12.5	Other mineral wastes	H										0							
44	12.4	Combustion wastes											0							
45	12.4	Combustion wastes	H										0							
46	12.6	Soils											0							
47	12.6	Soils	H										0							
48	12.7	Dredging spoils											0							

Waste Item	Code	Description	Hazardous	Annex 2 treatment								Annex 2 treatment								
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
				Total import for treatment (primary and secondary)	PRT	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	Total export for treatment (primary and secondary)	of which: Secondary waste exported for treatment	RCV_E	DSP_I	RCV_R	RCV_B	DSP_L	DSP_OTH	
49	12.7	Dredging spoils	H										0							
50	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H										0							
51	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H										0							

Legend:

Items in bold: PRIORITY-ITEMS

Secondary waste codes according to EWC-Stat

0 Values calculated (e.g. totals or taken directly from other sheets)

Abbreviations:

PRT Pre-treatment (D8, D9, D13, D14, R12)*

RCV_E Energy recovery (R1)

DSP_I Waste incineration (D10)

RCV_R Recycling (R2 – R11)

RCV_B Backfilling

DSP_L Landfilling (D1, D5, D12)

DSP_OTH Other disposal (D2, D3, D4, D6, D7)

*D15 and R13 are covered in table 1 as balance item, D11 is prohibited by EU legislation and international conventions.

Waste Item	Code	Description	Hazardous	Inputs							Output flows																						
				Input. dom. total.	Of which: Inp. dom. sec.	Inp. import. total.	Of which: import sec.	01.4, 02, 03.1	3.2	03.3	06.1	06.2	06.3	07.1	07.2	07.3	07.4	07.5	07.6	10.3	12.8, 13	Other	Other	Other	Other	Other	Output rem. in waste trt. total	Products	Losses/emiss.	Total output			
				H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		
25	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/ accumulators)		0	0																								0	0			0
26	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/ accumulators)	H	0	0																								0	0			0
27	08.1	Discarded vehicles		0	0																							0	0			0	
28	08.1	Discarded vehicles	H	0	0																							0	0			0	
29	08.41	Batteries and accumulators wastes		0	0																							0	0			0	
30	08.41	Batteries and accumulators wastes	H	0	0																							0	0			0	
31	09.1	Animal and mixed food waste		0	0																							0	0			0	
32	09.2	Vegetal wastes		0	0																							0	0			0	
33	09.3	Animal faeces, urine and manure		0	0																												
34	10.1	Household and similar wastes		0	0																							0	0			0	

Waste Item	Code	Description	Hazardous	Inputs													Output flows																
				Input. dom. total.	Of which: Inp. dom. sec.	Inp. import. total.	Of which: import sec.	01.4, 02, 03.1	3.2	03.3	06.1	06.2	06.3	07.1	07.2	07.3	07.4	07.5	07.6	10.3	12.8, 13	Other	Other	Other	Other	Other	Output rem. in waste trt. total	Products	Losses/emiss.	Total output			
				H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		
35	10.2	Mixed and undifferentiated materials		0	0																								0	0			0
36	10.2	Mixed and undifferentiated materials	H	0	0																								0	0			0
37	10.3	Sorting residues																											0	0			0
38	10.3	Sorting residues	H																										0	0			0
39	11.0	Common sludges		0	0																												
40	12.1	Mineral waste from construction and demolition		0	0																								0	0			0
41	12.1	Mineral waste from construction and demolition	H	0	0																							0	0			0	
42	12.2, 12.3, 12.5	Other mineral wastes		0	0																												
43	12.2, 12.3, 12.5	Other mineral wastes	H	0	0																												
44	12.4	Combustion wastes		0	0																												
45	12.4	Combustion wastes	H	0	0																												
46	12.6	Soils		0	0																												
47	12.6	Soils	H	0	0																												

Waste Item	Code	Description	Inputs											Output flows																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
			Hazardous	Input dom. total.	Of which: Inp. dom. sec.	Inp. import. total.	Of which: import sec.	01.4, 02, 03.1	3.2	03.3	06.1	06.2	06.3	07.1	07.2	07.3	07.4	07.5	07.6	10.3	12.8, 13	Other	Other	Other	Other	Other		Output rem. in waste trt. total	Products	Losses/emiss.	Total output		
								H	H	H								H	H	H	H	H	H	H	H	H	H						
48	12.7	Dredging spoils			0	0																											
49	12.7	Dredging spoils	H		0	0																											
50	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H																										0	0			0
51	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H																										0	0			0

Legend:

Items in bold: PRIORITY-ITEMS

- Secondary waste codes according to EWC-Stat
- 0 Values calculated (e.g., totals or taken directly from other sheets)
- Fields unlikely to contain secondary wastes
- Value expected to be less relevant in terms of quantities
- No need to be filled (outputs from non-priority item)

Abbreviations:

- Input. dom. total Input domestic Total
- Of which: Inp. dom. sec. Of which: Input domestic secondary
- Inp. import. total Input import total
- Of which: import sec. Of which: Input import secondary
- Output rem. in waste trt. total Output remaining in waste treatment total
- Losses/emiss. Losses & emissions
- Total output Total output including products & losses

TABLE 3B

Reporting of thermal processes (RCV_E & DSP_I)

