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## Validation of Waste Statistics - the way forward

Details of the validation approach and planned follow-up

Meeting of the  
Working Group "Waste Statistics"  
8 and 9 April 2014  
**BECH Building – Room Quetelet**

# Validation of Waste Statistics - the way forward

From reference year 2012, the countries reporting on Waste Statistics according to Regulation (EC) No 2150/2002 (WStatR) are asked to conduct a proposed set of standardised common validation rules to their data and submit the findings of this validation, e.g. in the quality report along with their data; the rules to be applied were presented and discussed at the workshop on validation held in September 2013. This document summarises the results of the workshop, describes the proposed validation rules and provides an overview of related developments at Eurostat.

*Countries are invited to comment on the results presented in this paper.*

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## Introduction

The next reporting round of the data pursuant to Regulation (EC) No 2150/2002 on Waste Statistics (WStatR) will be conducted in the course of 2014. By 30<sup>th</sup> of June 2014, Member States are required to submit their data for reference year 2012 and the associated Quality Reports. In September 2013, a workshop on validation was held at Eurostat aiming at the presentation of a proposed set of standardised validation rules to be applied by the countries prior to data delivery, in order to harmonise and streamline the validation activities of Eurostat and those within the Member States.

The document is structured as follows:

- Summary of the validation workshop (minutes)
- Results of the survey on the validation rules applied in Member States
- Explicit list of proposed common validation rules:
  - Overview of all relevant parameters
  - Description of the rules and proposed thresholds

In the following, the topics mentioned above are presented in detail.

## Summary of the validation workshop (minutes)

Workshop on the Validation of Waste Statistics, 26-27 September 2013

Hartmut Schroer from the waste statistics team at Eurostat opened the meeting and explained the overall objectives of the workshop:

- sharing information about the activities at Eurostat in the context of the ESS.VIP project on validation,
- exchange of knowledge about the validation routines carried out by countries and by Eurostat,
- identification of possible overlaps,
- starting a discussion on a possible shared responsibility regarding defined validation routines.
- reach a better understanding of our validation, its potential and limitations and get better idea about how to make progress.

He reminded the participants of the Excel file ("Validation rules and questionnaire table") that was sent out to the participants before the meeting with the request to fill in the checklist. The aim of this questionnaire is to reach a better understanding of the validation work done in the countries.

Angel Simon (AS) from Eurostat explained the objectives, scope and expected output of the ESS.VIP project on validation. The project pays special attention to communication and integration: between production units by the development of a common syntax and corresponding tools to express validation rules to be used in the statistical domains; across the ESS to share validation rules in this common validation syntax, distributing validation responsibilities, ensuring the coherence between data files and the integrity of the data produced. This presentation as well as other presentations held at the workshop can be viewed here:

<https://circabc.europa.eu/w/browse/da30965e-47ce-4862-8f55-f008a1e4ad97>

A leaflet summarising the approach and objectives can be downloaded here:

<http://bookshop.europa.eu/en/towards-a-common-validation-policy-pbKS0313405/>

### *Discussion*

The participants appreciated the efforts to describe validation rules in a standardised way and to formalise co-operation with the Member States; however, general validation rules cannot take into account all specific characteristics in a country. Sufficient flexibility should remain in the approach suggested by ESS.VIP project to adjust to the individual statistical domains, more specific validation will take country and domain particularities into account.

After the presentation by Volker Kuechen on Eurostat's validation routines and the discussions on the validation carried out by Eurostat and by MS, the following aspects were emphasised:

#### *Validation carried out in the country*

- Focus on time series checks, generation vs. treatment, outliers by economic activity. Micro-data checks are done if observations at aggregated level require verification/explanation.
- Limited possibilities of cross-checking with reporting obligations and cross country comparison.
- More time needed for validation: "Flexibility" regarding the deadline of 30 June for the data transmission is not an option because of legal requirement.

#### *Cross-validation with other reporting obligations*

- This is considered to be difficult because:

- non-NSIs (ministries, agencies ...) responsible for other reporting obligations use different methods,
- there are sometimes administrative obstacles to co-operation with other bodies in the country,
- timeliness is a problem. Data on reporting obligations may be produced at the same time or even later,
- on the other hand, the reporting structures and details are rather stable and do not necessarily change from one year to the other. Therefore, the cross check with other reporting obligations could be done once to clarify with the respective competent authorities the reporting details and to align the approaches as far as possible.

#### *Validation of generation and treatment data in general*

- Structural differences between generation and treatment data limit the possibility of comparison, there is no “balance sheet” in waste statistics:
  - double counts in generation,
  - dismantling before treatment (e.g. discarded vehicles, equipment, etc.),
  - pre-treatment (hazardous waste, sludges),
  - import, export, storage,
  - weight losses,
  - therefore, the plausibility check comparing waste generation and waste treatment remains a rather general check.

