# Chapter 8.2 - Improvements

## Improvements since last Submission

- 6.A: newly implemeted category on ammonia emissions form human breathing and sweating
- 1.A.3.d ii: introduction of LNG as a fuel in national maritime navigation
- 1.B.1: revision of the TSP, $PM_{10}$ and $PM_{2.5}$ emission factor from lignite mining
- 1.B.2: introduction of new methods and emission factors for gas transmission, distribution and end users
- 1.B.2: implementation of Hg emissions from oil and gas production

## Improvements planned for future submissions

Possible improvement issues that have been identified so far and will be checked in the future are given below:

**OVER-ALL INVENTORY (all source categories)**

- To prioritise improvements on the basis of the results of the uncertainty analysis, it is planned to determine uncertainty analysis at source category level.

**stationary fuel combustion:**

- 1.A.1.a: evaluation of measurement data on POPs and heavy metal in large combustion plants
- 1.A.1.b: revision of $SO_2$ emission factors
- further improvements of PAH Emission factors for small combustion plants

**mobile fuel combustion:**

- 1.A.3.b vi + vii: implementation of abrasive emissions from tyres, brakes and road surface into TREMOD
- 1.A.3.c: validation and revision of approach for abrasive emissions from railways; possible implementation into TREMOD
- 1.A.4.c ii (i): revision of activity data for agricultural mobile combustion

**industrial processes:**

- cement industry: update of several emission factors

## Investigated Review Findings

### NECD 2022

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transparency | 1A5b | Lack of transparency regarding the NOx emissions outlier in 2005 compared to 2000-2010 emissions | | | | | | | | DE-1A5b-2022-0001 | No | As to the peak in NOx emissions 2005: Here, diesel oil deliveries data show a peak in 2005 resulting in emission estimates well above the values of previous and following years. Due to the applied approach, the resulting outliers have already been looked into in several NEC and CLRTAP Reviews. However, given the underlying activity data, the noticeable emission estimates cannot be revised in a sensible way. |
| Transparency | 1A5b | Lack of transparency regarding the PM2.5 emissions outlier in 2005 compared to 2000-2010 emissions | | | | | | | | DE-1A5b-2022-0002 | No | |
| Transparency | 2C4 | Lack of transparency regarding the use of notation keys, does not match IIR description | | | | | | | | DE-2-2022-0002 | Partly | |
| Transparency | 2G | Lack of transparency regarding the drop in the emissions in 2020 from the previous rather steady trend | | | | | | | | DE-2G-2022-0001 | Partly | |
| Transparency | 2J | Lack of transparency regarding the use of notation keys because the notation keys 'NA' and 'NE' do not match the explanation in the IIR | | | | | | | | DE-2J-2022-0001 | Yes | |
| Transparency | 2K | Lack of transparency on the use of these notation keys and the explanation provided in the IIR | | | | | | | | DE-2K-2022-0001 | Yes | |
| Transparency | 3D | Lack of transparency regarding activity data reported in the NFR tables for years 1990-2020 | | | | | | | | DE-3D-2022-0001 | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Consistency | 1A4ciii | Large increase in AD from 2015 to 2016 | | | | DE-1A4ciii-2018-0001 | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | No | All issues regarding the inconsistency of activity data from the National Energy Balance (NEB) can only be resolved as soon as the ongoing internal revision process launched by the provider of the NEB has been finished. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Completeness | 2D3c | For particulate matter, Germany did not provide estimates and was using the notation key 'NA' (not applicable) in its NFR | | | | | | | | | No | Germany will check including emission estimates for particulate matter and report on the progress made implementing this improvement in IIR submissions. |
| Completeness | 2H1 | Germany reports 'IE' for all pollutants under NFR 1A2d, assuming that the fuel-related emissions are allocated under 2H1, however, for BC and CO the notation key 'NE' is used | | | | | | | | | Yes | We have improved the IIR documentation of the allocation of all emissions from the pulp and paper industry and included an explanation of the management of process related sulphur and ammonia emissions for pulping processes occurring in Germany. |
| Completeness | 3B | Other animals not reported | | | | | | | | | No | Will be implemented in Submission 2024 |
| Completeness | 3Da2a | Use of notation key for NMVOC while emissions are expected | | | | | | | | | Yes | |
| Completeness | 5D1 | Lack of transparency regarding dry toilets (including latrines) | | | | | | | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Accuracy | 3Dc | Farm-Level Agricultural Operations should be reported using Tier 2 or higher | | | | | | | | DE-3Dc-2022-0001 | Yes | |