Unit: Tonnes

Waste Item	Code	Description	Hazardous	Inputs				Output flows																	
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	28	
				Input. dom. total.	Of which: Inp. dom. sec.	Inp. import. total.	Of which: import sec.	06.1	06.2	06.3	12.4	12.8,13	Other	Other	Other	Other	Other	Output rem. in waste trt. total	Products	Losses/emiss.	Total output				
							H	H	H						H										
1	01.1	Spent solvents	H		0	0																			
2	01.2	Acid, alkaline or saline wastes			0	0																			
3	01.2	Acid, alkaline or saline wastes	H		0	0																			
4	01.3	Used oils	H		0	0												0	0				0		
5	01.4, 02, 03.1	Chemical wastes			0	0																			
6	01.4, 02, 03.1	Chemical wastes	H		0	0																			
7	03.2	Industrial effluent sludges			0	0																			
8	03.2	Industrial effluent sludges	H		0	0																			
9	03.3	Sludges and liquid wastes from waste treatment																							
10	03.3	Sludges and liquid wastes from waste treatment	H																						
11	05	Health care and biological wastes			0	0																			
12	05	Health care and biological wastes	H		0	0																			
13	06.1	Metallic wastes, ferrous			0	0												0	0					0	
14	06.2	Metallic wastes, non-ferrous			0	0												0	0						0
15	06.3	Metallic wastes, mixed ferrous and non-ferrous			0	0												0	0						0

Waste Item	Code	Description	Hazardous	Inputs											Output flows						Products	Losses/emiss.	Total output	
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17				18
				Input. dom. total.	Of which: Inp. dom. sec.	Inp. import. total.	Of which: import sec.	06.1	06.2	06.3	12.4	12.8,13	Other	Other	Other	Other	Other	Output rem. in waste trt. total	Output rem. in waste trt. total					
							H	H	H						H	H	H	H						
16	07.1	Glass wastes			0	0												0	0			0		
17	07.1	Glass wastes	H		0	0																		
18	07.2	Paper and cardboard wastes			0	0												0	0				0	
19	07.3	Rubber wastes			0	0																		
20	07.4	Plastic wastes			0	0												0	0				0	
21	07.5	Wood wastes			0	0												0	0				0	
22	07.5	Wood wastes	H		0	0												0	0				0	
23	07.6	Textile wastes			0	0												0	0				0	
24	07.7	Waste containing PCB	H		0	0																		
25	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/accumulators)			0	0												0	0				0	
26	08 (excl. 08.1, 08.41)	Discarded equipment (excl. discarded vehicles, batteries/accumulators)	H		0	0												0	0				0	
27	08.1	Discarded vehicles			0	0												0	0				0	
28	08.1	Discarded vehicles	H		0	0												0	0				0	
29	08.41	Batteries and accumulators wastes			0	0												0	0				0	
30	08.41	Batteries and accumulators wastes	H		0	0												0	0				0	

Waste Item	Code	Description	Hazardous	Inputs											Output flows									
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	28
				Input. dom. total.	Of which: Inp. dom. sec.	Inp. import. total.	Of which: import sec.	06.1	06.2	06.3	12.4	12.8,13	Other	Other	Other	Other	Other	Output rem. in waste trt. total	Products	Losses/emiss.	Total output			
							H	H	H						H									
31	09.1	Animal and mixed food waste			0	0												0	0			0		
32	09.2	Vegetal wastes			0	0												0	0			0		
33	09.3	Animal faeces, urine and manure			0	0																		
34	10.1	Household and similar wastes			0	0												0	0			0		
35	10.2	Mixed and undifferentiated materials			0	0												0	0			0		
36	10.2	Mixed and undifferentiated materials	H		0	0												0	0			0		
37	10.3	Sorting residues	H															0	0			0		
38	10.3	Sorting residues	H															0	0			0		
39	11.0	Common sludges			0	0																		
40	12.1	Mineral waste from construction and demolition			0	0												0	0			0		
41	12.1	Mineral waste from construction and demolition	H		0	0												0	0			0		
42	12.2, 12.3, 12.5	Other mineral wastes			0	0																		
43	12.2, 12.3, 12.5	Other mineral wastes	H		0	0																		
44	12.4	Combustion wastes			0	0																		
45	12.4	Combustion wastes	H		0	0																		
46	12.6	Soils			0	0																		

Waste Item	Code	Description	Hazardous	Inputs											Output flows									
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	28
				Input. dom. total.	Of which: Inp. dom. sec.	Inp. import. total.	Of which: import sec.	06.1	06.2	06.3	12.4	12.8,13	Other	Other	Other	Other	Other	Output rem. in waste trt. total	Products	Losses/emiss.	Total output			
							H	H	H					H										
47	12.6	Soils	H		0	0																		
48	12.7	Dredging spoils			0	0																		
49	12.7	Dredging spoils	H		0	0																		
50	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H															0	0			0		
51	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H															0	0			0		

Legend:

Items in bold: PRIORITY-ITEMS

Secondary waste codes according to EWC-Stat

0 Values calculated (e.g., totals or taken directly from other sheets)

Fields unlikely to contain secondary wastes

Value expected to be less relevant in terms of quantities

No need to be filled (outputs from non-priority item)

Abbreviations:

Input. dom. total Input domestic Total

Of which: Inp. dom. sec. Of which: Input domestic secondary

Inp. import. total Input import total

Of which: import sec. Of which: Input import secondary

Output rem. in waste trt. total Output remaining in waste treatment total

Losses/emiss. Losses & emissions

Total output Total output including products & losses

TABLE 3C

Reporting of recycling (RCV_R)