#### *Common standard validation rules*

- The scope of the validation considered in the context of the workshop was unclear. Do we discuss the whole production process or the final data matrix that countries send to Eurostat?
  - In principle, validation concerns the whole data collection process; data validation should be done as early as possible. However, this process varies from country to country.
  - Eurostat clarified that it concerns the final data tables (GENER, TREATM, REGIO) when discussing common validation rules.
- Thresholds for outlier detection should be country specific, depending on the size of the economy, economic sector.
- Eurostat presented proposals of common validation rules in a word file and asked the countries for their opinion: As a general result, most of the countries could agree to the validation checks which were listed in the proposal document as **directly applicable**, while the checks listed as **applicable with limitations** were rather regarded as an exercise to be done by Eurostat. The following checks were listed as **directly applicable**:
  - comparison over time
    - generation by NACE
    - hazardous share by NACE
    - treatment by operation [WST\_OPER])
    - generation & treatment by waste categories
    - relation treatment / generation by waste categories
  - relation generation / treatment (totals)
  - implausible combinations treatment operation / waste categories
  - treated amounts vs. treatment capacities (incineration)

### *Validation carried out by Eurostat*

- Countries find the data validation done by Eurostat helpful, it shows that the data is analysed.
- The queries asked by Eurostat are demanding and preparing the answer is sometimes time consuming as every now and then another institution has to be contacted.
- There should be clear guidance in the clarification request on what is expected from a country.
- Knowing the validation rules in advance would be appreciated by countries.
- A direct contact to the person(s) carrying out the validation was mentioned as being helpful.
- Countries find the cross-checking with data based on other reporting obligations rather difficult; however, the request of getting in contact with other institutions can be a positive exercise.
- Countries asked for a data release calendar communicating data update intervals throughout the year. It should be made clear when the validation process is finalised.
- A section could be entered in the Quality report where countries could explain the validation checks they carry out.

Finally, Eurostat presented EDIT, a Web-based Data Editing tool, allowing users to import data, run validation programs and export results. This tool would need to be adapted to the particularities of waste statistics if it should eventually be used in this domain. So far, this presentation intended to inform participants about the on-going work with regard to practical tools supporting a standard data validation approach. It was made clear that with such a tool not all validation routines can be carried out, an in-depth validation would still be necessary. Furthermore, the collaboration on validation is voluntary and the use of EDIT optional.

### On the way forward

- All collaboration on validation is voluntary and the use of EDIT is optional.
- Results from the workshop will be discussed at the WG meeting in April, possibly including suggestions on how to continue this work.
- The ESS-VIP project produces interesting material for formalised validation rules, documentation /reporting of validation results, countries will be informed about progress made in this project.
- An ESTP course on waste statistics focusing on validation is planned for September 2014.

**Results of the survey on the validation rules applied in the countries**

This chapter gives a short summary of the validation rules applied in the countries based on the replies to the survey conducted prior to the workshop on the Validation of Waste Statistics, 26-27 September 2013.

Figure 1 shows the number of countries which stated that a validation rule is applied. The figure shows the replies of 15 countries. The validation rules were summarised for better readability and in order to facilitate the comparison to the list of validation rules proposed for application in the countries. The rules that were in this list and which belong to the generally accepted group of validation checks directly applicable are marked by an “\*”.

For your reference, a detailed summary of the survey results is shown in Table 3 (Annex).