## NECD 2021

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| General | LPS | Update to the 2019 dataset | | | | | | | DE-LPS-GEN-2021-0002 | | No | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Transparency | 1A1a \ 1A2gviii \ 1A4 \ 1B1 | Clearly reference EFs used for HCB and BC | | | | | | | DE-1A1a-2021-0001 | | Yes | |
| Transparency | 1A2b | Update notation key used for BC emission | | | | | | | DE-1A2b-2021-0001 | | No | |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transparency | 1A2e | Update notation key for BC and check allocation | | | | | | | DE-1A2e-2021-0001 | | No | |
| Transparency | 1A3ei | Explicitly state why PM2.5 is equal to PM10 | | | | | | | DE-1A3ei-2021-0001 | | Yes | |
| Transparency | 1A4bii | Update IIR description | | | | | | | DE-1A4bii-2021-0001 | | No | |
| Transparency | 5 | Update to the latest Guidebook where needed | | | | | | | DE-5-2021-0001 | | Yes | Citation has been updated to the latest GB version - no changes in EF needed. Only for 5C2 some changes in EF is planned. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Consistency | 1A1b | Resolve time series issue for BC | | | | | | | DE-1A1b-2021-0001 | | Yes | |
| Consistency | 1A4cii | Inconsistent AD values NFR vs. IIR | | | | DE-1A4cii-2018-0001 | | | DE-1A4cii-2018-0001 (ID reused) | | No | |
| Consistency | 1A4ciii | Large increase in AD from 2015 to 2016 | | | | DE-1A4ciii-2018-0001 | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | No | All issues regarding the inconsistency of activity data from the National Energy Balance (NEB) can only be resolved as soon as the ongoing internal revision process launched by the provider of the NEB has been finished. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Completeness | 1A2a | Report BC emissions | | | | | | | DE-1A2a-2021-0002 | | No | |
| Completeness | 1A2a | Include BC emissions | | | | | | | DE-1A2a-2021-0001 | | No | |
| Completeness | 1A5a | Include BC emissions | | | | | | | DE-1A5a-2021-0001 | | Yes | |
| Completeness | 2A3 | Include BC emissions | | | | | | | DE-2A3-2021-0001 | | No | |
| Completeness | 2B6 | Include the NOx emissions in the next submission. | | | DE-2B6-2017-0001 | DE-2B6-2018-0001 | DE-2B6-2017-0001 (ID reused) | DE-2B6-2017-0001 (ID reused) | DE-2B6-2017-0001 (ID reused) | | Yes | |
| Completeness | 2D3g | Report PAHs from 2D3g Chemical Products | | | | DE-2D3g-2018-0001 | DE-2D3g-2018-0001 (ID reused) | DE-2D3g-2018-0001 (ID reused) | DE-2D3g-2018-0001 (ID reused) | | Yes | |
| Completeness | GRID | Include NOx emissions from shipping | | | | | | | DE-GRID-G-2021-0001 | | No | |
| Completeness | LPS | Add missing pollutants PAHs PCBs PM2.5 | | | | | | DE-LPS-GEN-2020-0001 | DE-LPS-GEN-2020-0001 (ID reused) | | No | Since these pollutants are not in the ePRTR dataset Germany cannot report them. |
| Completeness | LPS | Include PCDD/F emissions | | | | | | | DE-LPS-GEN-2021-0001 | | No | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Accuracy | 1A2f | Move CO emission calculation to a higher tier | | | | | | | DE-1A2f-2021-0003 | | Yes | Germany now includes a new estimate based on further analysis in sector 2A2 in sector 1A2f you can find only the notation key 'IE'. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Comparability | 1B1b | Update PAH reporting | | | | | | | DE-1B1b-2021-0001 | | Yes | Revised emission factors developed according to suggestions in review. |
| Comparability | 2A1 | Update PAH reporting | | | | | | | DE-2A1-2021-0001 | | Yes | Details of the methodology used for BaP and for PAH-1-4 estimation are explained in IIR 2022. |
| Comparability | 2C1 | Update PAH reporting | | | | | | | DE-2C1-2021-0001 | | Partly | |
| Comparability | 2C3 | Update PAH reporting | | | | | | | DE-2C3-2021-0001 | | Partly | |

## NECD 2020

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| General | LPS | Improve consistency with the latest ePRTR reporting. | | | | | | DE-LPS-GEN-2020-0002 | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| QA/QC | LPS | Improve coordinates given check for collisions | | | | | | DE-LPS-GEN-2020-0004 | | | Yes | |
| QA/QC | LPS | Make sure each point source reported has unique key build from attributes | | | | | | DE-LPS-GEN-2020-0003 | | | No | Germany checked this issue and does not see any reason to change the data. It is unclear why LPS name GNFR and stack height should function as a key alternative in particular because the table already provides the ePRTR ID as an unique and valid key. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Transparency | 2C7a | Improve Transparency for Cd and Pb emissions from copper production | | | | | | DE-2C7a-2020-0001 | | | Yes | |
| Transparency | 3I | Improve the transparency of the calculations used for NO emissions from storage of digestate from energy crops. | | | | | | DE-3I-2020-0001 | | | Yes | |
| Transparency | LPS | Reallocate livestock emissions from GNFR L_AgriOther to K_AgriLivestock | | | | | | DE-LPS-K-2020-0001 | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Consistency | 1A4cii | IEF Cd trend since 2007 erratic | | | | DE-1A4cii-2018-0001 | DE-1A4cii-2018-0001 (ID reused) | DE-1A4cii-2018-0001 (ID reused) | | | No | All issues regarding the inconsistency of activity data from the National Energy Balance (NEB) can only be resolved as soon as the ongoing internal revision process launched by the provider of the NEB has been finished. |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Consistency | 1A4ciii | Large increase in AD from 2015 to 2016 | | | | DE-1A4ciii-2018-0001 | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | No | All issues regarding the inconsistency of activity data from the National Energy Balance (NEB) can only be resolved as soon as the ongoing internal revision process launched by the provider of the NEB has been finished. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Completeness | 2B6 | Include the NOx emissions in the next submission. | | | DE-2B6-2017-0001 | DE-2B6-2018-0001 | DE-2B6-2017-0001 (ID reused) | DE-2B6-2017-0001 (ID reused) | DE-2B6-2017-0001 (ID reused) | | Yes | |
| Completeness | 2C1 | Potential under-estimate of emissions of HCB | | | | DE-2C1-2018-0001 | DE-2C1-2018-0001 (ID reused) | DE-2C1-2018-0001 (ID reused) | | | Yes | Data acquisition for the resolution of this issue will be implemented in the framework of a research project updating several emission factors. The effort is scheduled to start in 2021 and will take about 3 years. Until then the default emission factor from the EMEP/EEA Guidebook is used. |
| Completeness | 2D3a | Emissions of Hg not estimated | | | | | DE-2D3a-2019-0001 | DE-2D3a-2019-0001 (ID reused) | | | No | |
| Completeness | 2D3g | Report PAHs from 2D3g Chemical Products | | | | DE-2D3g-2018-0001 | DE-2D3g-2018-0001 (ID reused) | DE-2D3g-2018-0001 (ID reused) | DE-2D3g-2018-0001 (ID reused) | | Yes | |
| Completeness | 5D2 | NMVOC emissions missing although default EFs exist | | | | | DE-5D2-2019-0001 | DE-5D2-2019-0001 (ID reused) | | | Yes | Industrial wastewater NMVOC emissions were implemented and are part of the 2021 reporting. |
| Completeness | GRID | Add gridded emissions of Cd Pb Hg PCDD/F PAHs HCB PCBs to reporting | | | | | | DE-GRID-GEN-2020-0001 | | | Yes | |
| Completeness | LPS | Add missing pollutants PAHs PCBs PM2.5 | | | | | | DE-LPS-GEN-2020-0001 | DE-LPS-GEN-2020-0001 (ID reused) | | No | Since these pollutants are not in the ePRTR dataset Germany cannot report them. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Accuracy | 2D3a | Rationale for not estimating emissions in category 2D3a and notation key selection | | | | DE-2D3a-2018-0001 | DE-2D3a-2018-0001 (ID reused) | DE-2D3a-2018-0001 (ID reused) | | | No | Germany is in the process of evaluating data to calculate emissions of Hg from the use of fluorescent tubes. |
| Accuracy | LPS | Check emission data for facility "Heyne & Penke Verpackungen GmbH" | | | | | | DE-LPS-E-2020-0001 | | | Yes | |