Unit: Tonnes

Waste Item	Code	Description	Hazardous	Inputs													Output flows																				
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
				Input dom. total.	Of which: Inp. dom. sec.	Inp. import. total.	Of which: import sec.	01.4, 02, 03.1	3.2	03.3	06.1	06.2	06.3	07.1	07.2	07.3	07.4	07.5	07.6	10.3	12.8, 13	Other	Other	Other	Other	Other	Output rem. in waste trt. total	Products	Losses/emiss.	Total output							
H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H			
1	01.1	Spent solvents	H	0	0																																
2	01.2	Acid, alkaline or saline wastes		0	0																																
3	01.2	Acid, alkaline or saline wastes	H	0	0																																
4	01.3	Used oils	H	0	0																																
5	01.4, 02, 03.1	Chemical wastes		0	0																																
6	01.4, 02, 03.1	Chemical wastes	H	0	0																																
7	03.2	Industrial effluent sludges		0	0																																
8	03.2	Industrial effluent sludges	H	0	0																																
9	03.3	Sludges and liquid wastes from waste treatment																																			
10	03.3	Sludges and liquid wastes from waste treatment	H																																		
11	05	Health care and biological wastes		0	0																																
12	05	Health care and biological wastes	H	0	0																																
13	06.1	Metallic wastes, ferrous		0	0																																
14	06.2	Metallic wastes, non-ferrous		0	0																																
15	06.3	Metallic wastes, mixed ferrous and non-ferrous		0	0																																

Waste Item	Code	Description	Hazardous	Inputs										Output flows																							
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
				Input dom. total.	Of which: Inp. dom. sec.	Inp. import. total.	Of which: import sec.	01.4, 02, 03.1	3.2	03.3	06.1	06.2	06.3	07.1	07.2	07.3	07.4	07.5	07.6	10.3	12.8, 13	Other	Other	Other	Other	Other	Output rem. in waste trt. total	Products	Losses/emiss.	Total output							
47	12.6	Soils	H		0	0																															
48	12.7	Dredging spoils			0	0																															
49	12.7	Dredging spoils	H		0	0																															
50	12.8, 13	Mineral waste from waste treatment and stabilised wastes																																			0
51	12.8, 13	Mineral waste from waste treatment and stabilised wastes	H																																	0	

Legend:

Items in bold: PRIORITY-ITEMS

Secondary waste codes according to EWC-Stat

0 Values calculated (e.g., totals or taken directly from other sheets)

Fields unlikely to contain secondary wastes

Value expected to be less relevant in terms of quantities

No need to be filled (outputs from non-priority item)

Abbreviations:

Input dom. total

Input domestic Total

Of which: Inp. dom. sec.

Of which: Input domestic secondary

Inp. import. total

Input import total

Of which: import sec.

Of which: Input import secondary

Output rem. in waste trt. total

Output remaining in waste treatment total

Losses/emiss.

Losses & emissions

Total output

Total output including products & losses

List of variables

No. of column	Variable	Description	Relation to WStatR data or other module tables
Table 1: Primary waste generation and input into 1st treatment			
1	Domestically generated primary waste	Primary waste that is generated in the country; excludes secondary waste and waste imports	Subset of TOTAL Generation (Annex I)
2	Diff. between GEN and TRT due to delay and changes of stock	<p>Difference between the domestically generated primary waste and the input of the domestically generated primary waste into first treatment.</p> <p>Whether or not a difference between primary waste generation and input into first treatment exists, depends predominantly on the measurement points for the two parameters. In cases, where waste generation is measured at the input into the treatment facility, the difference will be / can be zero, (if no interim storage is involved). In case the measurement points are different, the reasons for difference may be manifold and include for instance:</p> <ul style="list-style-type: none"> – time delay between generation and treatment and related changes of stock; – different methods and sources for generation and treatment data; – water losses during collection and temporary storage; ... <p>The variable serves for the balancing of data on generation and treatment and to check the plausibility of the data, as the difference between both parameters should be explainable e.g. by the reasons mentioned above. Where the value can not be derived from the data, the difference is simply calculated.</p>	Data are not covered by Annex II
3	Total primary waste input to treatment	Total input of domestically generated primary waste into the first treatment; Should be similar to the domestically generated primary waste; Differences between both values should be explainable	Subset of TOTAL treatment (Annex II)

No. of column	Variable	Description	Relation to WStatR data or other module tables
4	PRT	The input of domestically generated primary waste into the first treatment, broken down by the seven treatment categories in columns 4 to 10 and the direct export in column 11. Direct export means export without prior treatment in the country. Columns 4 to 11 should sum up to the total input in column 3.	Data are not covered by Annex II. They are a subset of the total input into PRT to be reported in table 3A, column 1.
5	RCV_E		Subset of RCV_E (Annex II)
6	DSP_I		Subset of DSP_I (Annex II)
7	RCV_R		Subset of RCV_R (Annex II)
8	RCV_B		Subset of RCV_B (Annex II)
9	DSP_L		Subset of DSP_L (Annex II)
10	DSP_OTH		Subset of DSP_OTH (Annex II)
11	Export for treatment		Data are not covered by Annex II

Table 2: Treatment of imports and exports

1	Total import for treatment (primary and secondary)	Total import of primary and secondary waste from EU- and from non-EU countries	
2	PRT	Input of imported waste into the first treatment in the country, broken down by the seven treatment categories in columns 2 to 8.	Data are not covered by Annex II
3	RCV_E	Columns 2 to 8 should sum up to the total import in column 1.	Subset of RCV_E (Annex II)
4	DSP_I		Subset of DSP_I (Annex II)
5	RCV_R		Subset of RCV_R (Annex II)
6	RCV_B		Subset of RCV_B (Annex II)
7	DSP_L		Subset of DSP_L (Annex II)
8	DSP_OTH		Subset of DSP_OTH (Annex II)

No. of column	Variable	Description	Relation to WStatR data or other module tables
9	Total export for treatment (primary and secondary)	Total export of primary and secondary waste to EU- and non-EU-countries	Data are not covered by Annex II
10	of which: Secondary waste exported for treatment	Subset of column 9; calculated automatically as difference between total export in column 9 and direct export in table 1, column 11.	
11	RCV_E	Final treatment of exported waste in the receiving country, broken down by the six treatment categories in columns 11 to 16	
12	DSP_I		
13	RCV_R		
14	RCV_B		
15	DSP_L		
16	DSP_OTH		

