STATISTICS DENMARK

Documentation of statistics for Waste Accounts 2022

Statistics Denmark
Sankt Kjelds Plads 11
DK 2100 København Ø

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1 Introduction

Waste accounts record how much waste is generated in different parts of the economy, what kind of waste it is and how it is treated. Imports and exports of waste are also covered. The waste accounts build on data from the Danish Environmental Protection Agency and were published for the first time in 2015. Municipal waste by municipality, treatment form and waste type is compiled in 2023.

2 Statistical presentation

Waste accounts measure the amounts of generated waste distributed to 117 industry groups. Within the industry groups, waste is distributed according to categories and forms of treatment. Imports and exports of waste are distributed according to form of treatment and waste category. The waste accounts are published annually and disseminated through a press release and tables in the StatBank.

The statistics is part of the Environmental-Economic Accounts for Denmark (Green National Accounts).

Municipal waste by municipality, treatment form and waste type is compiled for the first time in 2023.

2.1 Data description

Waste accounts are part of the Environmental-Economic Accounts (Green National Accounts). The amounts of generated waste are distributed to the same 117 industry groups used across all other parts of the green national accounts, as well as in the core national accounts. Within the industry groups, waste is distributed according to 32 categories as well as to forms of treatment. The waste accounts are published annually and disseminated through a press release and tables in the StatBank. Municipal waste by municipality, treatment form and waste type is compiled for the first time in 2023.

The Waste Accounts include data for environmental and climate-model GreenREFORM, in the form of tailored tables compiled by a special classification of industries.

2.2 Classification system

The industry groups are the same as in the Danish National Accounts. These are based on the national version of NACE rev. 2 , with a limited number of deviations.

The categories of waste are based on the so-called 'E/H'-codes of the Danish Environmental Protection Agency. The category 'soil' contains soil from digging etc. in construction. A special kind of soil, stemming from cleaning and washing of beet, is not included here. It is instead part of 'other waste'. Soil from beets was previous to 2012 required to be deposited due to risk of spreading of beet disease, but since 2012 it can be used on selected fields (counted as materials recovery).

The source data are also classified according to the European List of Waste. Waste accounts are not published according to this classification.

Municipalities are aggregated to five municipality groups, for the purpose of highlighting differences between rural and urban areas.

In the tables for GreenREFORM, a special adjusted classification of industries is used.

2.3 Sector coverage

All sectors, incl. households, are covered.

2.4 Statistical concepts and definitions

Waste: Waste is any object or material the holder discards, intends to discard or is required to discard. Objects or materials which are reused (such as bottles that are refilled after cleaning) are not waste. Manure is not waste.

Segment: Segment (or waste segment) is a classification of waste according to material, composition and origin based on the Danish 'E/H' codes.

Mixed municipal waste: Waste which is mainly composed of kitchen waste, hygienic waste, packaging etc. and typically produced by households. Household waste which is sorted and collected under separate schemes, e.g. for glass and paper, is not included.

Waste suited for incineration: Waste, not suited for materials recovery and which can be incinerated without causing unacceptable amounts of pollution. Not included are waste types which are required to be either collected for materials recovery or deposited, and waste which it is forbidden to incinerate.

Biodegradable waste: The waste category biodegradable waste is used to classify separately collected biodegradable waste. In interpreting the numbers, it is important to note that biodegradable waste is also found as part of unsorted waste categories, especially in mixed municipal waste.

Glass: The waste category glass is used to classify separately collected glass waste. In interpreting the numbers, it is important to note that glass waste can also be found in unsorted waste categories, especially in mixed municipal waste.

Plastics: The waste category plastics is used to classify separately collected plastics waste. In interpreting the numbers, it is important to note that plastic waste is also found as part of unsorted waste categories, especially in mixed municipal waste.

Paper: The waste category paper is used to classify separately collected paper waste. In interpreting the numbers, it is important to note that paper waste is also found as part of unsorted waste categories, especially in mixed municipal waste.