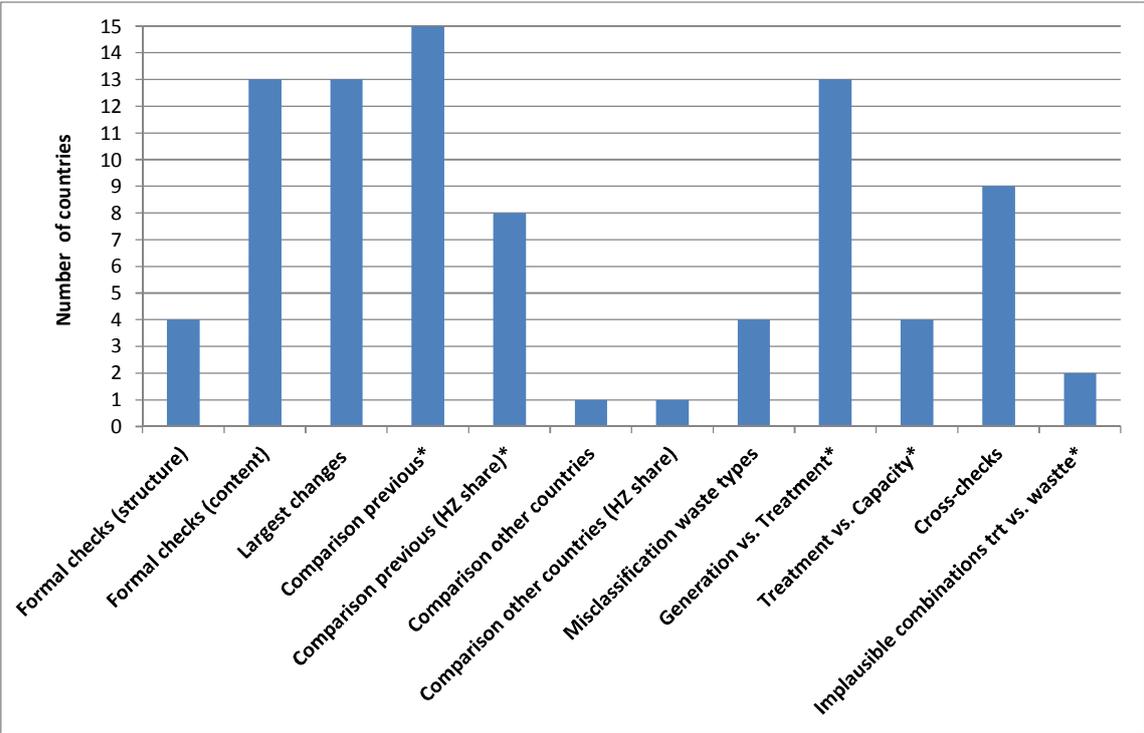


Figure 1: Number of countries applying the validation rules (\*proposed rules) (N=15)

It can be seen that four types of validations are done by 13 or more countries, two of which belong to the list of proposed rules for application in the countries, namely the comparison with previous values (done by all countries) and that of generation vs. treatment (13 countries). The largest differences and formal checks, such as the internal coherence of the dataset, are not part of the rules proposed at the workshop, but also already done by 13 of the countries which replied to the survey.

The (proposed) comparison with the previous hazardous share by NACE is done already by 8 countries; the treated amounts are related to capacities by only 4 countries, while only one country compares its values to those of other countries.

Most astonishing is the finding that the cross-checks, which were seen as particularly difficult by many countries at the workshop, are applied by 9 countries, i.e. by more countries than some of the proposed rules. It should, however, be taken into account that the above counts are based on a summary of the rules, i.e. if one of the rules of a certain type was stated as being applied by the country, it was counted in Figure 1.

## Explicit list of proposed common validation rules

This chapter contains a description of the validation rules proposed by Eurostat for application by the countries prior to data delivery. The description shall enable the countries which did not participate in the workshop to get sufficient understanding of the rationale of the rules in order to make a judgement on the question whether the application of these rules, if not done already, would be acceptable to them.

The following validation rules were generally agreed to be applied by the participants of the workshop on validation:

1. comparison over time
  - a) (total /hazardous) waste generation by NACE
  - b) hazardous share by NACE
  - c) treatment by operation [WST\_OPER]
  - d) generation & treatment by waste categories
  - e) relation treatment / generation by waste categories
  - f) generation & treatment: largest differences for inner cells
2. relation generation / treatment (totals)
3. implausible combinations treatment operation / waste categories
4. treated amounts vs. treatment capacities (incineration)

Method 1 f) (generation & treatment: largest differences for inner cells) was not explicitly discussed at the workshop, but was added to the list for the reason, that this validation is already done by 13 of the 15 countries which replied to the survey (see Figure 1).

In the following, the above mentioned validation rules are described in more detail.

### *Overview of all relevant parameters*

Table 1 shows the validation rules proposed for application by the countries. The table contains a reference number to the list above in the first column, which is also used throughout the remainder of the document. Further columns of the table describe:

- the dataset involved,
- the basis of the validation rule,
- the data level expressed by the codes used for cell identification,
- the formats used and their units, and
- the thresholds applied, as taken from the in-depth analysis conducted by Eurostat.

It can be seen that a total number of 10 validation rules are proposed, seven of which refer to a comparison of the data to be reported with those of previous reporting rounds. On account of the varying data level, dataset and indicators to be used for some rules, the table contains more than one row to describe these rules.

Table 1: Validation rules proposed for application in the countries.