No. of column	Variable	Description	Relation to WStatR data or other module tables
Table 3A: Reporting of pre-treatment (PRT)			
Inputs			
1	Input domestic total (primary and secondary)	Total input of domestically generated waste (i.e. primary and secondary waste) into pre-treatment operations (R12, D8, D9, D13, D14)	Data are not covered by Annex II
2	of which: Input domestic secondary	Input of domestically produced secondary waste into pre-treatment; calculated automatically as difference between the total in column 1 and the input of domestically produced primary waste in table 1, column 4.	
3	Input import total (primary and secondary)	Total input of imported waste (i.e. primary and secondary waste) into pre-treatment; value is equal to table 2, column 2	
4	of which: Input import secondary	Input of imported secondary waste into pre-treatment	
Output flows			
5	W02A - HAZ	Amounts of secondary waste remaining in waste treatment produced during pre-treatment of the priority waste streams, broken down by EWC-Stat category.	Data included in Annex II, but EWC-Stat of origin not known.
6	W02A - NHAZ		
7	W032 - HAZ	Five columns (C25 to C29) to specify further waste categories can be chosen, for three of which (C27 to C29) the hazardousness can be chosen as well to allow for more flexibility. If the wording haz/non-haz is typed in exactly, the module will automatically allocate the amounts in the correct totals (either C31 or C31)	
8	W032 - NHAZ		
9	W033 - HAZ		
10	W033 - NHAZ		
11	W061 - NHAZ		
12	W062 - NHAZ		
13	W063 - NHAZ		
14	W071 - NHAZ		
15	W072 - NHAZ		
16	W073 - NHAZ		
17	W074 - NHAZ		

No. of column	Variable	Description	Relation to WStatR data or other module tables
18	W075 - HAZ	Amounts of secondary waste remaining in waste treatment produced during pre-treatment of the priority waste streams, broken down by EWC-Stat category. Five columns (C25 to C29) to specify further waste categories can be chosen, for three of which (C27 to C29) the hazardousness can be chosen as well to allow for more flexibility. If the wording haz/non-haz is typed in exactly, the module will automatically allocate the amounts in the correct totals (either C31 or C31)	Data included in Annex II, but EWC-Stat of origin not known.
19	W075 - NHAZ		
20	W076 - NHAZ		
21	W103 - HAZ		
22	W103 - NHAZ		
23	W128_13 - HAZ		
24	W128_13 - NHAZ		
25	OTHER - HAZ		
26	OTHER - NHAZ		
27	OTHER -		
28	OTHER -		
29	OTHER -		
30	Output remaining in waste treatment total - HAZ	Calculated as sum of C5, C7, C9, C18, C21, C25 and C27 to C29, if declared as haz	Data are not covered by Annex II
31	Output remaining in waste treatment total - NHAZ	Calculated as sum of C6, C8, C10 to C17, C19 to C22, C24, C26 and C27 to C29, if declared as non-haz	
32	Products	Non-waste outputs, like waste that has reached end-of-waste status or wastes that are prepared for reuse	
33	Losses & emissions	Sum of material losses and emissions to water and air. Can be calculated as difference between total input (sum of column 1 and 3) and sum of secondary wastes (columns 5 to 29) and products (column 32), if no data are available	Data are partly covered by Annex II
34	Total output incl. products & losses	Input and output shall be balanced, i.e. the value shall be equal to the sum of columns 1 and 3.	

No. of column	Variable	Description	Relation to WStatR data or other module tables
Table 3B: Reporting of thermal processes (RCV_E & DSP_I)			
Inputs			
1	Input domestic total (primary and secondary)	Total input of domestically generated waste (i.e. primary and secondary waste) into thermal processes, i.e. into energy recovery (R1) and incineration (D10)	The total input (sum of columns 1 and 3) should be equal to the input into RCV_E and DSP_I as reported under Annex II for each EWC-Stat categories and overall, if data for all EWC-Stat categories are entered.
2	of which: Input domestic secondary	Input of domestically produced secondary waste into thermal processes; calculated automatically as difference between the total in column 1 and the input of domestically produced primary waste in table 1, columns 5 and 6	
3	Input import total (primary and secondary)	Total input of imported waste (i.e. primary and secondary waste) into thermal processes; value is equal to table 2, columns 3 and 4	
4	of which: Input import secondary	Input of imported secondary waste into thermal processes	
Output flows			
5	W061 - NHAZ	Amounts of secondary waste remaining in waste treatment produced through energy recovery and incineration of priority waste streams, broken down by EWC-Stat category. Five columns (C12 to C16) to specify further waste categories can be chosen, for three of which (C14 to C16) the hazardousness can be chosen as well to allow for more flexibility. If the wording haz/non-haz is typed in exactly, the module will automatically allocate the amounts in the correct totals (either C18 or C18)	Data included in Annex II, but EWC-Stat of origin not known.
6	W062 - NHAZ		
7	W063 - NHAZ		
8	W124 - HAZ		
9	W124 - NHAZ		
10	W128_13 - HAZ		
11	W128_13 - NHAZ		
12	OTHER - HAZ		
13	OTHER - NHAZ		
14	OTHER -		
15	OTHER -		
16	OTHER -		