## NECD 2019

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transparency | 1A1 | Presents its NH3 EF for stationary combustion in the next submission of its IIR justify the use of these and compare these against the values in 2016 EMEP/EEA Guidebook. | | | DE-1A1-2017-0001 | DE-1A1-2018-0001 | DE-1A1-2017-0001 (ID reused) | | | | No | A comparison with default values is not possible |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Consistency | 1A4bii | Significant fluctuations in fuel consumption over the time series | | | | | DE-1A4bii-2019-0001 | | | | No | All issues regarding the inconsistency of activity data from the National Energy Balance (NEB) can only be resolved as soon as the ongoing internal revision process launched by the provider of the NEB has been finished. |
| Consistency | 1A4cii | IEF Cd trend since 2007 erratic | | | | DE-1A4cii-2018-0001 | DE-1A4cii-2018-0001 (ID reused) | DE-1A4cii-2018-0001 (ID reused) | | | No | All issues regarding the inconsistency of activity data from the National Energy Balance (NEB) can only be resolved as soon as the ongoing internal revision process launched by the provider of the NEB has been finished. |
| Consistency | 1A4ciii | Large increase in AD from 2015 to 2016 | | | | DE-1A4ciii-2018-0001 | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | No | All issues regarding the inconsistency of activity data from the National Energy Balance (NEB) can only be resolved as soon as the ongoing internal revision process launched by the provider of the NEB has been finished. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Completeness | 1A2a | NE reported for Cadmium although a default EF is available | | | | | DE-1A2a-2019-0001 | | | | Yes | |
| Completeness | 1A2b | NE reported for some pollutants although default EFs are available | | | | | DE-1A2b-2019-0002 | | | | Yes | |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Completeness | 1A2b | NA is reported for HCB 1990 | | | | | DE-1A2b-2019-0001 | | | | No | Germany carefully checked all possible aditional sources for HCB in this sector. This includes the BREF documents as well as other literature. There was no indication for any missing emission found. The emission factors in the Guidebook are only applicable to processes not occuring in Germany. |
| Completeness | 1A3b | PCB emissions missing for all years although default emission factors are available | | | | | DE-1A3b-2019-0001 | | | | Yes | Emissions calculated based on default EF |
| Completeness | 1A3c | Update notation key from NE to NA | | | | | DE-1A3c-2019-0001 | | | | Yes | |
| Completeness | 2B3 | Include the NOx emissions in the next submission preferably using a country specific method to account for the specific technologies and abatement equipment applied. | | | DE-2B3-2017-0001 | DE-2B3-2018-0001 | DE-2B3-2017-0001 (ID reused) | | | | Yes | |
| Completeness | 2B6 | Include the NOx emissions in the next submission. | | | DE-2B6-2017-0001 | DE-2B6-2018-0001 | DE-2B6-2017-0001 (ID reused) | DE-2B6-2017-0001 (ID reused) | DE-2B6-2017-0001 (ID reused) | | Yes | |
| Completeness | 2C1 | Potential under-estimate of emissions of HCB | | | | DE-2C1-2018-0001 | DE-2C1-2018-0001 (ID reused) | DE-2C1-2018-0001 (ID reused) | | | Yes | Data acquisition for the resolution of this issue will be implemented in the framework of a research project updating several emission factors. The effort is scheduled to start in 2021 and will take about 3 years. Until then the default emission factor from the EMEP/EEA Guidebook is used. |
| Completeness | 2D3a | Emissions of Hg not estimated | | | | | DE-2D3a-2019-0001 | DE-2D3a-2019-0001 (ID reused) | | | No | |
| Completeness | 2D3g | Report PAHs from 2D3g Chemical Products | | | | DE-2D3g-2018-0001 | DE-2D3g-2018-0001 (ID reused) | DE-2D3g-2018-0001 (ID reused) | DE-2D3g-2018-0001 (ID reused) | | Yes | |
| Completeness | 5A | Include NMVOC and PM2.5 emissions from 5A in its next submission. | | | DE-5A-2017-0001 | DE-5A-2018-0001 | DE-5A-2017-0001 (ID reused) | | | | Yes | Implemented in 2020 reporting. Although only the reporting of NMVOC and PM2.5 emissions was requested Germany decided to additionally report PM10 and TSP. |
| Completeness | 5C2 | Emission are not estimated for PCDD/F Pb and Cd although default EFs are available | | | | | DE-5C2-2019-0001 | | | | Yes | Default-EF used emissions reported. |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Completeness | 5D2 | NMVOC emissions missing although default EFs exist | | | | | DE-5D2-2019-0001 | DE-5D2-2019-0001 (ID reused) | | | Yes | Industrial wastewater NMVOC emissions were implemented and are part of the 2021 reporting. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Accuracy | 1A1a | Include the revised estimate of activity data and emissions for biogas in its next submission. | | | DE-1A1a-2017-0003 | DE-1A1a-2018-0001 | DE-1A1a-2017-0003 (ID reused) | | | | Yes | Implemented in 2020 submission |
| Accuracy | 2D3a | Rationale for not estimating emissions in category 2D3a and notation key selection | | | | DE-2D3a-2018-0001 | DE-2D3a-2018-0001 (ID reused) | DE-2D3a-2018-0001 (ID reused) | | | No | Germany is in the process of evaluating data to calculate emissions of Hg from the use of fluorescent tubes. |
| Accuracy | 3B | Tier 1 method used for key category | | | | | DE-3B-2019-0001 | | | | Yes | Implemented in 2020 reporting |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Comparability | 1A4ai | Implied EFs PAHs and PCDD/F are outliers compared to other member states | | | | | DE-1A4ai-2019-0001 | | | | Yes | |

