2.A.5.a - Quarrying & Mining - Other Than Coal

Category Code	Method	AD	EF
2.A.5.a	T1/T2	NS/IS/AS	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	**L/-**	**L/T**	**L/-**	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

Regarding particulate emissions, Mining is the main emissions source in the Mineral industries.

In Germany, two diffrent approaches are applied for sands and rocks, and for salts, respectively.

Short description

The mining process emits relevant amounts of particles. Quarrying and mining of minerals other than coal is subsumed, in particular mining of limestone, hard rock and building Sands, with rising recycled materials.

Salt production is a sub-category of the mining activities in respect of the country specific approach used.

The Tier 1 methodology for the emissions from salt mining represents only a small portion of emissions from this sector - few than 4%, depending on the PM fraction. Considering the limited scale of the activity and emission, the part is considered to be below the significance for higher Tiers. Please see the small relevance of this under trend diskussion.

Methodology

With the use of the 2023 GB method [1)], a Tier 2 method is available that can reflect different national conditions.

In particular, this concerns input variables on humidity and wind speed, which are localized according to the administrative states of Germany. Larger city states (Berlin, Hamburg and Bremen) were merged with the respective larger states (Brandenburg, Schleswig-Hollstein, Niedersachsen) as the city states do not neccessarily represent the local weather conditions. Parameters on weather as well as on areas can thus be improved in the model above. In a first this was done by using weather data from the German Weather Service (DWD), which may be obtained as daily station data from the Open Data Portal: ClimateDataCenter (CDC) of the DWD URL:
https://opendata.dwd.de/climate_environment/CDC/observations_germany/climate/daily/kl/

No area information from the Corine land cover before 2010 is used (consistent data sets). In addition, information from CLC category 131 (Mineral extraction sites [2)]) had to be adjusted for areas of active open-pit lignite mines.

For salt production currently a Tier 1 method is used: information on production of salts are multiplied with country specific emission factors for TSP and PM. Please see the small relevance of this under trend diskussion.

Activity Data

As provided in the Guidebook model, specific AD for hard rock, sand, and recycled material are applied. Because of incomplete national statistics, these AD are taken from nationals and international association information [3)]. Within the framework of technical consultations, historical data were confirmed by the National Association for Mineral Resources [4)]. Now we are additionally in contact with Federal Institute for Geosciences and Natural Resources for figures og mineral raw materials [5)]. For time series concsistency, data gaps are closed via interpolation or expert adjustement.

The data from national statistics includes production of potash and rock salt. Potash salt is dominating, nevertheless gaps of statistics are filled and emissions are modelled as potash salt only.

Emission factors

The calculation of emissions takes into account national circumstances and reduction measures.The calculations are available in total more than ten Excel files (individual years since 1990, annually from 2010). Since the GB tool in principle calculates emissions for exactly one year [6)], files must be available for exactly those years in which input data are available. Intermediate years are interpolated in case of data gaps.

With the help of the GB tools, IEFs are estimated on an annual basis, which are used for the inventory method AR x EF. The emission factors are virtual, but the calculation of this is modified by national circumstances on the parameters. So we would name the EF as country-specific.