No. of column	Variable	Description	Relation to WStatR data or other module tables
17	Output remaining in waste treatment total - HAZ	Calculated as sum of C8, C10, C12 and C14 to C16, if declared as haz	
18	Output remaining in waste treatment total -NHAZ	Calculated as sum of C5 to C7, C9, C11, C13 and C14 to C16, if declared as non-haz	
19	Products	Non-waste outputs, e.g. waste that has reached end-of-waste status	Data are not covered by Annex II
20	Losses & emissions	Sum of material losses and emissions to water and air. Can be calculated as difference between total input (sum of column 1 and 3) and sum of secondary wastes (columns 5 to 29) and products (column 32), if no data are available	
21	Total output incl. products & losses	Input and output shall be balanced, i.e. the value shall be equal to the sum of columns 1 and 3.	Data are partly covered by Annex II

No. of column	Variable	Description	Relation to WStatR data or other module tables
Table 3C: Reporting of recycling (RCV_R)			
Inputs			
1	Input domestic total (primary and secondary)	Total input of domestically generated waste (i.e. primary and secondary waste) into recycling (R2 to R11)	The total input (sum of columns 1 and 3) should be equal to the input into RCV_R as reported under Annex II for each EWC-Stat categories and overall, it data for all EWC-Stat categories are entered.
2	of which: Input domestic secondary	Input of domestically produced secondary waste into recycling; calculated automatically as difference between the total in column 1 and the input of domestically produced primary waste in table 1, column 7	
3	Input import total (primary and secondary)	Total input of imported waste (i.e. primary and secondary waste) into recycling; value is equal to table 2, column 5	
4	of which: Input import secondary	Input of imported secondary waste into recycling	
Output flows			
5	W02A - HAZ	Amounts of secondary waste remaining in waste treatment produced during pre-treatment of the priority waste streams, broken down by EWC-Stat category. Five columns (C25 to C29) to specify further waste categories can be chosen, for three of which (C27 to C29) the hazardousness can be chosen as well to allow for more flexibility. If the wording haz/non-haz is typed in exactly, the module will automatically allocate the amounts in the correct totals (either C31 or C31)	Data included in Annex II, but EWC-Stat of origin not known.
6	W02A - NHAZ		
7	W032 - HAZ		
8	W032 - NHAZ		
9	W033 - HAZ		
10	W033 - NHAZ		
11	W061 - NHAZ		
12	W062 - NHAZ		
13	W063 - NHAZ		
14	W071 - NHAZ		
15	W072 - NHAZ		
16	W073 - NHAZ		
17	W074 - NHAZ		
18	W075 - HAZ		

No. of column	Variable	Description	Relation to WStatR data or other module tables
19	W075 - NHAZ	Amounts of secondary waste remaining in waste treatment produced during pre-treatment of the priority waste streams, broken down by EWC-Stat category.	Data included in Annex II, but EWC-Stat of origin not known.
20	W076 - NHAZ	Five columns (C25 to C29) to specify further waste categories can be chosen, for three of which (C27 to C29) the hazardousness can be chosen as well to allow for more flexibility. If the wording haz/non-haz is typed in exactly, the module will automatically allocate the amounts in the correct totals (either C31 or C31)	
21	W103 - HAZ		
22	W103 - NHAZ		
23	W128_13 - HAZ		
24	W128_13 - NHAZ		
25	OTHER - HAZ		
26	OTHER - NHAZ		
27	OTHER -		
28	OTHER -		
29	OTHER -		
30	Output remaining in waste treatment total - HAZ	Calculated as sum of C5, C7, C9, C18, C21, C25 and C27 to C29, if declared as haz	
31	Output remaining in waste treatment total - NHAZ	Calculated as sum of C6, C8, C10 to C17, C19 to C22, C24, C26 and C27 to C29, if declared as non-haz	
32	Products	Non-waste outputs, like waste that has reached end-of-waste status or wastes that are prepared for reuse	Data are not covered by Annex II
33	Losses & emissions	Sum of material losses and emissions to water and air. Can be calculated as difference between total input (sum of column 1 and 3) and sum of secondary wastes (columns 5 to 29) and products (column 32), if no data are available	
34	Total output incl. products & losses	Input and output shall be balanced, i.e. the value shall be equal to the sum of columns 1 and 3.	Data are partly covered by Annex II

Annex IV – Overview of legal changes

This Annex provides a brief overview of legal changes of either the Waste Statistics Regulation itself or of related EU legislation that had an impact on scope, data structure, underlying definitions, or relevant classifications of the WStatR. These changes may thus have caused breaks in the time series:

- The Directive 2006/12/EC on waste was repealed by Directive 2008/98/EC on waste. The changes affected, inter alia, the scope of the Waste Framework Directive and in consequence the scope of the Waste Statistics Regulation through the exclusion of some waste streams:
 - manure and other non-hazardous agricultural wastes when used in agriculture;
 - uncontaminated excavation waste when used at the site of generation;
 - by-products as defined in Article 5 of Directive 2008/98/EC.

Further changes through Directive 2008/98/EC include:

- the specification of the recovery and disposal operations;
- the introduction of the end-of-waste concept.
- Transition from classification of economic activities according to NACE Rev. 1.1 to NACE Rev. 2. As of reference year 2008, countries had to report according to NACE Rev. 2. The synopsis of the NACE aggregates used in waste statistics according to NACE Rev. 1.1 and Nace Rev. 2 is shown in Annex IV.
- Substantial revision of the Annexes I, II and III of the Waste Statistics Regulation through Commission Regulation (EU) No 849/2010. The revised Regulation entered into force in 2010, and was applied for data collection and compilation for the first time in 2012 for the reporting on reference year 2010. The main changes include:
 - Change from EWC-Stat 3 to EWC-Stat 4: A synopsis of the old and new waste categories and a summary of the main changes is provided in Annex V of this Manual.
 - Harmonisation of the breakdown by waste categories in Annex I (Generation of waste) and Annex II (Treatment of waste).
 - Change of NUTS level for the reporting of data on waste treatment and on the coverage of the collection scheme for mixed household and similar waste.
 - Introduction of backfilling as sixth treatment category
 - Reporting of sludges in wet weight only and no longer in dry and wet weight.