Cardboard: The waste category cardboard is used to classify separately collected cardboard waste. In interpreting the numbers, it is important to note that cardboard waste is also found as part of unsorted waste categories, especially in mixed municipal waste.

Hazardous waste: Waste is counted as hazardous when it has been reported as belonging to the category 'hazardous waste' to ADS **or** the detailed waste type, according to the reported EWC code is classified as hazardous. This is the same definition as in the waste statistics from the Danish Environmental Protection Agency.

Waste suited for deposition: Waste which is not suited for either materials recovery or incineration.

Materials recovery: Any recovery operation where waste materials are processed into products or materials. This includes processing of organic materials, but not energy recovery, processing into materials for incineration or for landfill purposes.

Primary waste: Primary waste, or primary waste production, is waste that is not produced from treatment of other waste (secondary waste). Secondary waste is e.g. residuals from incineration of

waste.

Residuals from incineration: Ashes and slag from incineration. In the tables covering primary waste generation, this does not include residuals from incineration of waste, as these are defined as secondary waste. In the tables on exports and import, residuals from incineration of waste is included in this category.

Special treatment: Separate treatment of waste by special processes, reserved for hazardous waste.

2.5 Statistical unit

The local unit is used for distribution of waste to industry groups.

2.6 Statistical population

All production units (local units) in Denmark that produce primary waste and all households. For the accounts of import and exports of waste, the population consists of all production units exporting or importing waste (regardless of whether it is primary or secondary waste).

2.7 Reference area

Denmark.

2.8 Time coverage

These statistics cover the time period from 2011 and onwards. Waste by municipality covers 2013 and onwards.

2.9 Base period

Not relevant for these statistics.

2.10 Unit of measure

Waste amounts are measured in metric tons.

2.11 Reference period

01-01-2022 - 31-12-2022

2.12 Frequency of dissemination

Annual publication.

2.13 Legal acts and other agreements

Data is collected by the Danish Environmental Protection Agency and no separate regulation is required for Statistics Denmark. Law on Statistics Denmark (§6) regulates the access of Statistics Denmark to data from administrative sources.

The Danish Environmental Protection Agency collects waste data according to Regulation (EC) No 2150/2002 of the European Parliament and of the Council on waste statistics.

2.14 Cost and burden

Based on administrative data, collected by the Danish Environmental Protection Agency. There is no burden on respondents from Statistics Denmark.

2.15 Comment

Waste accounts are presented on the subject page Material flows and waste.

3 Statistical processing

Waste data are validated in the Danish Environmental Protection Agency before Statistics Denmark receives them. The data processing in Statistics Denmark primarily concerns the detailed and complete distribution of the waste to the 117 industry groups of the Green National Accounts.

3.1 Source data

Waste accounts are based on data from the Danish Environmental Protection Agency. All enterprises collecting or treating waste are required to report electronically through a system called 'ADS'.

3.2 Frequency of data collection

Statistics Denmark receives data annually from the Danish Environmental Protection Agency.

3.3 Data collection

Data is not collected by Statistics Denmark. The Danish Environmental Protection Agency collects data through an electronic reporting system.

3.4 Data validation

The data reported into the electronic system for waste (ADS) are validated and edited at the Danish Environmental Protection Agency, who uses the data in their annual report on waste statistics as well as for reporting to EU. Data validation in Statistics Denmark focuses on the distribution to industry groups according to activity codes. The activity codes are also to some extent validated and edited in the Danish Environmental Protection Agency. Especially, all waste classified as construction waste is categorized as coming from the construction sector.

Some waste is reported from unlikely activities. Data editing focuses on waste from holding companies, headquarters and enterprises engages in renting out commercial buildings. In all three cases it is most likely that the waste was generated from the 'real' activity, rather than from the holding, controlling or renting out. Therefore, these activity codes are disregarded and the waste treated in the same way as the waste reported without activity code.

3.5 Data compilation

Data processing consists of distribution of waste according to industry groups, followed by aggregation to the groups used in publication.