Rule No.	Dataset	Validation name	Validation rule based on	Data level				Formats used	Unit	Threshold	
				HAZARD	WASTE	NACE	WST_OPER			Low	High
1 a)	GENER	Comparison to previous value	previous value	TOTAL	TOTAL	all	n.a.	indicator employees	kg/employee	0,5	2
	GENER	Comparison to previous value	previous value	TOTAL	TOTAL	all	n.a.	indicator population	kg/capita	0,5	2
	GENER	Comparison to previous value	previous value	HAZ	TOTAL	all	n.a.	indicator employees	kg/employee	0,5	2
	GENER	Comparison to previous value	previous value	HAZ	TOTAL	all	n.a.	indicator population	kg/capita	0,5	2
1 b)	GENER	Comparison to previous value	previous value	HAZ	TOTAL	all	n.a.	haz share from total	n.a.	0,5	2
1 c)	TREATM	Comparison to previous value	trt share from trt-previous	TOTAL	TOTAL	n.a.	all	ratio	n.a.	0,8	1,2
1 d)	GENER	Time series by waste types	previous values	all	all + SDI*			indicator population	kg/capita	0,5	2
	TREATM	Time series by waste types	previous values	all	all + Ind**			indicator population	kg/capita	0,5	2
1 e)	GENER TREATM	Comparison to previous value	previous values	HAZ	all	TOTAL	TRT	trt share from gen	n.a.	0,5	2
	GENER TREATM	Comparison to previous value	previous values	NHAZ	all	TOTAL	TRT	trt share from gen	n.a.	0,5	2
1 f)	GENER TREATM	Largest changes to previous	previous value	all***	all***	all***	all***	original	tonnes	var	var
2	GENER TREATM	Comparison generation to treatment	trt share from gen	NHAZ	TOTAL	TOTAL	TRT	ratio	n.a.	0,8	1,15
	GENER TREATM	Comparison generation to treatment	trt share from gen	HAZ	TOTAL	TOTAL	TRT	ratio	n.a.	0,8	1,15
	GENER TREATM	Comparison generation to treatment WSR	trt share from gen+Imp-Exp	HAZ	TOTAL	TOTAL	TRT	ratio	n.a.	0,8	1,15
3	TREATM	Implausible combinations treatment op. / waste cat.	logic control	all	all	n.a.	all	n.a.	n.a.	****	
4	TREATM REGIO	Comparison to treatment capacity	trt share from trt-cap	TOTAL	TOTAL	n.a.	RCV_E, INC	ratio	n.a.		1

Notes:

n.a. = not applicable

var = variable threshold depending on the data situation

\* = Sustainable development indicator (SDI) for waste excluding major mineral wastes

\*\* = Indicators (Ind) for recycling and landfill

\*\*\* = except TOTAL

\*\*\*\* = exclusion table approved by countries

## Description of the rules and proposed thresholds

In this chapter, the proposed validation rules shown in Table 1 are briefly described regarding their rationale and application. For each rule, a short description is available covering the main assumption, the data level checked, the required calculations and the thresholds to be used to filter possibly wrong values.

### 1. Comparison over time

All validation rules for the comparison over time are intra-country comparisons with datasets of the previous reporting. Whenever a particularity is 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.

#### 1 a) and b) (total /hazardous) waste generation by NACE & hazardous share by NACE

The first comparison with values from previous year covers the values for each economic activity. It aims at identifying considerable changes of the amounts of hazardous waste and total waste (on the basis of indicators based on employees and population), or large changes of the shares of hazardous waste from the totals.

##### Short description:

- **Assumption:** Total & hazardous waste generation per NACE sector is stable over time.
- **Data level:** Analysis carried out for 19 NACE sectors and households
- **Calculations:**
  - Step 1: Calculation of indicator variables for current and previous year:

a)

$$\frac{\text{Total (hazardous) Waste (ton) reported in NACE xx}}{\text{NACE xx (production) proxy}^1}$$

<sup>1</sup> number of persons employed or population

and

b)

$$\frac{\text{Total Hazardous waste (ton) reported in NACE xx}}{\text{Total waste (HAZ+NHAZ) (ton) reported in NACE xx}}$$

- Step 2: Calculation of ratios of the indicators calculated in step 1.

$$\frac{\text{Current indicator NACE xx}}{\text{Previous indicator NACE xx}}$$

- **Thresholds:**
  - lower threshold: ratio current/previous < 0.5
  - upper threshold: ratio current/previous > 2.0

#### 1 c) Treatment by operation [WST\_OPER]

The second comparison with values from previous year covers the treated total and each of the 6 treatment categories. The comparison is based on the ratio of the amount treated of the current year and that of the previous year in tons, respectively. No distinction between hazardous and non-hazardous waste is made. It aims at identifying large changes in the treated amounts for all treatment categories and/or the total amounts treated.