## NECD 2018

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transparency | 1A1 | Presents its NH3 EF for stationary combustion in the next submission of its IIR justify the use of these and compare these against the values in 2016 EMEP/EEA Guidebook. | | | DE-1A1-2017-0001 | DE-1A1-2018-0001 | DE-1A1-2017-0001 (ID reused) | | | | No | A comparison with default values is not possible |
| Transparency | 1A1b | Include the country specific EFs for combustion in refineries in the relating chapter of its IIR to improve transparency. | | § 55 | DE-1A1b-2017-0001 | DE-1A1b-2018-0001 | | | | | No | Emission factors are under revision. New emission factors will be included in the IIR following completion of the running refinery project. |
| Transparency | 1A3bi | Incorrect notation keys for activity data | | | | DE-1A3bi-2018-0002 | | | | | Yes | notation keys replaced by activity data values |
| Transparency | 1A3bv | Incorrect notation keys for HCB and PCB emissions | | | | DE-1A3bv-2018-0001 | | | | | Yes | 'NE' replaced by 'NA' as suggested by the TERT |
| Transparency | 2D3d | Include explanation on recalculation to 1994 in the next submission. | | | DE-2D3d-2017-0001 | DE-2D3d-2018-0001 | | | | | Yes | Was reported with the submission 2019. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Consistency | 1A4cii | IEF Cd trend since 2007 erratic | | | | DE-1A4cii-2018-0001 | DE-1A4cii-2018-0001 (ID reused) | DE-1A4cii-2018-0001 (ID reused) | | | No | All issues regarding the inconsistency of activity data from the National Energy Balance (NEB) can only be resolved as soon as the ongoing internal revision process launched by the provider of the NEB has been finished. |
| Consistency | 1A4cii | Inconsistent AD values NFR vs. IIR | | | | DE-1A4cii-2018-0001 | | | DE-1A4cii-2018-0001 (ID reused) | | No | |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Consistency | 1A4ciii | Large increase in AD from 2015 to 2016 | | | | DE-1A4ciii-2018-0001 | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | DE-1A4ciii-2018-0001 (ID reused) | No | All issues regarding the inconsistency of activity data from the National Energy Balance (NEB) can only be resolved as soon as the ongoing internal revision process launched by the provider of the NEB has been finished. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Completeness | 1B2aiv | Potential under-estimate of emissions of Hg Cd PCDD/F | | | | DE-1B2aiv-2018-0001 | | | | | No | Metal and PCDD/F emissions are not considered as fugitive. If IE would be used nevertheless one can assume there are such fugitives. Germany suggest to keep the notation key NA. |
| Completeness | 2B3 | Include the NOx emissions in the next submission preferably using a country specific method to account for the specific technologies and abatement equipment applied. | | | DE-2B3-2017-0001 | DE-2B3-2018-0001 | DE-2B3-2017-0001 (ID reused) | | | | Yes | |
| Completeness | 2B6 | Include the NOx emissions in the next submission. | | | DE-2B6-2017-0001 | DE-2B6-2018-0001 | DE-2B6-2017-0001 (ID reused) | DE-2B6-2017-0001 (ID reused) | DE-2B6-2017-0001 (ID reused) | | Yes | |
| Completeness | 2C1 | Potential under-estimate of emissions of HCB | | | | DE-2C1-2018-0001 | DE-2C1-2018-0001 (ID reused) | DE-2C1-2018-0001 (ID reused) | | | Yes | Data acquisition for the resolution of this issue will be implemented in the framework of a research project updating several emission factors. The effort is scheduled to start in 2021 and will take about 3 years. Until then the default emission factor from the EMEP/EEA Guidebook is used. |
| Completeness | 2C3 | Include NOx from aluminium production in the next submission to improve completeness and comparability. | | | DE-2C3-2017-0001 | DE-2C3-2018-0002 | | | | | Yes | Germany carefully assessed the situation regarding this issue and concluded that no substantial NOx emission are to be expected from this source. But in order to avoid an underestimation Germany implemented the default EF of the emission guidebook 2019. |
| Completeness | 2C3 | Potential under-estimate of emissions of HCB | | | | DE-2C3-2018-0001 | | | | | Yes | |
| Completeness | 2D3g | Report PAHs from 2D3g Chemical Products | | | | DE-2D3g-2018-0001 | DE-2D3g-2018-0001 (ID reused) | DE-2D3g-2018-0001 (ID reused) | DE-2D3g-2018-0001 (ID reused) | | Yes | |
| Completeness | 5A | Include NMVOC and PM2.5 emissions from 5A in its next submission. | | | DE-5A-2017-0001 | DE-5A-2018-0001 | DE-5A-2017-0001 (ID reused) | | | | Yes | Implemented in 2020 reporting. Although only the reporting of NMVOC and PM2.5 emissions was requested Germany decided to additionally report PM10 and TSP. |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Completeness | 5D | Include the estimation of NMVOC emissions from wastewater treatment plant in its next submission. | | | DE-5D-2017-0001 | DE-5D-2018-0001 | | | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Accuracy | 1A1a | Include the revised estimate of activity data and emissions for biogas in its next submission. | | | DE-1A1a-2017-0003 | DE-1A1a-2018-0001 | DE-1A1a-2017-0003 (ID reused) | | | | Yes | Implemented in 2020 submission |
| Accuracy | 2D3a | Rationale for not estimating emissions in category 2D3a and notation key selection | | | | DE-2D3a-2018-0001 | DE-2D3a-2018-0001 (ID reused) | DE-2D3a-2018-0001 (ID reused) | | | No | Germany is in the process of evaluating data to calculate emissions of Hg from the use of fluorescent tubes. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Comparability | 5C | Hg EF is 100 times smaller than the default value proposed in the 2016 EMEP/EEA Guidebook and the Cd and Pb EF are 1000 times smaller than the default values proposed in the 2016 EMEP/EEA Guidebook | | | | DE-5-2018-0001 | | | | | Yes | References to research Projects of CS-EF added |