The detailed and complete distribution of waste to industry groups takes place through a series of steps. First, the activity codes reported to ADS and validated by the Danish Environmental Protection Agency are used, inclusive of edits made by the Danish Environmental Protection Agency.

Then the remaining waste is distributed. A small part is assigned to industry groups based on the code from the European List of Wastes, which in some cases is detailed enough to mean that the waste can be from only one industry group.

Next, remaining waste is distributed proportionally, meaning that waste without activity codes is distributed with the same percentage added to all the industry groups already having waste of the same category. The result is that all waste is assigned to an activity code based on NACE rev. 2 (the national version, DB07). The share of total waste distributed in this way is about 1-2 per cent annually, but with variations among categories of waste.

Finally, special procedures distribute waste to those industry groups which are specific to the (green) national accounts and which are not directly based on NACE rev. 2. (see separate list of industry groups). The main principle is that figures on hours worked is used for distribution of the waste. For construction, data (from the source, ADS) on whether waste is from businesses or households is used to distinguish how much waste is assigned to the group for 'own-account repair and maintenance' (DIY).

For the municipal distribution of household waste, information from the source data about municipality is used. A small share (1-2 per cent) of the waste lacks information on municipality. Specifically for sludge from wastewater treatment, the distribution in VANDUD is used. For the remaining waste, a proportional distribution is conducted, based on the type of waste.

3.6 Adjustment

Nothing further than what is described under statistical treatment and validation.

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4 Relevance

Waste accounts are of relevance for administrative bodies, researchers, NGOs, businesses, the educational sector and individuals - all with interests in waste, resources, economic-environmental interactions, the circular economy etc. To ensure international comparability, the waste accounts are prepared according to the UN statistical standard SEEA (System of Environmental Economic Accounting) 2012.

4.1 User Needs

Users are administrative bodies, researchers, NGOs, businesses, the educational sector and individuals - all with interests in waste. resources, economic-environmental interactions, the circular economy etc. The Waste Account is part of the data for environmental and climate-model GreenREFORM, developed by DREAM.

4.2 User Satisfaction

The statistics are discussed with expert users in the user committee for economic-environmental statistics and accounts, material in Danish only.

4.3 Data completeness rate

Not relevant for these statistics.

5 Accuracy and reliability

The quality is good concerning the figures for total amounts of waste as well as the amounts for different forms of treatment. The distribution of waste according to categories also has a good quality, even if it is most reliable at the aggregated level. At more detailed level, the precision is less due to measurement errors (in the reporting).

The detailed distribution according to industry groups is less precise. This stems from errors in the source data (measurement errors from the reporting) as well as from the assumptions made in the distribution of waste to detailed industry groups.

Waste by individual municipalities is less precise than totals for the municipality groups. This stems from the data source, and can be linked to waste from one municipality being treated at a facility in a different municipality, waste stations being used by inhabitants of several different municipalities etc.

5.1 Overall accuracy

No quantitative assessment of total precision has been made.

Precision is high for the figures for total amounts of waste as well as the amounts for different forms of treatment. This evaluation is based, among other things, on comparisons to data from other source, e.g. on incinerated amounts of waste. The distribution of waste according to categories also has a good quality, even if it is most reliable at the aggregated level. At more detailed level, the precision is less due to measurement errors (in the reporting).

The detailed distribution according to industry groups is less precise. This stems from errors in the source data (measurement errors from the reporting) as well as from the assumptions made in the distribution of waste to detailed industry groups. Especially for the specific industry groups where 'hours worked' is used to distribute waste (as described under data compilation), the figures must be regarded as estimates only.