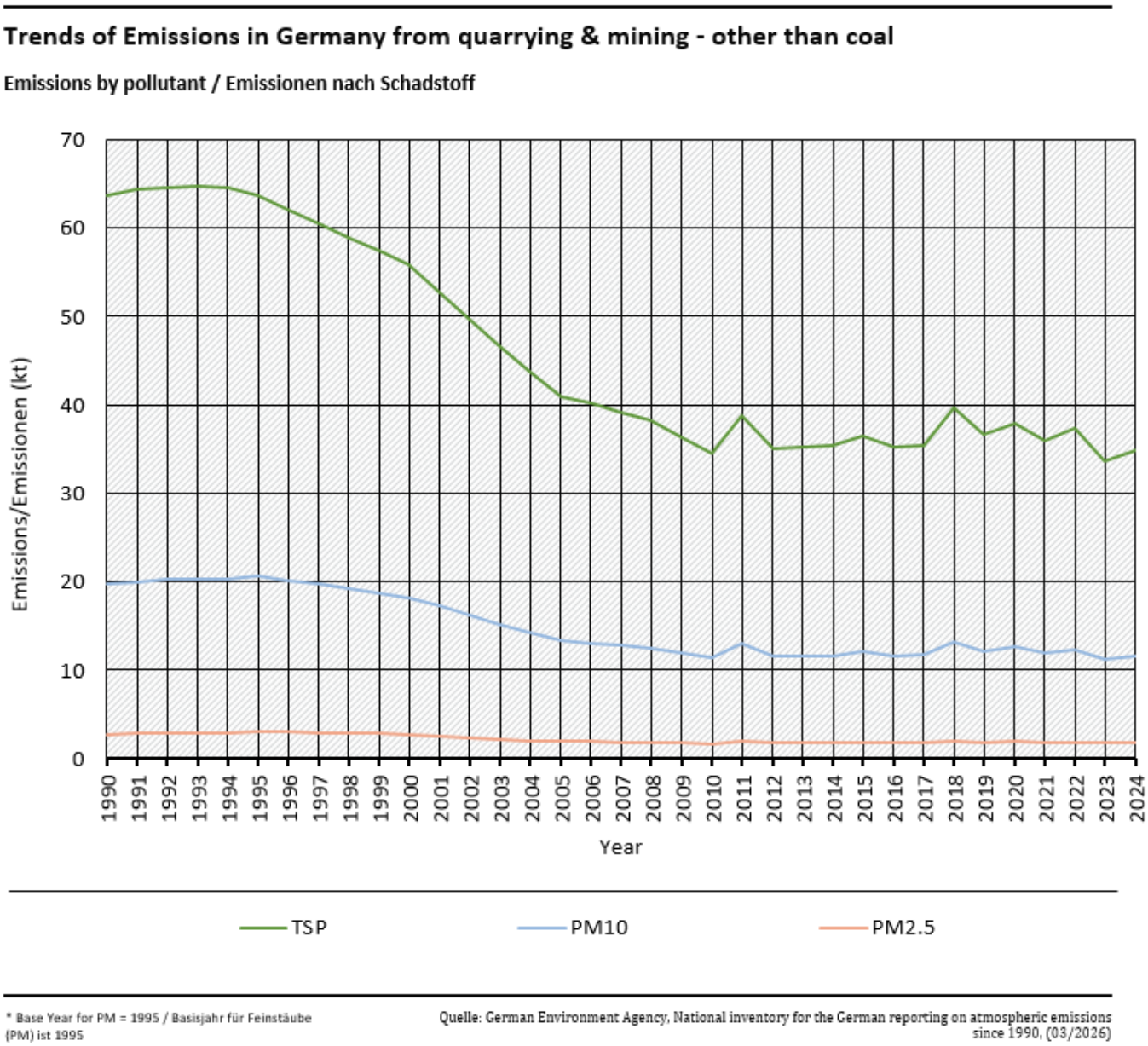
The emission factors for salt production are based on analogy to bulk product handling by an UBA expert judgement:

Table 2: Overview of applied emission factors, in kg/t salt

	EF value	**EF trend**
TSP	0.031	constant
PM_{10}	0.016	constant
$PM_{2.5}$	0.003	constant

Trend discussion

Trends in emissions follow the shrinking mining activities.



