5.C.1.b v - Cremation

Category Code	Method	AD	EF
5.C.1.b.v	CS	AS	D, 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	Pb	Cd	Hg	As	Cr	Cu	Ni	Se	Zn	PCDD/F	B(a)P	B(b)F	B(k)F	I(x)P	PAH1-4	HCB	PCBs
-/-	-/-	-/-	NA	-/-	-/-	-/-	NE	-/-	-/-	-/-	-/-	NE	NE	NE	NE	NE	NE	-/-	-/-	-/-	NE	-/-	-/-	-/-	-/-

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

Method

Emissions from cremation are not a key source and of minor priority. Since March 1997, a national legal ordinance for cremation plants nationwide is in force (27. BImSchV).

Activity data

Activity data for this category are based on data from the statistics of the “Bundesverband Deutscher Bestatter e.V.”[1)]. For purposes of GHG reporting we specify cremations as masses, too. The cremation is a growing trend in funerals.

Table 1: Annual amount of cremated human bodies, in [kt]

1990	1995	2000	2005	2010	2015	2020	2023
13.55	25.32	26.24	29.22	34.18	45.88	56.77	62.51

Source: own calculation, conversion is not described in more detail here for reasons of piety, but is done in a manner comparable to other publications.

Emission factors

Emission factors used are default values from the EMEP/EEA air pollutant emission inventory guidebook 2023 [2)] as well as national data for POPs from the research project “POP- und Hg-Emissionen aus abfallwirtschaftlichen Anlagen” - Teilvorhaben zum Globalvorhaben „Überprüfung des Standes der Technik der Emissionen prioritärer Schadstoffe für einzelne Industriebranchen (Kleinfeuerungsanlagen und abfallwirtschaftliche Anlagen)“ [3)] .

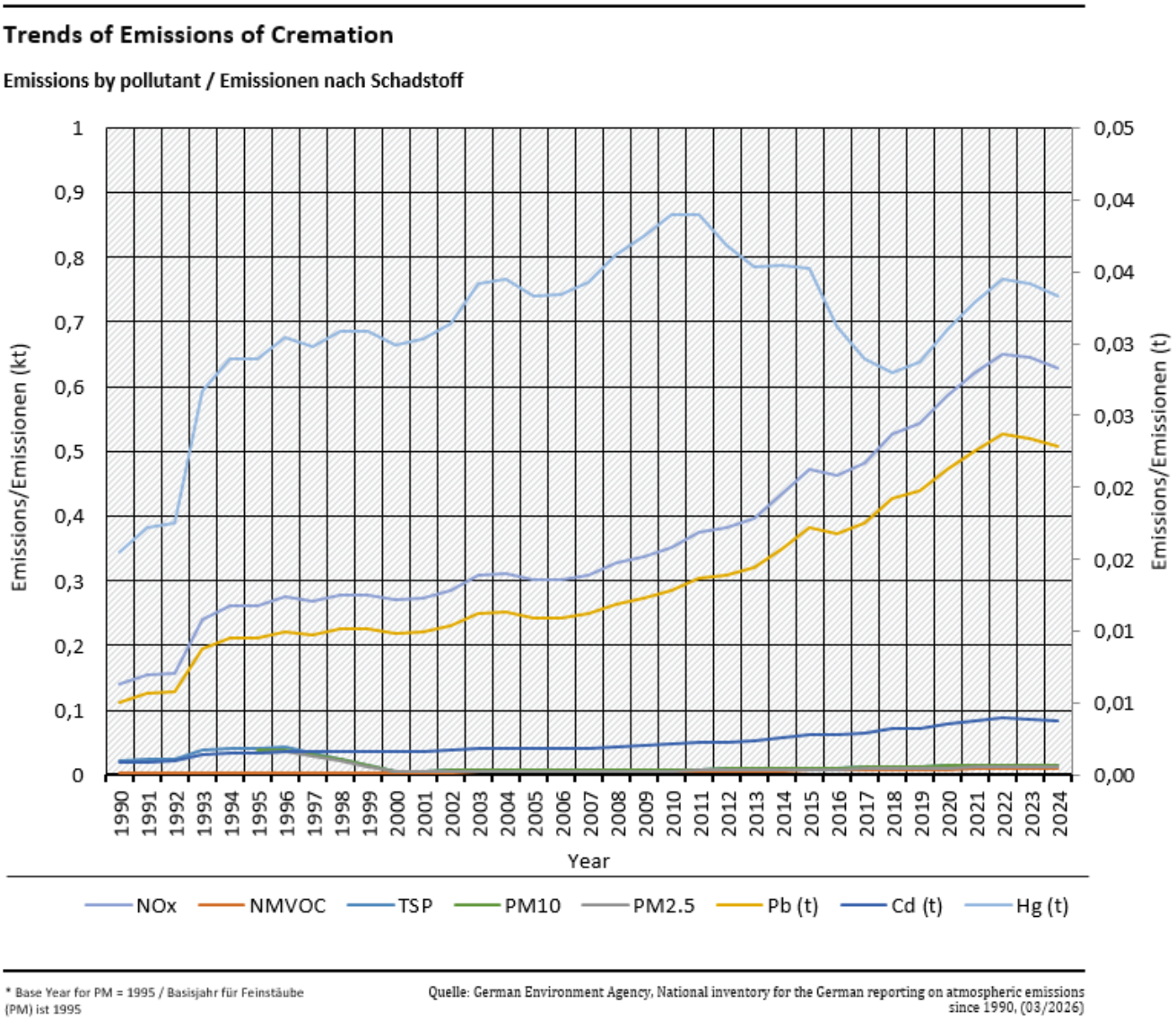
In 2018, the TERT noted that the German emission factor for Hg is 100 times smaller than the default value proposed in the 2016 EMEP/EEA Guidebook and the emission factors for Cd and Pb being 1,000 times smaller than the proposed default values. However, the EFs for Pb and Cd are based on national expert judgement assuming that a) the emissions behave similarly to dust and b) the dust limit value of the air pollution control specification (27th BImSchV) is complied with (to be confirmed on the basis of the new measurement data from 5 crematoria with different exhaust-gas cleaning systems). In contrast, the country-specific emission factor for Hg was calculated on the basis of the German report on “OSPAR Recommendation 2003/4 on controlling the dispersal of mercury from crematoria“ - and was revised after the finalization of a research Project [4)]. As part of this research project, emission measurements were carried out at six cremation routes. According to OSPAR reporting 2010/2014, approx. 90% of the plants have effective Hg mitigation technology, whereas approx. 10% are not equipped. This ratio is roughly reflected in the 2020 project report, too. Since the cremation duration is approximately one hour, the mean value per hour corresponds to the Hg load per cremation and is used accordingly for inventory calculation.