Short description:

- **Assumption:** Total & hazardous waste by treatment operation is stable over time.
- **Data level:** Analysis carried out for 6 treatment operations (WST\_OPER) and total treatment.
- **Calculations:**
  - Calculation of the ratio of the amounts treated of the current year and those of the previous year:

$$\frac{\text{Total waste (HAZ + NHAZ) (ton) treated by WST\_OPER xx, current year}}{\text{Total waste (HAZ + NHAZ) (ton) treated by WST\_OPER xx, previous year}}$$

- **Thresholds:**
  - lower threshold: ratio current/previous < 0.8
  - upper threshold: ratio current/previous > 1.2

### 1 d) Generation & treatment by waste categories

The comparison with previous values is made for the total amount generated and treated by all 51 waste categories. As the 51 waste categories are either hazardous or non-hazardous, this validation rule disregards the totals of the waste categories.

In addition, the comparison should be made on the basis of the existing sustainable development indicators (SDI) 'waste excluding major mineral wastes'<sup>1</sup> and 'hazardous waste generated' and the corresponding indicators for landfilling and for recovery, aiming at understanding and interpretation of these indicators.

Short description:

- **Assumption:** Waste **generation** and **treatment** by waste categories is stable over time.
- **Data level:** Comparison carried out for each waste item (51 items) and two SDI
- **Calculations:**
  - Generation: Calculation of the ratio of the amounts generated for all waste item and the two SDI of the current year and the corresponding values of the previous year:

$$\frac{\text{Total waste (TOTAL) (ton) generated by WASTE xx, current year}}{\text{Total waste (TOTAL) (ton) generated by WASTE xx, previous year}}$$

- Treatment: Calculation of the ratio of the amounts treated for all waste item and the two SDI of the current year and the corresponding values of the previous year:

$$\frac{\text{Total waste (TRT}^1\text{) (ton) treated by WASTE xx, current year}}{\text{Total waste (TRT}^1\text{) (ton) treated by WASTE xx, previous year}}$$

<sup>1</sup> and for RCV\_O and DSP\_D for waste excl. major min. wastes

- **Thresholds:**
  - lower threshold: ratio current/previous < 0.5
  - upper threshold: ratio current/previous > 2.0

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<sup>1</sup> Definition of 'waste excluding major mineral wastes': The indicator covers hazardous (haz) and non-hazardous (nhaz) waste from all economic sectors and from households, including waste from waste treatment (secondary waste) but excluding mineral waste, i.e. the total waste generated except the following waste categories: a) Mineral waste from construction and demolition (EWC-Stat 12.1); b) Other mineral wastes (EWC-Stat 12.2, 12.3, 12.5); c) (EWC-Stat 12.6); d) (EWC-Stat 12.7); Although completely or partly mineral, the indicator explicitly includes combustion wastes (EWC-Stat 12.4) and mineral wastes from waste treatment and stabilised wastes (EWC-Stat 12.8 to 13).

### 1 e) Relation treatment / generation by waste categories

The comparison between waste generation and treatment is made for all 51 waste categories<sup>2</sup>, in fact, for each waste category, the ratio of total treatment and waste generation is calculated for the current and the previous year and compared.

#### Short description:

- **Assumption:** Relation treatment / generation relatively stable over time and waste category
- **Data level:** Comparison carried out for each waste item (51 items)
- **Calculations:**
  - Step 1: Calculation of the indicator of the amount treated divided by the amount generated for each waste category for current and previous year::

$$\frac{\text{Total waste (TRT) (ton) treated by WASTE xx}}{\text{Total waste (TOTAL) (ton) generated by WASTE xx}}$$

- Step 2: Calculation of ratios of the indicators calculated in step 1.

$$\frac{\text{Current indicator WASTE xx}}{\text{Previous indicator WASTE xx}}$$

- **Thresholds:**
  - lower threshold: ratio current/previous < 0.5
  - upper threshold: ratio current/previous > 2.0

### 1 f) Generation & treatment: largest differences for inner cells

In order to track the largest changes in the current dataset compared with the previous reference year, this validation rule aims at calculating the differences of all inner cell values (except totals) of the datasets on waste generation and waste treatment and the listing of the largest differences in tons. It supplements the ratio-based validation rules above in order to catch large absolute changes which were not recognised due to the lower changes of the ratio.