Emission trends in NFR 2.A.5.a

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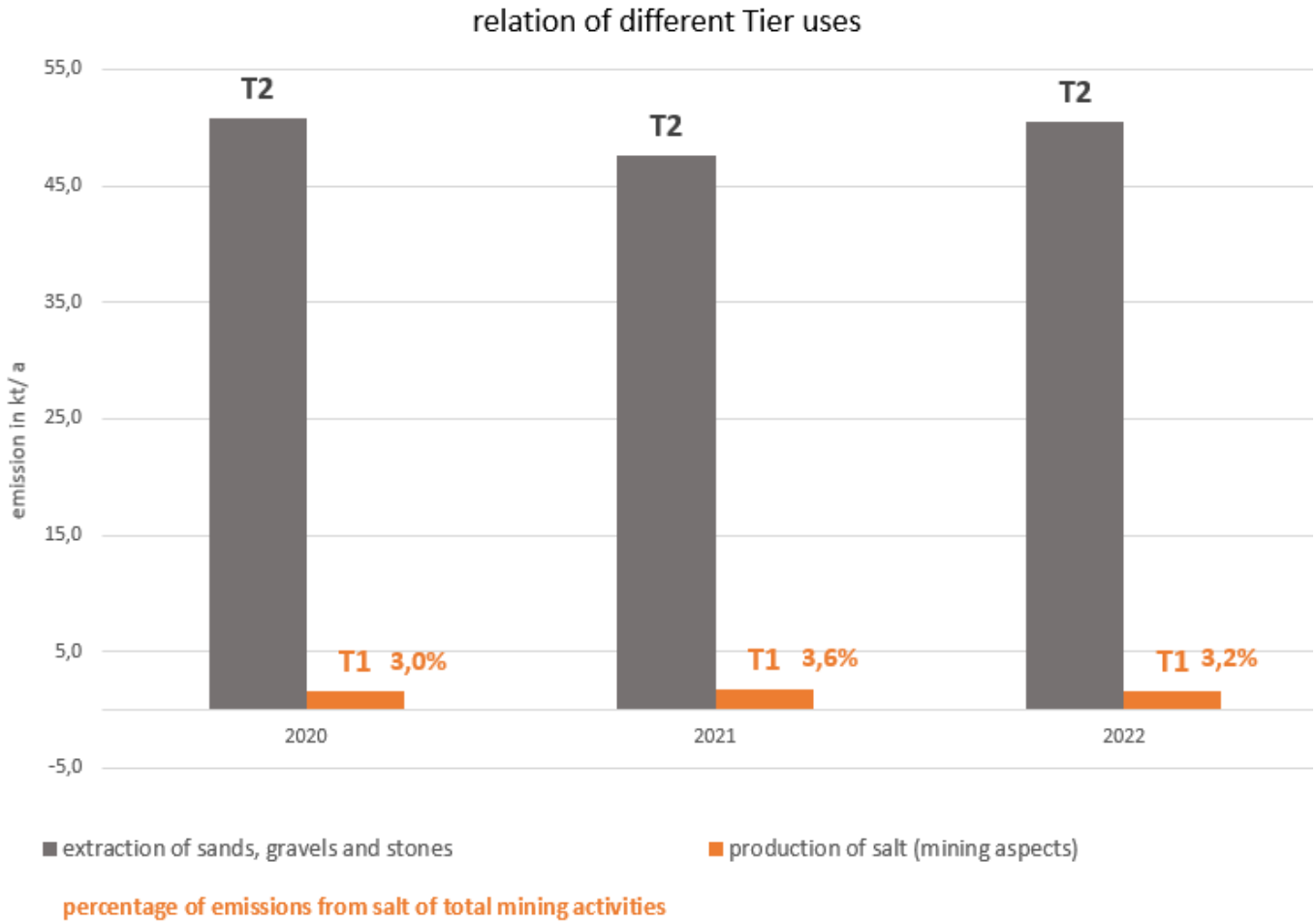
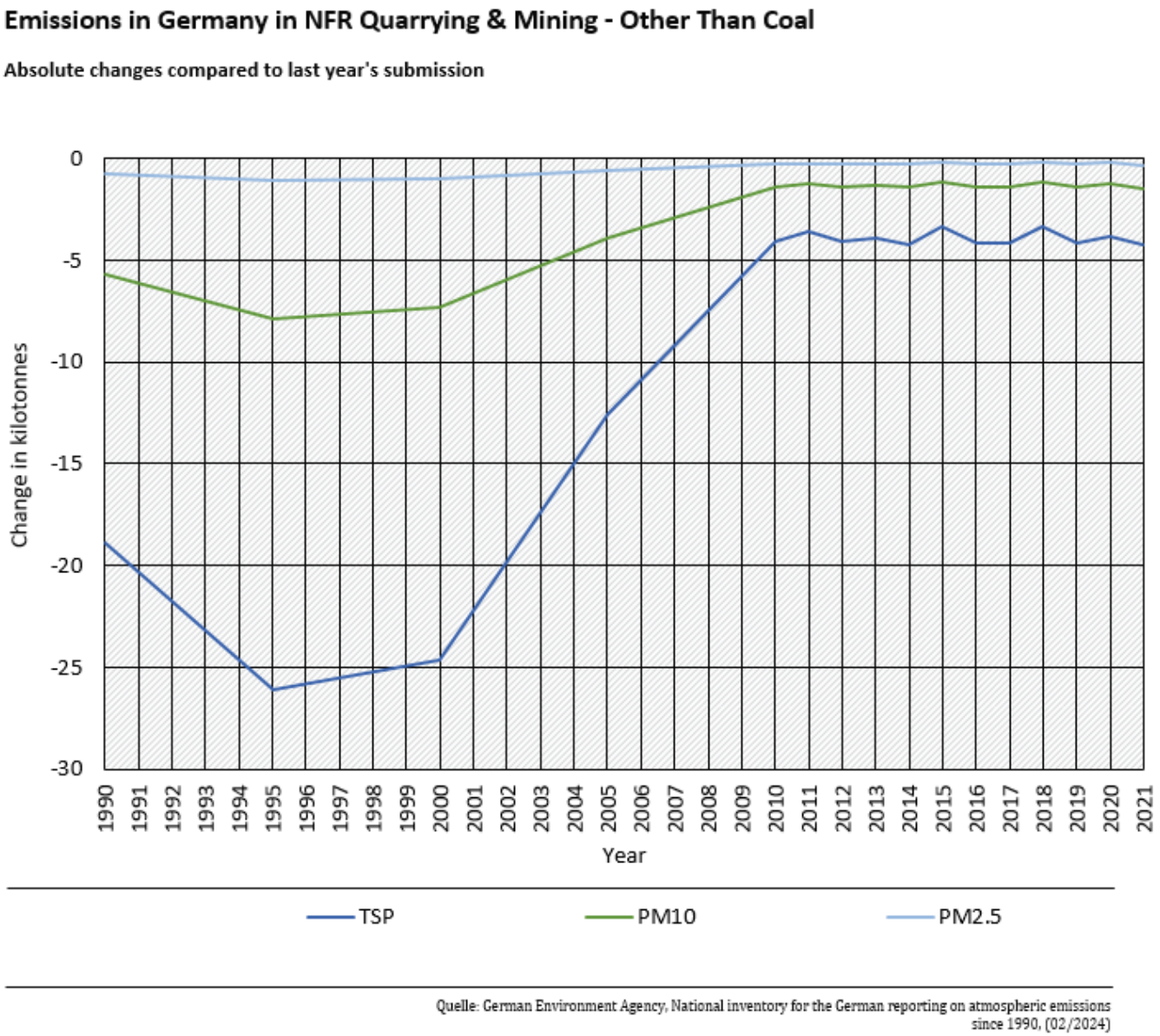