## NECD 2017

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transparency | 1A1 | Presents its NH3 EF for stationary combustion in the next submission of its IIR justify the use of these and compare these against the values in 2016 EMEP/EEA Guidebook. | | | DE-1A1-2017-0001 | DE-1A1-2018-0001 | DE-1A1-2017-0001 (ID reused) | | | | No | A comparison with default values is not possible |
| Transparency | 1A1a | Improves the transparency of its IIR regarding PM2.5 shares used for each fuel (solid fuels (coal and lignite) and gaseous fuels but also biomass if relevant). | | | DE-1A1a-2017-0001 | | | | | | Yes | |
| Transparency | 1A1b | Include the country specific EFs for combustion in refineries in the relating chapter of its IIR to improve transparency. | | § 55 | DE-1A1b-2017-0001 | DE-1A1b-2018-0001 | | | | | No | Emission factors are under revision. New emission factors will be included in the IIR following completion of the running refinery project. |
| Transparency | 1A2gviii | Improve the transparency of the IIR to explain its assumptions on the PM2.5 fraction used for each fuel and particularly for liquid fuels biomass and other fuels. | | | DE-1A2gviii-2017-0001 | | | | | | Yes | |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transparency | 2A1 | Include the explanation and rationale for using two sets of activity data to be included in the IIR for the next submission. | | | DE-2A1-2017-0001 | | | | | | Yes | |
| Transparency | 2C | Update the SO2 emission factors for 2C5 2C6 and 2C7a for the next submission to reflect the individual production activities and to include more transparent information on primary vs. secondary production of lead zinc and copper in the IIR. | | | DE-2C-2017-0001 | | | | | | Yes | |
| Transparency | 2D3d | Include explanation on recalculation to 1994 in the next submission. | | | DE-2D3d-2017-0001 | DE-2D3d-2018-0001 | | | | | Yes | Was reported with the submission 2019. |
| Transparency | 3B | Include the information for the proportional of NO-N and N2 and the reference in the IIR to improve transparency. | | | DE-3B-2017-0002 | | | | | | Yes | |
| Transparency | 3B2 | Mention that NFR 3B2 includes lambs and also explain the lower EF NMVOC used for lambs. Furthermore the TERT recommend that Germany in IIR mentioned that pullets are included in NFR 3B4giv other poultry. | | | DE-3B2-2017-0004 | | | | | | Yes | |
| Transparency | 3F | Include more information in the IIR for the next submission referring to the specific law and clarifying from which year the ban came into force. Furthermore it is recommended to inform whether there are derogations for field burning under certain circumstances or for certain crop types. | | | DE-3F-2017-0001 | | | | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Consistency | 1A2 | Use the right notation keys in the NFR tables for its next submissions. (1A2 Stationary Combustion in Manufacturing Industries and Construction PM2.5 2005-2015) | | | DE-1A2-2017-0001 | | | | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Completeness | 2B10a | Investigate whether flaring occurs in relation to carbide production e.g. by contacting the single producer of carbide. | | | DE-2B10a-2017-0002 | | | | | | Yes | Flaring is a common destruction technic in chemical industry. But no information exists to assign flaring quantities to a single installation. |
| Completeness | 2B3 | Include the NOx emissions in the next submission preferably using a country specific method to account for the specific technologies and abatement equipment applied. | | | DE-2B3-2017-0001 | DE-2B3-2018-0001 | DE-2B3-2017-0001 (ID reused) | | | | Yes | |
| Completeness | 2B6 | Include the NOx emissions in the next submission. | | | DE-2B6-2017-0001 | DE-2B6-2018-0001 | DE-2B6-2017-0001 (ID reused) | DE-2B6-2017-0001 (ID reused) | DE-2B6-2017-0001 (ID reused) | | Yes | |
| Completeness | 2C3 | Include NOx from aluminium production in the next submission to improve completeness and comparability. | | | DE-2C3-2017-0001 | DE-2C3-2018-0002 | | | | | Yes | Germany carefully assessed the situation regarding this issue and concluded that no substantial NOx emission are to be expected from this source. But in order to avoid an underestimation Germany implemented the default EF of the emission guidebook 2019. |
| Completeness | 3Da2b | Include the emission from sewage sludge applied to agricultural soils in the next submission. | | | DE-3Da2b-2017-0001 | | | | | | Yes | |
| Completeness | 5A | Include NMVOC and PM2.5 emissions from 5A in its next submission. | | | DE-5A-2017-0001 | DE-5A-2018-0001 | DE-5A-2017-0001 (ID reused) | | | | Yes | Implemented in 2020 reporting. Although only the reporting of NMVOC and PM2.5 emissions was requested Germany decided to additionally report PM10 and TSP. |
| Completeness | 5D | Include the estimation of NMVOC emissions from wastewater treatment plant in its next submission. | | | DE-5D-2017-0001 | DE-5D-2018-0001 | | | | | Yes | |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Completeness | 5E | Although the Guidebook has methods for car and house fires in Chapter 6 it may be more transparent to include these in Chapter 7 as Chapter 6D is more focused on compost and sludge. The ERT encourages Germany to consider including some of these emissions in the next submissions. | § 116 | §139 | DE-5A-2017-0003 | | | | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Accuracy | 1A1a | Include the revised estimate of activity data and emissions for biogas in its next submission. | | | DE-1A1a-2017-0003 | DE-1A1a-2018-0001 | DE-1A1a-2017-0003 (ID reused) | | | | Yes | Implemented in 2020 submission |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Comparability | 3Da1 | Use the updated emission factors available in the 2016 EMEP/EEA Guidebook (Table 3.2) for the next submission. | | | DE-3Da1-2017-0001 | | | | | | Yes | |