The structure of the data sets and the breakdowns before and after the revision are shown in Table 56 overleaf.

- Adoption of the Circular Economy package, resulting in the revision of Directive 2008/98/EC and of several other waste-related legal acts.
- Change from webform-based reporting to reporting via Excel questionnaires as of reference year 2018

TABLE 56

Data sets according to the Waste Statistics Regulation before and after revision in 2010

Structure of data sets until reference year <u>2008</u>				Structure of data sets as of reference year <u>2010</u>			
	Data set	Description and breakdown	Regional level		Data set	Description and breakdown	Regional level
1	Generation	Waste generation by: – 20 waste producing activities: 19 industries, households – 48 waste categories	National	1	Generation	Waste generation by: – 19 waste producing activities: 18 industries, households – 51 waste categories	National
2	Incineration	Incineration of waste by: – 2 treatment types: – 14 waste categories	NUTS 1	2	Treatment	Waste treatment by: – 6 treatment types – 51 waste categories	National
3	Recovery excl. energy recovery	Waste recovery by: – 1 treatment type – 17 waste categories	NUTS 1				
4	Disposal other than incineration	Waste disposal by: – 2 treatment types: – 16 waste categories	NUTS 1				
5	Treatment Infrastructure	No./capacity of recovery/disposal facilities by: – 5 treatment types	NUTS 2	3	Treatment Infrastructure	No./capacity of recovery/disposal facilities by: – 4 treatment types	NUTS 2
	Coverage of the collection scheme	Percentage of population / dwellings covered by a collection scheme for household and similar waste.	NUTS 2		Coverage of the collection scheme	Percentage of population covered by a collection scheme for household and similar waste.	National

Annex V – Synopsis NACE Rev. 1.1 – NACE Rev. 2

Item No	NACE Rev.1.1 divisions	Code Description (Rev.1.1)	Item No	NACE Rev.2 divisions	Code Description (Rev.2)
1	A	Agriculture, hunting and forestry	1	A01 A02 A03	Agriculture, hunting and forestry; Fishing and aquaculture
2	B	Fishing			
3	C	Mining and quarrying	2	B04 - B09	Mining and quarrying
4	DA	Manufacture of food products; beverage and tobacco	3	C10 C11 C12	Manufacture of food products + beverage + tobacco
5	DB + DC	Manufacture of textile and textile products; Manufacture of leather and leather products	4	C13 C14 C15	Manufacture of textiles + wearing apparel + leather and related products
6	DD	Manufacture of wood and wood products	5	C16	Manufacture of wood and wood products
7	DE	Manufacture of pulp, paper and paper products; publishing and printing	6	C17 C18	Manufacture of pulp, paper and paper products + printing and reproduction or recorded media
8	DF	Manufacture of coke, refined petroleum products and nuclear fuel	7	C19	Manufacture of coke, refined petroleum products
9	DG + DH	Manufacture of chemicals, rubber and plastic products	8	C20 C21 C22	Manufacture of chemicals, chemical products + basic pharmaceutical products and preparations + rubber and plastic products
10	DI	Manufacture of other non-metallic mineral products	9	C23	Manufacture of other non-metallic mineral products

Item No	NACE Rev.1.1 divisions	Code Description (Rev.1.1)	Item No	NACE Rev.2 divisions	Code Description (Rev.2)
11	DJ	Manufacture of basic metals and fabricated metal products	10	C24 C25	Manufacture of basic metals + fabricated metal products
12	DK+DL+DM	Manufacture of machinery and equipment n.e.c.; man. of electrical and optical equipment; man. of transport equipment	11	C26 C27 C28 C29 C30	Manufacture of computer, electronic and optical products + electrical equipment + machinery and equipment + motor vehicles, trailers and semi-trailers + other transport equipment
13	DN36	Manufacture of furniture; manufacturing n.e.c.	12	C31 C32 C33	Manufacture of furniture + other manufacturing + repair and installation of machinery and equipment
14	E	Electricity, gas and water supply	13	D34 D35	Electricity, gas, steam and air conditioning supply
19	O90	Sewage and refuse disposal, sanitation and similar activities	14	E36 E37 E39	Water collection, treatment and supply + Sewerage + Remediation activities and other waste management services
17	DN37	Recycling	15	E38	Waste collection, treatment and disposal activities; materials recovery
15	F	Construction	16	F41 F42 F43	Construction

Item No	NACE Rev.1.1 divisions	Code Description (Rev.1.1)	Item No	NACE Rev.2 divisions	Code Description (Rev.2)
16	G - Q excluded 90 and 51.57	Services activities: Wholesale and retail trade; Repair of motor vehicles, motorcycles and personal and household goods + Hotels and Restaurants + Transports, storage and communications + Financial intermediation + Real estate, renting and business activities + Public administration, defence and compulsory social security + Education + Health and Social work + Other community, social and personal activities + Activities of households + Extraterritorial organisations and bodies	17	Sections G - U Excluded G46.77	Service activities: Wholesale and retail trade; Repair of motor vehicles, motor cycles + Transportation and storage + Accommodation and food service activities + Information and communication + Financial and insurance activities + Real estate activities + Professional, scientific and technical activities + Administrative and support service activities + Public administration and defence; compulsory social security + Education + Human health and social work activities + Arts, entertainment and recreation + Other service activities + Activities of households as employers; undifferentiated goods – and services – producing activities of households for own use + Activities of extraterritorial organisations and bodies
18	G51.57	Wholesale of waste and scrap	18	G46.77	Wholesale of waste and scrap
20	HH	Waste generated by households	19	HH	Waste generated by households

