5.B.1 - Biological Treatment of Waste: Composting

Short description

Within NFR category **5.B.1**, ammonia (NH_3) emissions from composting of organic wastes are reported.

NFR Code	Method	AD	EF
5.B.1	CS	NS	CS

Method(s) applied	
D	Default
T1	Tier 1 / Simple Methodology *
T2	Tier 2*
T3	Tier 3 / Detailed Methodology *
C	CORINAIR
CS	Country Specific
M	Model
* as described in the EMEP/EEA Emission Inventory Guidebook - 2019, in category chapters.	
(source for) Activity Data	
NS	National Statistics
RS	Regional Statistics
IS	International Statistics
PS	Plant Specific
As	Associations, business organisations
Q	specific Questionnaires (or surveys)
M	Model / Modelled
C	Confidential
(source for) Emission Factors	
D	Default (EMEP Guidebook)
CS	Country Specific
PS	Plant Specific
M	Model / Modelled
C	Confidential

NO_x	NMVOC	SO_2	**NH_3**	$PM_{2.5}$	PM_{10}	TSP	BC	CO	Heavy Metals	POPs
NA	NA	NA	**-/-**	NA	NA	NA	NA	NA	NA	NA

L/-	key source by **L**evel only
-/T	key source by **T**rend only
L/T	key source by both **L**evel and **T**rend
-/-	no key source for this pollutant
IE	emission of specific pollutant **I**ncluded **E**lsewhere (i.e. in another category)
NE	emission of specific pollutant **N**ot **E**stimated (yet)
NA	specific pollutant not emitted from this source or activity = **N**ot **A**pplicable
*	no analysis done

Separately collected organic waste (biowaste) from e.g. households, public garden and park service, food industry, restaurants, canteens and from agriculture can be treated in two different ways: aerobic treatment (composting) and anaerobic treatment (biogas production).

The aim of the treatment is the production of compost, leading to the recycling of nutrients and organic matter.

The produced compost is used as fertilizer or soil improver in agriculture or horticulture and also in private gardening. In Germany about two thirds of the organic waste is treated in composting plants and ammonia (NH_3) is an important emission to air.

Method

Emissions from composting are not a key source and of minor priority.

Activity Data

Official statistical data (Statistisches Bundesamt, Fachserie 19, Reihe 1: Abfallentsorgung (Waste management), Table 2.1; [1)]) are used for the estimation. The data are published on a yearly basis with an exception for the actual year of reporting. The activity data for the actual year of reporting are obtained, initially, by carrying the relevant data from the previous year forward, in unchanged form. In the following year, when the actual activity data for the given year becomes available, they replace the data that were carried forward. This procedure has only a very small impact on the total emissions in the relevant current report year.

Emission factors

The emission factor used for calculating NH_3 emissions is based on emission data from a research project [2)]. The NH_3-EF is 222 g/t and used for the whole time series. The use of abatement technologies (such as biofilters) are taken into account.

Uncertainties

The AD from Statistisches Bundesamt have an uncertainty of ±2% whereas the uncertainty for the EF is -59/+130% (ibid.).

Recalculations

When preparing the current inventory data, statistical data are only available for the previous reporting year, as the Federal Statistical Office's waste statistics are one year behind schedule. The current reporting year must therefore be extrapolated on the basis of the previous year. The result of this approach is revised by the correct data in the following year. For this reason, annual recalculations are required for the previous year. Since the resulting recalculation is always very small, it is no longer reported here.

Additionally, a transmission error has been noticed during the annual quality assurance - the 1990 value for the annual data on biowaste was falsely entered for the year 1991. The error has been corrected. For 1991 and 1992 statistical data do not exist, which is why an intrapolation for the missing values has been performed. The correction leads to significantly higher emissions in 1990.

Table 1: Revised biowaste activity data, in [kt]

	1990	**1991**	**1992**	**2020**
current submission	1.515	1.809	2.103	9.134
previous submission	724	1.515	1.956	8.808

Table 2: Accordingly revised NH_3 emissions, in [t]

	1990	**1991**	**1992**	**2020**
current submission	336	402	467	2.028
previous submission	161	336	434	1.955

For **pollutant-specific information on recalculated emission estimates for Base Year and 2020**, please see the recalculation tables following chapter 8.1 - Recalculations.

Planned improvements

Currently no improvements are planned.

[1)] Statistisches Bundesamt, Fachserie 19, Reihe 1: Abfallentsorgung; Wiesbaden; URL: https://www.destatis.de/DE/Publikationen/Thematisch/UmweltstatistischeErhebungen/Abfallwirtschaft/Abfallentsorgung.html

[2)] Carsten Cuhls, Birte Mähl, Joachim Clemens; gewitra Ingenieurgesellschaft für Wissenstransfer mbH: Ermittlung der Emissionssituation bei der Verwertung von Bioabfällen; https://www.umweltbundesamt.de/publikationen/ermittlung-der-emissionssituation-bei-der; im Auftrag des Umweltbundesamtes, April 2015