## CLRTAP 2014

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | Provide a PDF version of the IIR for offline use and to better facilitate the review process | § 6 9 11 28 | § 17 | | | | | | | No | The current Wiki platform isn't able to export a whole site to PDF. But we can provide an offline HTML version with full navigation. |
| General | | Use the results of the KCA to prioritise improvements in the inventory | | § 14 | | | | | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| QA/QC | | Fully implement the QA/QC system for the air pollutant emission inventory. If possible implement a unified QA/QC system for reporting to CLRTAP and UNFCCC. | § 21 24 62 74 88 105 | § 37 44f | | | | | | | No | Ongoing discussion |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QA/QC | | Widen the use of the existing QA/QC system used for the set of activity data as well as the methods and emission factors for GHGs for the needs of CLRTAP/NECD inventories and providing further details on its implementation in the IIR (general and sectoral descriptions). | § 33 40 | § 16 69 84 87 103 105 | | | | | | | No | Ongoing discussion |
| QA/QC | | Include information on verification and validation of the inventory in the IIR. | | § 38 | | | | | | | No | Ongoing discussion |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Transparency | | Inaccuracies were found in the use of notation keys and it is recommended to justify the use of notation keys in the IIR for each particular sector. | § 38 | § 19 | | | | | | | Yes | Information tables for NE & IE were added to the completeness chapter of the current IIR |
| Transparency | | Provide more detailed to explain emission trends e.g. annual fluctuations and discontinuities of emissions. | | § 21 78 | | | | | | | Yes | |
| Transparency | | Extend the use of a bibliography for some subsectors to all sectors in the IIR. | | § 77 | | | | | | | Partly | The amount of recurring references is very small within most source categories. And the total number of references per page is usually quite low. So directly linking to the documents seems like a good way to make sources available to the readers. |
| Transparency | 1A1b | Include the country specific EFs for combustion in refineries in the relating chapter of its IIR to improve transparency. | | § 55 | DE-1A1b-2017-0001 | DE-1A1b-2018-0001 | | | | | No | Emission factors are under revision. New emission factors will be included in the IIR following completion of the running refinery project. |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transparency | 1A3b | Explain in more detail the emission calculation for road transport not only by saying that HBEFA and TREMOD are used but giving more information including an overview of emission factors in the next versions of the IIR. | § 65 | § 72 | | | | | | | Yes | |
| Transparency | 1B2d | Report in the IIR on what basis emissions from geothermal energy extraction are considered negligible. | | § 59 | | | | | | | Yes | |
| Transparency | 2D3 | The methodology described in the IIR for solvent and other product use is found to be not transparent. Provide detail on all 37 subcategories including activity data and emission factors. | | § 18 96 97 98 | | | | | | | Yes | The transparency for the solvents used and products used sector in the IIR was much improved in the submission 2016. |
| Transparency | 3B | Explain the variation in activity data for goats in the IIR. | | § 120 | | | | | | | Yes | |
| Transparency | 3B | Provide additional information in the IIR especially related to: TAN contents distributions of housing and storage facilities (e.g. for the first and last reporting year) slurry storage systems and the spreading systems applied corresponding EFs. | | § 117 | | | | | | | Yes | |
| Transparency | 5A\5B\5C | Since all incineration is reported under energy add information about the methodology used for different types of waste incineration under NFR 1. In NFR 6C use the notation key “IE” instead of “NO” and to explain the use of the notation key in the IIR. | § 103 110 111 112 | § 136 | | | | | | | Yes | Information on methods used for estimation of energy-related is reported in NFR 1. Germany considers NO to be correct and explains the situation in its IIR. Cremation estimation is explained now. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Consistency | 1A1\1A2 | In the IIR in the “Short description” for 1A1 and 1A2 Germany presents a tier 2 or 3 approach. However during the review Germany indicated that only the tier 2 approach was used. This needs correction in the IIR (was agreed by Germany to do this) | § 47 | § 54 | | | | | | | Yes | |
| Consistency | 2 | Ensure time series consistency of TSP emissions between 1990 and later years and clearly explain in the IIR where and why consistent reporting is not possible. | | § 80 | | | | | | | Yes | |
| Consistency | 2A1\2A2 | A time series inconsistency is found which relates to a different reporting structure before 2000. It is recommended to explore the feasibility of harmonizing the methodology. | | § 93 | | | | | | | Yes | |
| Consistency | 2D3 | Provide emissions for 1990-2005 at a disaggregated level similar to later years if possible. If not explain why for the earlier period emissions have been estimated at a more aggregated level. Also clearly document in the case of IE where emissions have been allocated. | | § 100 101 | | | | | | | Yes | The manufacturing industry was the most important branch of the GDR economy. The transformation of the markets and the disappearance of large state-owned enterprises in the course of the German unity led to a dramatic change in the eastern part of Germany |
| Consistency | 3B | The ERT encourages Germany to further improve the consistency of the time series of NH3 for manure management. In chapter 4 of the EMEP/EEA Guidebook 2013 specific methods are provided. | | § 110 | | | | | | | Yes | |
| Consistency | 3B | Sheep animal numbers show a step change due to a different reporting time. This should be corrected for and described in the IIR as appropriate. | | § 119 | | | | | | | Yes | |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Consistency | 3B | Check and explain the variation in activity data for horses in the IIR. | | § 121 | | | | | | | Yes | |
| Consistency | 3B | Explain how the change in farm practices or the implementation of mitigation measures has affected the time series in the IIR in order to facilitate the assessment of emission trends. | | § 111 | | | | | | | Yes | |