When using the statistic to calculate recycling percentages, it is important to note that the type of collection of waste influences the classification. E.g. a piece of plastic packaging will only be classified as plastic packaging waste if it is separately collected. If, on the other hand, it is collected unsorted, as part of mixed municipal waste, it will be classified as mixed municipal waste. Some of the waste flows (mixed municipal waste, waste suited for incineration) have the character of unsorted/mixed waste, whereas other waste flows only contain separately collected waste (plastics, cardboard, glass etc.). The waste accounts do not contain information on the amount of total waste from particular materials (e.g. plastic), only regarding the waste that has been separately collected. As a result, the statistic cannot be used for calculating the *share* of particular materials, e.g. plastic, waste collected for recycling. However, is it possible to see developments in the overall amount collected for recycling.

Waste by individual municipalities is less precise than totals for the municipality groups. This stems from the data source, and can be linked to waste from one municipality being treated at a facility in a different municipality, waste stations being used by inhabitants of several different municipalities etc.

Due to more detailed classifications, the tables for GreenREFORM contains more uncertainty than the other tables.

5.2 Sampling error

Not relevant for these statistics.

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5.3 Non-sampling error

The main sources of non-sampling error are measurement errors and partial non-response in the source data (the electronically reported waste data received from the Danish Environmental Protection Agency) as well as the assumptions made in the complete and detailed distribution to industry groups. The Danish Environmental Protection Agency is working to improve the user friendliness of the waste reporting system to ensure better quality of reports.

The most significant effect on published figures is that waste from the transport industry is overestimated, due to reports from companies transporting waste being misreported as the generators of the waste.

Waste by individual municipalities is less precise than totals for the municipality groups. This stems from the data source, and can be linked to waste from one municipality being treated at a facility in a different municipality, waste stations being used by inhabitants of several different municipalities etc.

5.4 Quality management

Statistics Denmark follows the recommendations on organisation and management of quality given in the Code of Practice for European Statistics (CoP) and the implementation guidelines given in the Quality Assurance Framework of the European Statistical System (QAF). A Working Group on Quality and a central quality assurance function have been established to continuously carry through control of products and processes.

5.5 Quality assurance

Statistics Denmark follows the principles in the Code of Practice for European Statistics (CoP) and uses the Quality Assurance Framework of the European Statistical System (QAF) for the implementation of the principles. This involves continuous decentralized and central control of products and processes based on documentation following international standards. The central quality assurance function reports to the Working Group on Quality. Reports include suggestions for improvement that are assessed, decided and subsequently implemented.

5.6 Quality assessment

The quality is good concerning the figures for total amounts of waste as well as the amounts for different forms of treatment. This evaluation is based, among other things, on comparisons to data from other source, e.g. on incinerated amounts of waste. The distribution of waste according to categories also has a good quality, even if it is most reliable at the aggregated level. At more detailed level, the precision is less due to measurement errors (in the reporting).

The detailed distribution according to industry groups is less precise. This stems from errors in the source data (measurement errors from the reporting) as well as from the assumptions made in the distribution of waste to detailed industry groups. Especially for the specific industry groups where 'hours worked' is used to distribute waste (as described under data treatment), the figures must be regarded as estimates only.

There is an overestimation of waste generated by the transport industry, due to incorrect reports from enterprises transporting waste.

Waste by individual municipalities is less precise than totals for the municipality groups. This stems from the data source, and can be linked to waste from one municipality being treated at a facility in a different municipality, waste stations being used by inhabitants of several different municipalities etc.

5.7 Data revision - policy

Statistics Denmark revises published figures in accordance with the Revision Policy for Statistics Denmark. The common procedures and principles of the Revision Policy are for some statistics supplemented by a specific revision practice.

5.8 Data revision practice

The accounts are based on data from a system in the Environmental Agency. It is expected that data, also for previous years, will be revised as incorrect reports are identified and corrected. These revisions in the source data will be fully implemented in future publications of the waste accounts.

6 Timeliness and punctuality

Publication of the waste accounts was on time, 21 months after the end of the reference period. The long production time is due to the dependence on data from the Environmental Agency.

6.1 Timeliness and time lag - final results

The waste accounts was published 21 months after the end of the reference period. The production time is explained by data availability from the Danish Environmental Agency. In the Danish Environment Agency, there is an ongoing process to improve data quality. As a result, previous years may be corrected.