#### Short description:

- **Assumption:** All cell values relatively stable over time and waste category
- **Data level:** Comparison carried out for all cells of datasets GENER and TREATM except ALL totals
- **Calculations:**
  - Generation: Calculation of the difference of the amounts generated for all waste items and NACE sectors of the current year and the values of the previous year:

$$\text{Waste (ton) generated by WASTE xx and NACE yy, current year} - \text{Waste (ton) generated by WASTE xx and NACE yy, previous year}$$

- Treatment: Calculation of the difference of the amounts treated for all waste items and treatment operations (WST\_OPER) of the current year and the values of the previous year:

$$\text{Waste (ton) treated by WASTE xx and WST_OPER yy, current yr.} - \text{Waste (ton) treated by WASTE xx and WST_OPER yy, previous yr.}$$

- **Thresholds:** None: It is proposed to make a list with the 20-30 largest absolute differences.

<sup>2</sup> The revision of the WStatR harmonised the breakdown by waste categories for Annex I (generation) and Annex II (treatment).

## 2. Relation generation / treatment (totals)

The comparison between waste generation and treatment totals is made for hazardous and non-hazardous waste for the current reference year. The ratio of total treatment and waste generation is calculated for the totals of hazardous waste and non-hazardous waste over all sectors (generation) and treatment operations (treatment), respectively.

### Short description:

- **Assumption:** Treated total similar to generated total
- **Data level:** Comparison carried out for total hazardous waste and total non-hazardous waste
- **Calculations:**
  - Calculation of the ratio of the total amount treated divided by the total amount generated for hazardous and non-hazardous waste:

$\frac{\text{Total waste (TRT) (ton) treated by HAZARD xx, current year}}{\text{Total waste (TOTAL) (ton) generated by HAZARD xx, current year}}$
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- Optional: Correction for imports and exports of hazardous waste.

$$\frac{\text{treatment (Annex II WStatR)}}{(\text{gen (Annex I WStatR)} + \text{Im} - \text{Exp})}$$

- **Thresholds:**
  - lower threshold: ratio generation/treatment < 0.8
  - upper threshold: ratio generation/treatment > 1.15

## 3. Implausible combinations

Implausible or at least questionable combinations of waste categories and treatment operations for amounts larger 1000 tons should be identified using this validation rule. Examples of such combination include incineration of non-hazardous soils or backfilling of hazardous equipment. The combinations proposed in Table 2 should be detected and explained as they might reveal:

- Possible misclassification of treatment categories;
- Differences in the methodology of data collection for waste treatment

### Short description:

- **Assumption:** Check the plausibility of treatment by waste types based on combinations of waste category and treatment operations which do not appear plausible.
- **Data level:** Certain combinations of all waste item (51 items) and of all 6 treatment operations.
- **Calculations:** None.
- **Thresholds:** None. The validation will generate a list with all occurrences as defined in the black shaded cells in Table 2. The table is a first approach and should be revised and approved by the countries based on their experience.

Table 2: Detailed results of the replies on survey on the validation rules applied in the countries

Item	treatment item number		1	2	3a	3b	4	5
	Waste (EWC-Stat Ver. 4)	hazardous	Energy recovery (R1)	Waste Incineration (D10)	Recycling (R2-R11)	Backfilling	Landfilling (D1, D5, D12)	Other disposal (D2, D3, D4, D6, D7)
1	01.1 - Spent solvents	H						
3	01.2 - Acid, alkaline or saline waste	H						
4	01.3 - Used oils	H						
6	01.4, 02, 03.1 - Chemical wastes	H						
8	03.2 - Industrial effluent sludges	H						
10	03.3 - Sludges and liquid wastes from waste treatment	H						
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							
24	07.7 - Waste containing PCB	H						
25	08 (excl. 8.1, 8.41) - Discarded equipment (excluding discarded vehicles, batteries and accumulators wastes)							
26	08 (excl. 8.1, 8.41) - Discarded equipment (excluding discarded vehicles, batteries and accumulators wastes)	H						
27	08.1 - Discarded vehicles							
28	08.1 - Discarded vehicles	H						
40	12.1 - Mineral waste from construction and demolition							
42	12.2, 12.3, 12.5 - Other mineral waste							
44	12.4 - Combustion wastes							
46	12.6 - Soils							
48	12.7 - Dredging spoils							
50	12.8, 13 - Mineral wastes from waste treatment and stabilised wastes							

#### 4. Treated amounts vs. treatment capacities

The quality and comparability of data on waste treatment that of waste treatment infrastructure shall be assessed by the comparison of the quantity of waste treated with reported capacities of treatment facilities for the operations energy recovery and incineration.