| Consistency | 3B | Explain in the IIR why the NH3 EF for dairy cattle decreased from 2011 to 2012. | | § 122 | | | | | | | Yes | |
| Consistency | 3B | Explain in the IIR why the NH3 EF for swine decreased from 1993 to 1994. | | § 123 | | | | | | | Yes | |
| Consistency | 3B | Explain in the IIR why the NH3 EF significant changes for different poultry subsectors in the 2000s. | | § 124 | | | | | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Completeness | | Emissions prior to 1990 are not reported. | § 27 | § 24 | | | | | | | Yes | |
| Completeness | | LPS data were not reported. | | § 10 | | | | | | | Yes | |
| Completeness | | A key category analysis (KCA) was missing for the base years (1990 or 2000 for PM) of the pollutants. | | § 13 | | | | | | | Yes | |
| Completeness | 1A3ai(i)\1A3aii(i) | Heavy metal emissions are currently not estimated. The ERT recommends that the Party estimates these emissions using the methodology in the EMEP/EEA Guidebook. | | § 62 | | | | | | | Yes | |
| Completeness | 1A3biv\1A4bii | PM10 and PM2.5 emissions are reported as “NE”. The ERT recommends that Germany completes the inventory by estimating these emissions. | | § 63 | | | | | | | Yes | |
| Completeness | 1A3bv | Evaporative emissions from running losses (i.e. vapour generated in the fuel tank during vehicle operation) were missing because not considered in the TREMOD model. The ERT recommends to include these in the inventory. | | § 73 | | | | | | | No | This issue has not yet been looked into as other model revisions especially regarding a follow-up of 'diesel gate' appear much more relevant tying up all resources. |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Completeness | 1A3dii | Pb and Hg emissions are currently not estimated. The ERT recommends that the Party considers the emission factors available in the Guidebook. | | § 64 | | | | | | | Yes | |
| Completeness | 1A4ai\1A4ci\1A5a | HM and POP currently not reported since no consistent dataset is available (partly country specific partly Guidebook). The recommendation is to describe the issue in the IIR and until it is solved use the Guidebook emission factors despite their recognized uncertainty rather than reporting NE. | | § 57 | | | | | | | Partly | Implemented for 1A4ai and 1A4ci |
| Completeness | 5A\5C\5D | The inventory regarding Waste is currently not complete with missing estimates for several source categories. | § 102 | § 134 135 | | | | | | | Yes | Industrial wastewater emissions implemented since 2021 reporting. Solid waste emissions implemented since 2020 reporting. Domestic wastewater emissions implemented since 2018 reporting. 5.C completed |
| Completeness | 5A\5D | Improves the completeness of the inventory by estimating emissions from solid waste disposal and wastewater handling. | | § 127 | | | | | | | Yes | Solid waste emissions implemented since 2020 reporting. Domestic wastewater emissions implemented since 2018 reporting. Industrial wastewater emissions implemented since 2021 reporting. |
| Completeness | 5E | Although the Guidebook has methods for car and house fires in Chapter 6 it may be more transparent to include these in Chapter 7 as Chapter 6D is more focused on compost and sludge. The ERT encourages Germany to consider including some of these emissions in the next submissions. | § 116 | §139 | DE-5A-2017-0003 | | | | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accuracy | | Implement a (qualitative and quantitative) uncertainty analysis and use the results to prioritize improvements to the inventory | § 20 24 | § 32 44e 85 | | | | | | | Yes | |
| Accuracy | | Include a chapter in the IIR with for each source category the foreseen improvements for the inventory | | § 34 | | | | | | | Partly | Included for most categories |
| Accuracy | 1A3bvi | This source is a key category for Pb and the ERT has noted that the emission factor for brake wear used by Germany was higher than the maximum range quoted by the 2013 Guidebook. Germany is recommended to review the EF explain where it is coming from in the IIR and potentially revise to bring in line with the Guidebook. | | § 74 | | | | | | | Yes | |
| Accuracy | 1A3dii\1A5b | Review the methodology for national navigation by distinguishing between coastal and inland shipping based on an ongoing research project as well as explicitly include emissions from military activities. | | § 75 76 | | | | | | | Yes | |
| Accuracy | 2A1 | Cement production is a key source for Hg HCB and for NOx PM10 and PAH but Tier 1 is used. The ERT encourages Germany to use plant-specific data collected as part of the LCPD IPPC and E-PRTR to develop a tier 2 or 3 methodology in the near future and to document these in its IIR. | § 79 | § 88 | | | | | | | Yes | plant-specific data approach is not planned |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accuracy | 2D3 | Increase the use of information from individual installations that make a high contribution to the key categories such as car assembly sites and big printing installations. | | § 104 | | | | | | | Yes | Emissions caused by the use of solvents and solvent-based products are reported in the relevant source groups. In our methodology we also include the application of solvent-based products in large installations such as those used in automotive series production or large printing systems. The emission data of defined individual plants are thus included in the calculation but cannot be shown and published individually for reasons of confidentiality and data protection. |
| Accuracy | 3B | Describe the efforts taken to verify / validate the emission model in the IIR. | | § 118 | | | | | | | Yes | |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Comparability | 1A2a\1A4ai\1A4ci\1A5a | Notation key NE is used for (many) heavy metals despite the availability of EFs in the EMEP/EEA Guidebook. If all HM emissions from iron & steel are reported in 2C1 the notation key should be IE. | | § 56 | | | | | | | Partly | Implemented for 1A4ai and 1A4ci |
| Comparability | 1A4bii\1A4cii | Implied NOx emission factors are at the high end of the range when compared with a selected group of countries (AT BE DK ES FI FR GB IE IT NL NO). The ERT recommends that the Party reviews the emission factors for these two sources and includes an explanation for this issue in the IIR. | | § 66 | | | | | | | No | This minor issue has not yet been checked. The inventory compiler will look into this as soon as resources allow. |