Annex VI – Synopsis of Waste Categories between EWC-Stat 3 and EWC-Stat 4

The table below shows on the left side the EWC-Stat version 3 that was valid until reference year 2008 and on the right side the EWC-Stat version 4 that is valid since. Changes by EWC-Stat categories for the categories marked in red are described in more detail below the table

EWC-Stat / Version 3				EWC-Stat / Version 4			
Item No	Code	Description	Hazardous / Non-Hazardous waste	Item No	Code	Description	Hazardous / Non-Hazardous waste
1	01.1	Spent solvents	Hazardous	1	01.1	Spent solvents	Hazardous
2	01.2	Acid, alkaline or saline wastes	Non- Hazardous	2	01.2	Acid, alkaline or saline wastes	Non- Hazardous
3	01.2	Acid, alkaline or saline wastes	Hazardous	3	01.2	Acid, alkaline or saline wastes	Hazardous
4	01.3	Used oils	Hazardous	4	01.3	Used oils	Hazardous
5	01.4	Spent chemical catalysts	Non- Hazardous	5	<i>01.4, 02, 03.1</i>	<i>Chemical wastes</i>	<i>Non- Hazardous</i>
6	01.4	Spent chemical catalysts	Hazardous	6	<i>01.4, 02, 03.1</i>	<i>Chemical wastes</i>	<i>Hazardous</i>
7	02	Chemical preparation wastes	Non- Hazardous	7	03.2	Industrial effluent sludges	Non- Hazardous
8	02	Chemical preparation wastes	Hazardous	8	03.2	Industrial effluent sludges	Hazardous
9	03.1	Chemical deposits and residues	Non- Hazardous	9	<i>03.3</i>	<i>Sludges and liquid wastes from waste treatment</i>	<i>Non- Hazardous</i>

EWC-Stat / Version 3				EWC-Stat / Version 4			
Item No	Code	Description	Hazardous / Non-Hazardous waste	Item No	Code	Description	Hazardous / Non-Hazardous waste
10	03.1	Chemical deposits and residues	Hazardous	10	03.3	<i>Sludges and liquid wastes from waste treatment</i>	Hazardous
11	03.2	Industrial effluent sludges	Non- Hazardous	11	05	Health care and biological wastes	Non- Hazardous
12	03.2	Industrial effluent sludges	Hazardous	12	05	Health care and biological wastes	Hazardous
13	05	Health care and biological wastes	Non- Hazardous	13	06.1	<i>Metallic wastes, ferrous</i>	Non- Hazardous
14	05	Health care and biological wastes	Hazardous	14	06.2	<i>Metallic wastes, non-ferrous</i>	Non- Hazardous
15	06	Metallic wastes	Non- Hazardous	15	06.3	<i>Metallic wastes, mixed ferrous and non-ferrous</i>	Non- Hazardous
16	06	Metallic wastes	Hazardous	16	07.1	Glass wastes	Non- Hazardous
17	07.1	Glass wastes	Non- Hazardous	17	07.1	Glass wastes	Hazardous
18	07.1	Glass wastes	Hazardous	18	07.2	Paper and cardboard wastes	Non- Hazardous
19	07.2	Paper and cardboard wastes	Non- Hazardous	19	07.3	Rubber wastes	Non- Hazardous
20	07.3	Rubber wastes	Non- Hazardous	20	07.4	Plastic wastes	Non- Hazardous
21	07.4	Plastic wastes	Non- Hazardous	21	07.5	Wood wastes	Non- Hazardous
22	07.5	Wood wastes	Non- Hazardous	22	07.5	Wood wastes	Hazardous
23	07.5	Wood wastes	Hazardous	23	07.6	Textile wastes	Non- Hazardous
24	07.6	Textile wastes	Non- Hazardous	24	07.7	Wastes containing PCB	Hazardous

EWC-Stat / Version 3				EWC-Stat / Version 4			
Item No	Code	Description	Hazardous / Non-Hazardous waste	Item No	Code	Description	Hazardous / Non-Hazardous waste
25	07.7	Wastes containing PCB	Hazardous	25	08 (excl. 08.1, 08.41)	Discarded equipment	Non- Hazardous
26	08	Discarded equipment	Non- Hazardous	26	08 (excl. 08.1, 08.41)	Discarded equipment	Hazardous
27	08	Discarded equipment	Hazardous	27	08.1	Discarded vehicles	Non- Hazardous
28	08.1	Discarded vehicles	Non- Hazardous	28	08.1	Discarded vehicles	Hazardous
29	08.1	Discarded vehicles	Hazardous	29	08.41	Batteries and accumulators wastes	Non- Hazardous
30	08.41	Batteries and accumulators wastes	Non- Hazardous	30	08.41	Batteries and accumulators wastes	Hazardous
31	08.41	Batteries and accumulators wastes	Hazardous	31	09.1	<i>Animal and mixed food waste</i>	Non- Hazardous
32	09 (excl. 09.11, 09.3)	Animal and vegetal wastes (excluding animal waste of food preparation and products; and excluding animal faeces, urine and manure)	Non- Hazardous	32	09.2	<i>Vegetal wastes</i>	Non- Hazardous
33	09.11	Animal waste of food preparation and products	Non- Hazardous	33	09.3	Animal faeces, urine and manure	Non- Hazardous
34	09.3	Animal faeces, urine and manure	Non- Hazardous	34	10.1	Household and similar wastes	Non- Hazardous
35	10.1	Household and similar wastes	Non- Hazardous	35	10.2	Mixed and undifferentiated materials	Non- Hazardous