6.2 Punctuality

Publication on pre-announced time.

7 Comparability

The methods and data sources for the Waste Accounts are unchanged throughout the period covered by published figures. International comparison is possible with all other waste accounts based on UN's statistical standard SEEA 2012.

7.1 Comparability - geographical

Waste Accounts are consistent with the primary waste statistics published and reported to EU by the Danish Environmental Protection Agency. Waste Accounts are produced according to SEEA 2012, the UN statistical standard for environmental economic accounts, and therefore comparable to waste accounts from other countries using this standard.

7.2 Comparability over time

Waste accounts are comparable over time, as the source and methods are the same for the period published (2011-). However, the source (ADS) and validation of data is still being developed and improved at the Danish Environmental Protection Agency. When errors are detected and corrected, this is done for all the years as far as possible, but there may be cases where this is not possible. Especially at the most detailed level, some changes over time may be the result of improved quality of data rather than actual changes.

From 2016, food waste and other organic waste are presented separately. For the years 2011-2015, these two waste types were shown together as Biodegradable waste. In addition, from 2016, waste types Textiles and Mixed packaging are presented separately. In the years 2011-2015 these two waste types are shown as part of Other waste. For the years where the separation is not in place, a 0 is shown for the relevant waste type.

7.3 Coherence - cross domain

The energy accounts have figures on incinerated waste. These are not identical to the figures on waste collected for incineration. The differences are due to imports of waste for incineration as well as to some waste being treated differently than originally reported when it was collected, e.g. when waste is collected for materials recovery, there may be a residual which is eventually incinerated.

7.4 Coherence - internal

Full internal consistency.

8 Accessibility and clarity

These statistics are published yearly in a Danish press release and in the StatBank under Waste Accounts.

8.1 Release calendar

The publication date appears in the release calendar. The date is confirmed in the weeks before.

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8.3 User access

Statistics are always published at 8:00 a.m. at the day announced in the release calendar. No one outside of Statistics Denmark can access the statistics before they are published.

8.2 Release calendar access

The Release Calender can be accessed on our English website: Release Calender.

8.4 News release

These statistics are published yearly in a Danish press release.

8.5 Publications

Publications only in Danish.

8.6 On-line database

The statistics are published in the StatBank in the following tables:

- AFFALD: Waste generation by industry, kind of treatment and waste category
- AFFALD01: Waste generation by industry and waste category
- AFFALD02: Waste generation by industry and kind of treatment
- AFFALD03: Waste generation by industry and hazardousness
- AFFALD04: Im- and exports of waste by waste category, kind of treatment and imports and exports

8.7 Micro-data access

There is no availability of micro-level data for researchers.

8.8 Other

Data from the source (ADS) is made available from the Danish Environmental Protection Agency at their ADS Portal. ADS is the source for the waste accounts, but due to the statistical processing, it is not necessarily possible to recreate the figures from the waste accounts from reports through the ADS portal.

The Waste Account delivers tailored datasets to environmental and climate-model GreenREFOM. The tables are available on http://www.dst.dk/groenreform (in Danish).

8.9 Confidentiality - policy

Data Confidentiality Policy for Statistics Denmark.

8.10 Confidentiality - data treatment

No specific measures have been needed to ensure confidentiality.

8.11 Documentation on methodology

There are no separate documentation on methodology for these statistics.

Methods for compiling the tables for GreenREFORM industry classification are available (in Danish): Dokumentation Affaldsregnskab leverance til GrønREFORM .

8.12 Quality documentation

Results from the quality evaluation of products and selected processes are available in detail for each statistics and in summary reports for the Working Group on Quality.

9 Contact

The administrative placement of these statistics is in the division of National Accounts, Climate and Environment, Economic Statistics. The contact person is Maria Skytte Christiansen, tel.: + 45 3046 4206, and e-mail: MCR@dst.dk.