Short description:

- **Assumption:** : Total amount treated equal or lower than available capacity
- **Data level:** Test applied to total amount (NHAZ & HAZ) treated by:
  - Incineration with energy recovery (R1)
  - Incineration without energy recovery (D10)
- **Calculations:**
  - Calculation of the ratio of the total amount treated by energy recovery and incineration divided by the capacities of the respective treatment operations:

$\frac{\text{Total waste (TOTAL) (ton) treated by WST\_OPER } xx^1, \text{ current year}}{\text{Total capacity (TOTAL) (ton) by WST\_OPER } xx^1, \text{ current year}}$
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<sup>1</sup> only for RCV\_E and INC

- **Thresholds:**
  - lower threshold: None
  - upper threshold: ratio treatment/capacity > 1.0

# Annex

Table 3: Detailed results of the replies on the survey on the validation rules applied in the countries

Type	Dataset	Validation name	Validation rule based on	Data level				Formats used	CZ	DK	EE	IE	EL	ES	FR	HR	LU	NL	AT	PL	SI	FI	TR	No. of Countries	Share of No. of replies
				HAZARD	WASTE	NACE	WST_OPER																		
Formal checks (structure)	GENER TREATM REGIO	File name	compliance with file naming convention		n.a.	n.a.	n.a.						x			x							2	13%	
	GENER TREATM REGIO	File structure	correct variables	n.a.	n.a.	n.a.	n.a.					x											1	7%	
	GENER TREATM REGIO	Dictionary compliance	correct items in classification	all	all	all	all						x			x							2	13%	
	GENER TREATM REGIO	Value format	correct values for data variables	n.a.	n.a.	n.a.	n.a.						x			x							2	13%	
	GENER TREATM REGIO	Flag compliance	appropriate metadata flags	n.a.	n.a.	n.a.	n.a.							x	x							x	3	20%	
Formal checks (content)	GENER TREATM REGIO	Flag counts	number of records with flags C, P, E and M	all	all	all	all											x	x				4	27%	
	GENER TREATM REGIO	Completeness	missing records	all	all	all	all			x	x	x	x	x	x	x	x	x	x	x	x	x	12	80%	
	GENER TREATM REGIO	Check of aggregates	sums by NACE, treatment operation etc.	all	all	all	all			x	x	x	x	x	x	x	x	x	x	x	x	x	12	80%	
	GENER TREATM REGIO	Waste and hazardousness	invalid combinations waste vs. hazardous	all	all	all	all			x	x	x	x	x					x	x	x	x	10	67%	
	GENER TREATM REGIO	Existing values with M flags ("missing")	invalid combinations flags vs. values	all	all	all	all							x	x	x					x	x	6	40%	
Largest changes	GENER TREATM	Largest changes to previous value	previous value	all	all	all	all	original	x	x	x	x	x	x	x	x	x	x	x	x	x	x	13	87%	
Comparison to previous value	GENER	Comparison to previous value	previous value	TOTAL	TOTAL	all	n.a.	per employee	x				x	x									3	20%	
	GENER	Comparison to previous value	previous value	TOTAL	TOTAL	all	n.a.	per value added	x									x				x	4	27%	
	GENER	Comparison to previous value	previous value	TOTAL	TOTAL	all	n.a.	per capita	x					x				x					4	27%	
	GENER	Comparison to previous value	previous value	TOTAL	TOTAL	all	n.a.	other indicator	x							x					x		4	27%	
	GENER	Comparison to previous value	previous value	HAZ	TOTAL	all	n.a.	per employee	x				x	x									3	20%	
	GENER	Comparison to previous value	previous value	HAZ	TOTAL	all	n.a.	per value added	x					x								x	4	27%	
	GENER	Comparison to previous value	previous value	HAZ	TOTAL	all	n.a.	per capita	x							x							3	20%	
	GENER	Comparison to previous value	previous value	HAZ	TOTAL	all	n.a.	other indicator	x					x			x					x	5	33%	
Comp. to previous value (hz shares)	GENER	Comparison to previous value	previous value	HAZ	TOTAL	all	n.a.	haz share from total	x	x		x	x	x	x	x	x	x	x	x		8	53%		
Comparison to other countries	GENER	Comparison to other countries	interquartile range of all countries	TOTAL	TOTAL	all	n.a.	per employee															0	0%	
	GENER	Comparison to other countries	interquartile range of all countries	TOTAL	TOTAL	all	n.a.	per value added															x	0	0%
	GENER	Comparison to other countries	interquartile range of all countries	TOTAL	TOTAL	all	n.a.	per capita																0	0%
	GENER	Comparison to other countries	interquartile range of all countries	TOTAL	TOTAL	all	n.a.	other indicator								x								1	7%
	GENER	Comparison to other countries	interquartile range of all countries	HAZ	TOTAL	all	n.a.	per employee																0	0%
