Chapter 8.1 - Recalculations

Generally, improvement of the emission inventory is an ongoing task and triggers recalculations for all source categories and pollutants frequently.

Further information regarding recalculations (especially due to changes in methods or activity data) can be found in the corresponding chapter of the **National Inventory Report**.

Possible reasons for Recalculations

Due to the ever ongoing efforts to improve the inventory, more or less broad recalculations become necessary with each new submission.

Possible reasons for recalculations are

- **new** (sub-)**categories** to be included in the inventory or dislocation of subcategories within the inventory
- **data** (activity data & emission factors) for certain (sub-)categories **available for the first time**
- **change of data sources** (for activity data)
- use of **new emission factors** (due to: inquest, research projects, expert judgement etc.)
- **improvement of methods** used for calculating emissions
- **outcome of** ongoing **review** activities under both UN FCCC and UN ECE
- etc.

All these changes can effect *specific years* of the inventory as well the *entire time series*, leading to more or less significant changes within the emission trends.

Declaration of Recalculations

Under UN FCCC reporting, parties have to comment any recalculations in any year leading to differences between latest and current submission for a given year or the time period or series. Thereby, highest attention is given to recalculations within base year and the most current year of the latest submission:

Recalculations in Base Year data

- mostly rather small but of highest importance
- mostly due to changed methods or emission factors used for entire time series
- impact on basis of any evaluation

Recalculations in data of current year of the latest submission

- mostly because of **corrected activity data** (especially in Energy Production) from actualized Energy Balances
- also due to changed methods, emission factors, or data sources used
- impact on the amount of emission reduction reported in latest submission

Under UN ECE, within the IIR, Germany focusses on recalculations in values reported for **1990** for all MAIN POLLUTANTS, HEAVY METALS and POPS, **1995** for $PM_{2.5}$ and PM_{10} and **2000** for BLACK CARBON (BC), and the **last year of the previous submission**, providing the **quantity** (in absolute numbers and in %) of change for any recalculated emission **and the reasons** for the recalculations carried out

Recalculations in current submission

Table 1: Overview of impact of recalculations on the level of National Totals (For more detailed information please mouseclick the pollutant.)

for reporting year:		BASE YEAR[1]				2019			
in NFR submission:		2021	2022	±	± %	2021	2022	±	± %
Main pollutants									
NEC									
Nitrogen Oxides - NO_x (as NO_2)	[kt]	2.850,05	2.835,33	-14,72	-0,52%	1.136,79	1.108,82	-27,97	-2,46%
Non-Methane VOC - NMVOC	[kt]	3.890,85	3.891,58	0,73	0,02%	1.121,23	1.072,23	-49,00	-4,37%
Sulphur Oxides - SO_x (as SO_2)	[kt]	5.474,42	5.460,02	-14,40	-0,26%	263,53	259,70	-3,84	-1,46%
Ammonia - NH_3	[kt]	715,09	718,16	3,07	0,43%	586,69	575,00	-11,69	-1,99%
Particulate Matter									
Particles <2.5µm - $PM_{2.5}$	[kt]	205,65	202,39	-3,26	-1,58%	91,94	89,91	-2,03	-2,21%
Particles <10µm - PM_{10}	[kt]	346,18	342,22	-3,96	-1,14%	203,61	193,78	-9,83	-4,83%
Total Suspended Particles - TSP	[kt]	2.050,52	2.042,44	-8,08	-0,39%	379,55	358,94	-20,60	-5,43%
Black Carbon - BC	[kt]	39,08	38,44	-0,64	-1,64%	11,71	11,58	-0,13	-1,09%
Other									
Carbon Monoxide - CO	[kt]	13.171,06	13.046,02	-125,04	-0,95%	2.882,74	2.750,27	-132,47	-4,60%
Heavy Metals									
Priority HM									
Lead - Pb	[t]	1.900,35	1.899,19	-1,15	-0,06%	160,78	157,69	-3,09	-1,92%
Cadmium - Cd	[t]	29,10	29,10	0,00	0,00%	10,85	10,70	-0,15	-1,36%
Mercury - Hg	[t]	35,47	35,51	0,04	0,13%	7,21	7,07	-0,13	-1,85%
Other HM									
Arsenic - As	[t]	85,85	85,92	0,07	0,08%	5,47	5,34	-0,14	-2,51%
Chrome - Cr	[t]	165,81	165,69	-0,12	-0,07%	71,05	71,09	0,04	0,06%
Copper - Cu	[t]	620,19	619,88	-0,31	-0,05%	587,38	591,28	3,91	0,67%
Nickel - Ni	[t]	339,57	332,74	-6,83	-2,01%	138,99	137,54	-1,45	-1,04%
Selenium - Se	[t]	5,66	5,73	0,07	1,17%	7,26	2,88	-4,37	-60,29%
Zinc - Zn	[t]	474,59	474,15	-0,44	-0,09%	294,75	297,04	2,29	0,78%
Persistent Organic Pollutants - POPs									
Dioxines & Furanes - PCDD/F	[g]					118,72	120,07	1,35	1,14%
Polycyclic Organic Hydrocarbons - PAHs									
Benzo(a)pyrene - B[a]P	[t]	27,94	26,98	-0,96	-3,42%	16,09	16,10	0,01	0,04%
Benzo(b)fluoranthene - B[b]F	[t]	35,30	35,84	0,54	1,52%	23,35	23,38	0,03	0,14%
Benzo(k)fluoranthene - B[k]F	[t]	16,01	16,27	0,27	1,66%	10,69	10,70	0,01	0,14%
Indeno(1,2,3-c,d)pyrene - I[1,2,3-c,d]P	[t]	22,84	23,03	0,19	0,83%	15,47	15,49	0,02	0,12%
Polycyclic Aromatic Hydrocarbons - PAH 1-4	[t]	177,42	118,56	-58,87	-33,18%	76,79	70,44	-6,36	-8,28%
Other POPs									
Hexachlorobenzene - HCB	[kg]	2.898,38	2.898,46	0,07	0,00%	12,66	13,04	0,38	2,99%
Polychlorinated Biphenyls - PCBs	[kg]	1.735,48	1.735,78	0,30	0,02%	215,78	222,55	6,77	3,14%