share-of-salt-in-mining

Recalculations

Recalculations were necessary due to improvement of method. The significant changes can be shown as an absolute difference over time as follows:



Recalculations in NFR 2.A.5.a

Planned improvements

At the moment, it is planned evaluate further Country specific conditions.

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[1] EMEP/EEA, 2023: EEA Report No 06/2023 EMEP EEA air pollutant emission inventory guidebook 2023, Copenhagen, 2023; URL: https://www.eea.europa.eu/publications/emep-eea-guidebook-2023/part-b-sectoral-guidance-chapters/2-industrial-processes-and-product-use/2-a-mineral-products/2-a-5-a-quarrying-1/view

[2] Copernicus 2019: CLC-classes; URL: https://land.copernicus.eu/user-corner/technical-library/corine-land-cover-nomenclature-guidelines/html/index-clc-131.html

[3] European Industry Association data are published annually at https://www.aggregates-europe.eu/facts-figures/figures/

[4] https://www.bv-miro.org/

[5] https://www.bgr.bund.de/DE/Themen/Min_rohstoffe/Produkte/produkte_node.html

[6] EMEP/EEA, 2019: EEA Report No 13/2019 EMEP EEA air pollutant emission inventory guidebook 2019, Copenhagen, 2019; URL: https://www.eea.europa.eu/publications/emep-eea-guidebook-2019/part-b-sectoral-guidance-chapters/2-industrial-processes/2-a-mineral-products/2-a-5-a-quarrying-1/view