As developement of state of the art, values are interpolated between 2010 and 2018 (from 0,0913 g/cremation to 0,0449 g/cremation). This time span represents a real retrofit of the crematoria.

Emission factors for TSP, PM_{10}, and $PM_{2.5}$ derive from the research study “Studie zur Korngrößenverteilung (PM_{10} und $PM_{2.5}$) von Staubemissionen”[5)].

Trends in emissions

Most emission trends are the result of the increasing trend of AD, partly with decreasing EF at the same time. As result even the trend for Hg emissions is decreasing for a temporary period.



Emission trends in NFR 5.C.1.b.v

note: small changes for 2023

Recalculations

With **activity data and emission factors remaining unrevised**, no recalculations were carried out compared to the previous submission.

Planned improvements

At the moment, no category-specific improvements are planned.

[1)] annual personal message from Stephan Neuser (contact URL: https://www.bestatter.de/verband/allgemeines-ueber-den-bdb/)

[2)] EMEP/EEA, 2023: EMEP/EEA air pollutant emission inventory guidebook 2023, Copenhagen, 2023, https://www.eea.europa.eu/en/analysis/publications/emep-eea-guidebook-2023

[3)] Stöcklein, Gass u. Suritsch, 2016: “POP- und Hg-Emissionen aus abfallwirtschaftlichen Anlagen”, Teilvorhaben zum Globalvorhaben „Überprüfung des Standes der Technik der Emissionen prioritärer Schadstoffe für einzelne Industriebranchen (Kleinfeuerungsanlagen und abfallwirtschaftliche Anlagen“; URL: https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/texte_38_2016_pop-und_hg-emissionen_aus_abfallwirtschaftlichen_anlagen.pdf; UBA-Texte 38/2016; im Auftrag des Umweltbundesamtes, April 2016

[4)] FKZ 3716 53 3021 „Umweltrelevanz und Stand der Technik bei Einäscherungsanlagen“ (Environmental relevance and state of the art for cremation plants); URL: https://www.umweltbundesamt.de/publikationen/umweltrelevanz-stand-technik-einaescherungsanlagen

[5)] Dreiseidler, A., Baumbach, G., Pregger, T., Obermeier, A. (1999): Studie zur Korngrößenverteilung (< PM_{10} und < $PM_{2.5}$) von Staubemissionen. UBA-Forschungsbericht 297 44 853, Umweltbundesamt Berlin (Study on particle size distribution (< PM_{10} and < $PM_{2.5}$) of dust emissions)