[1]: Base Year of reporting: 1990; excumptions: $PM_{2.5}$ and PM_{10}: 1995 and BC: 2000

Reasons overview

1. revision of activity data

- entire NFR 1.A + 2.C.1: finalisation of National Energy Balance 2019
- NFRs 1.A.3.a i and 1.A.3.a ii: revision of percental shares of aviation gasoline allocated to international and domestic flights
- NFRs 1.A.3.b vi & vii: revision of annual mileage data for different road vehicles

- several NFR categories: revision of population data: The population in Germany has been subject to several evaluations in recent years. In the meantime, the methodology for the so-called “Census 2011” has been confirmed by the Federal Constitutional Court in the final instance with a representative survey and extrapolation by the Federal Statistical Office. On this basis, the Federal Statistical Office examined correction options for previous years and published a so-called “recalculated and extrapolated population on the basis of the 2011 census”. This recalculation up to and including 1991 eliminates the gap between the 2010 population updates and the 2011 census results. The inventory team of the Single National Entity has decided to use this corrected population time series for all relevant calculations. As a result, various time series have been recalculated from 1991 up to and including 2016.

- NFR 3.B, 3.D, 3.D.f & 3.I: updated information and statistical data of the 2020 official agricultural census (e.g. animal numbers, weight data, milk yield: see main agricultural page under „Recalculations and reasons“, Chapter 5 - NFR 3 - Agriculture (OVERVIEW).

2. update or revision of entire model

- NFR 1.A.3.a: revision of TREMOD AV
- NFR 1.A.3.b: revision of TREMOD
- NFR 3 in general, the model GAS-EM was updated, see description Chapter 5 - NFR 3 - Agriculture (OVERVIEW).

3. newly implemented emission factors

- For urea fertilizer the German fertilizer ordinance prescribes the use of urease inhibitors or the direct incorporation into the soil from 2020 onwards. The NH3 emission factor for urea fertilizers is therefore reduced by 70% from 2020 onwards, see description Chapter 5 - NFR 3 - Agriculture (OVERVIEW).

4. revision of emission factors

- NFR 2.C.7.a: use of new plant specific data for emission factors of TSP, SO_2, As, Cu and Pb in Primary copper production recalculations have been carried out for the entire time series.
- NFR 3: Cattle grazing: The NH_3 emission factors were updated according to EMEP (2019) & and for sheep, laying hens, broilers, pullets: Update of the NH_3 emission factors for manure storage according to EMEP (2019).

5. re-allocation of activity data and emissions

6. as an outcome of the ongoing review activities under both UNFCCC and UNECE

- NFR 2.C.1: reporting of HCB emissions using standard emission factor for the entire time period