EWC-Stat / Version 3				EWC-Stat / Version 4			
Item No	Code	Description	Hazardous / Non-Hazardous waste	Item No	Code	Description	Hazardous / Non-Hazardous waste
36	10.2	Mixed and undifferentiated materials	Non- Hazardous	36	10.2	Mixed and undifferentiated materials	Hazardous
37	10.2	Mixed and undifferentiated materials	Hazardous	37	10.3	Sorting residues	Non- Hazardous
38	10.3	Sorting residues	Non- Hazardous	38	10.3	Sorting residues	Hazardous
39	10.3	Sorting residues	Hazardous	39	11	Common sludges	Non- Hazardous
40	11	Common sludges (excluding dredging spoils)	Non- Hazardous	40	12.1	<i>Mineral waste from construction and demolition</i>	Non- Hazardous
41	11.3	Dredging spoils	Non- Hazardous	41	12.1	<i>Mineral waste from construction and demolition</i>	Hazardous
42	12.1 + 12.2 + 12.3 + 12.5	Mineral wastes (excluding combustion wastes, contaminated soils and polluted dredging spoils)	Non- Hazardous	42	12.2, 12.3, 12.5	<i>Other mineral wastes (excl. C&D waste, combustion wastes, soils, dredging spoils, waste from waste treatment)</i>	Non- Hazardous
43	12.1 + 12.2 + 12.3 + 12.5	Mineral wastes (excluding combustion wastes, contaminated soils and polluted dredging spoils)	Hazardous	43	12.2, 12.3, 12.5	<i>Other mineral wastes (excl. C&D waste, combustion wastes, soils, dredging spoils, waste from waste treatment)</i>	Hazardous
44	12.4	Combustion wastes	Non- Hazardous	44	12.4	Combustion wastes	Non- Hazardous
45	12.4	Combustion wastes	Hazardous	45	12.4	Combustion wastes	Hazardous
46	12.6	Contaminated soils and polluted dredging spoils	Hazardous	46	12.6	<i>Soils</i>	Non- Hazardous
47	13	Solidified, stabilised or vitrified wastes	Non- Hazardous	47	12.6	<i>Soils</i>	Hazardous

EWC-Stat / Version 3				EWC-Stat / Version 4			
Item No	Code	Description	Hazardous / Non-Hazardous waste	Item No	Code	Description	Hazardous / Non-Hazardous waste
48	13	Solidified, stabilised or vitrified wastes	Hazardous	48	12.7	<i>Dredging spoils</i>	Non- Hazardous
				49	12.7	<i>Dredging spoils</i>	Hazardous
				50	12.8, 13	<i>Mineral waste from waste treatment and stabilised wastes</i>	Non- Hazardous
				51	12.8, 13	<i>Mineral waste from waste treatment and stabilised wastes</i>	Hazardous

Changes by EWC-Stat category

Chemical wastes (01.4, 02, 03.1)

Until reference year 2008 chemical waste were split into the three categories:

- Spent chemical catalysts (01.4)
- Chemical preparation wastes (02)
- Chemical deposits and residues (03.1)

Sludges and liquid wastes from waste treatment (03.3): items 9/10

New category to be reported as of 2010; wastes were formerly included in the categories

- Industrial effluent sludges (03.2)
- Common sludges (11)
- Chemical preparation wastes (02)

Metallic wastes, ferrous (06.1): item 13., Metallic wastes, non-ferrous (06.2): item 14, Metallic wastes, mixed ferrous and non-ferrous (06.3): item 15

Until reference year 2010 all metal wastes (ferrous, non-ferrous and mixed) were reported under one category (EWC-Stat 06)

Paper and cardboard wastes (07.2): item 18

Two codes on production waste and unspecified wastes were removed from this category; as a consequence, quantities might be lower as of 2010.

Animal and mixed food wastes (09.1): item 31., Vegetal wastes (09.2): item 32

Categories 09.1 and 09.2 were restructured. The sum of both categories should be comparable to the sum of the previous categories 09 (excl. 09.11 and 09.3) and 09.11.

Mixed and undifferentiated materials (10.2): items 35/36

As of 2010 the category summarises all unspecified LoW-codes (99-codes); the amount of category 10.2, non-hazardous, should be higher than before.

Common sludges (11): item 39

Some sludges were reallocated to category 03.3; as of 2010 quantities should be lower than before.

Mineral waste from construction and demolition (12.1): item 40/41

New category to be reported as of 2010; wastes were formerly included in the category “Mineral Waste” consisting of EWC-Stat 12.1, 12.2, 12.3 + 12.5

Other mineral wastes (12.2, 12.3, 12.5): items 42/43

New category to be reported as of 2010; wastes were formerly included in category “Mineral Waste” consisting of EWC-Stat 12.1, 12.2, 12.3 + 12.5

Combustion wastes (12.4): items 44/45

Wastes from waste incineration were removed from 12.4 and are reported in a separate category (12.8, 13); as of 2010, the amount of category 12.4 should be lower than before

Soils (12.6): items 46/47

New category to be reported as of 2010:

Non-hazardous soils were formerly reported under category “Mineral Waste” consisting of EWC-Stat 12.1, 12.2, 12.3 + 12.5

Hazardous soils were reported together with dredging spoils in category 12.6 “Contaminated soils and polluted dredging spoils”

Dredging spoils (12.7): items 48/49

Hazardous dredging spoils are reported separately as of 2010; they were reported together with hazardous soils in category 12.6 “Contaminated soils and polluted dredging spoils”

For non-hazardous dredging spoils only the EWC-Stat code has changed (formerly 11.3).

Solidified, stabilised or vitrified wastes

New category to be reported as of 2010; wastes were formerly reported under category “Mineral Waste” consisting of EWC-Stat 12.1, 12.2, 12.3 + 12.5 or under EWC-Stat 13

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