	GENER	Comparison to other countries	interquartile range of all countries	HAZ	TOTAL	all	n.a.	per value added																0	0%
	GENER	Comparison to other countries	interquartile range of all countries	HAZ	TOTAL	all	n.a.	per capita																0	0%
	GENER	Comparison to other countries	interquartile range of all countries	HAZ	TOTAL	all	n.a.	other indicator																0	0%
Comp. to other countries (hz shares)	GENER	Comparison to other countries	interquartile range of all countries	HAZ	TOTAL	all	n.a.	haz share from total								x							1	7%	
Misclassification of waste types	GENER	Misclassification of waste types	check across countries	HAZ	all	all	all	Rank of waste		x										x			2	13%	
	GENER	Misclassification of waste types	check across countries	NHAZ	all	all	all	Rank of waste		x										x			2	13%	
Comparison generation to treatment	GENER TREATM	Comparison generation to treatment	ratio treatment / generation	NHAZ	TOTAL	TOTAL	TRT	ratio	x	x	x	x	x	x	x	x	x	x	x	x	x	x	13	87%	
	GENER TREATM	Comparison generation to treatment	ratio treatment / generation	HAZ	TOTAL	TOTAL	TRT	ratio	x	x	x	x	x	x	x	x	x	x	x	x	x	x	13	87%	
Comparison to previous value	GENER TREATM	Comparison generation to treatment WShipR	ratio treatment / (generation + imports - exports)	HAZ	TOTAL	TOTAL	TRT	ratio		x	x	x	x	x	x	x	x	x	x	x	x	x	6	40%	
Comparison to treatment capacity	TREATM	Comparison to previous value	previous value	TOTAL	TOTAL	n.a.	all	ratio	x	x	x	x	x	x	x	x	x	x	x	x	x	x	12	80%	
Cross-check	TREATM REGIO	Comparison to treatment capacity	ratio treatment / treatment capacity	TOTAL	TOTAL	n.a.	RCV E, INC	ratio	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4	27%	
	GENER	Cross-check to WShipR	relation WStatR to WShipR	HAZ	TOTAL	TOTAL	n.a.	ratio															3	20%	
	GENER	Cross-check ELV	relation WStatR to ELV	TOTAL	TOTAL	TOTAL		ratio			x	x	x	x	x	x	x					x	8	53%	
	TREATM	Cross-check packaging	relation WStatR to Packaging	NHAZ	TOTAL	TOTAL		ratio			x	x	x	x	x	x	x						6	40%	
	GENER	Cross-check WEEE	relation WStatR to WEEE	TOTAL	TOTAL	TOTAL		ratio			x	x	x	x	x	x	x						8	53%	
Comparison to previous value	GENER	Time series by waste category	previous values	all	all + SDI*			per capita	x													x	6	40%	
	TREATM	Time series by waste category	previous values	all	all + SDI**			per capita	x													x	5	33%	
	TREATM GENER	Comparison to previous value	previous ratio treatment / generation	HAZ	all	TOTAL	TRT	trt share from gen		x				x	x						x	x	6	40%	
	TREATM GENER	Comparison to previous value	previous ratio treatment / generation	NHAZ	all	TOTAL	TRT	trt share from gen		x				x	x							x	x	5	33%
Implausible combinations	TREATM	Implausible combinations treatment op. / waste cat.	logic control	all	n.a.	all			x				x										2	13%	
Misclassification of waste types	GENER	Implausible combinations NACE / waste cat.	logic control	all	all	all	n.a.		x				x										2	13%	
Comparison generation to treatm.	GENER TREATM	Comparison generation to treatment	ratio treatment / (generation + imports - exports)	NHAZ	some	some	RCV	ratio															1	7%	
Comparison to previous value	GENER	comparison to previous value	previous value	NHAZ	TOTAL	all	n.a.	original					x										1	7%	
	GENER	comparison to previous value	previous value	HAZ	TOTAL	all	n.a.	original						x									1	7%	
	TREATMENT	comparison to previous value	previous value	NHAZ	TOTAL	n.a.	all	original					x										1	7%	
	TREATMENT	comparison to previous value	previous value	HAZ	TOTAL	n.a.	all	original						x									1	7%	
Total number of checks applied per country									17	5	17	11	20	18	24	14	11	12	24	12	14	11	6	15	No. of replies

Notes: The unshaded validation rules are based on the in-depth validation methodology as conducted by Eurostat (standard rules). The yellow shaded area contains “additional” validation rules mentioned by some countries. These “additional” rules can generally be classified as mentioned in the first column for the reason that they deviate from the corresponding “standard” rules only in respect of data level or the formats used. For the counts in Figure 1, the yellow shaded validation rules were assigned to the corresponding “standard” rule.