## CLRTAP 2010

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| General | | Provide a PDF version of the IIR for offline use and to better facilitate the review process | § 6 9 11 28 | § 17 | | | | | | | No | The current Wiki platform isn't able to export a whole site to PDF. But we can provide an offline HTML version with full navigation. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| QA/QC | | Fully implement the QA/QC system for the air pollutant emission inventory. If possible implement a unified QA/QC system for reporting to CLRTAP and UNFCCC. | § 21 24 62 74 88 105 | § 37 44f | | | | | | | No | Ongoing discussion |
| QA/QC | | Widen the use of the existing QA/QC system used for the set of activity data as well as the methods and emission factors for GHGs for the needs of CLRTAP/NECD inventories and providing further details on its implementation in the IIR (general and sectoral descriptions). | § 33 40 | § 16 69 84 87 103 105 | | | | | | | No | Ongoing discussion |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Transparency | | Inaccuracies were found in the use of notation keys and it is recommended to justify the use of notation keys in the IIR for each particular sector. | § 38 | § 19 | | | | | | | Yes | Information tables for NE & IE were added to the completeness chapter of the current IIR |
| Transparency | | Provide more detailed information on the rationale for recalculations at a sectoral level to compliment the information already provided in the recalculation tables per pollutant. | § 30 43 90 107 | | | | | | | | Yes | |
| Transparency | 1A2a\1A2b\2C | For iron & steel there is a mix of reporting under 1A2a (PM & CO) 2C1 (NOx SOx VOC NH3) and “NE” (HMs and POPs). For non ferrous metals similar issues are observed. The recommendation is to explain the rationale for reporting in different source categories as well the rationale for NEs. NE reporting should be avoided as much as possible e.g. by applying Guidebook Tier 1 EFs. | § 48 49 | | | | | | | | Yes | The reporting in the different source categories is explained in the IIR. |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transparency | 1A2gviii | The ERT recommends that Germany include details of the units of AD used in its estimations as this was not always the case. | § 51 | | | | | | | | Yes | |
| Transparency | 1A3b | Explain in more detail the emission calculation for road transport not only by saying that HBEFA and TREMOD are used but giving more information including an overview of emission factors in the next versions of the IIR. | § 65 | § 72 | | | | | | | Yes | |
| Transparency | 1A4 | Provide more detail on the emission factors used including their applicability for the different years and sub-categories of the time series. Find EFs to estimate emissions for heavy metals (for example: using tier 1 in the EMEP Guidebook inventories in other countries). | § 52 | | | | | | | | Yes | |
| Transparency | 3B | The ERT recommends including in the IIR information on the complete time series of the activity data description of emission drivers recalculations and improvements for the agriculture sector. | § 86 94 | | | | | | | | Yes | |
| Transparency | 5A\5B\5C | Since all incineration is reported under energy add information about the methodology used for different types of waste incineration under NFR 1. In NFR 6C use the notation key “IE” instead of “NO” and to explain the use of the notation key in the IIR. | § 103 110 111 112 | § 136 | | | | | | | Yes | Information on methods used for estimation of energy-related is reported in NFR 1. Germany considers NO to be correct and explains the situation in its IIR. Cremation estimation is explained now. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Consistency | 1A1\1A2 | In the IIR in the “Short description” for 1A1 and 1A2 Germany presents a tier 2 or 3 approach. However during the review Germany indicated that only the tier 2 approach was used. This needs correction in the IIR (was agreed by Germany to do this) | § 47 | § 54 | | | | | | | Yes | |
| Consistency | 1A5 | The IIR says Tier 1 method is used for 1A5 but it is actually Tier 2/3. This should be corrected in the IIR. | § 53 | | | | | | | | Yes | |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Consistency | 3B | The activity data (animal numbers) is coming from various sources and some corrections are being done. It is recommended that Germany includes a table in the IIR showing the livestock numbers from different sources and the type of elaboration/correction that has been done. | § 94 | | | | | | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Completeness | | Emissions prior to 1990 are not reported. | § 27 | § 24 | | | | | | | Yes | |
| Completeness | 1A2a\1A2b\1A4\1B1a | Some emissions are not estimated for some pollutants: heavy metals and POPs for 1A2a particulates heavy metals and POPs for 1A2b heavy metals for 1A4 and NMVOC for 1B1a. The ERT recommends Germany to use the Guidebook default EFs if no other method is available. | § 36 | | | | | | | | Yes | |
| Completeness | 1A3a | NH3 reported as NE. Recommendation to investigate the emissions or report as NO if emissions do not occur. | § 68 | | | | | | | | Yes | The notation key 'NE' is used only for ammonia from aviation gasoline (as recommended in the 2016 EMEP Guidebook). For jet kerosene emissions are estimated. |
| Completeness | 1B1a | In 2010 “NE” is indicated for particulates and “NA” for NMVOC but the Guidebook has EFs. It is recommended that Germany identifies the type of coal mining using the EFs from the EMEP Guidebook or other references to estimate emissions for this sector. In 2014 NMVOC was reported as NE and the ERT recommends Germany to describe why NE is reported (emissions assumed negligible). | § 54 | | | | | | | | Yes | |
| Completeness | 2C1 | Include emissions for dioxins and heavy metals based on new research project. | § 80 81 | | | | | | | | Yes | |
| Completeness | 3D | The ERT encourages Germany to estimate PM10 and PM2.5 emissions for 3D in future submissions following the EMEP/EEA Guidebook recommendations. | § 98 | | | | | | | | Yes | |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Completeness | 5A\5C\5D | The inventory regarding Waste is currently not complete with missing estimates for several source categories. | § 102 | § 134 135 | | | | | | | Yes | Industrial wastewater emissions implemented since 2021 reporting. Solid waste emissions implemented since 2020 reporting. Domestic wastewater emissions implemented since 2018 reporting. 5.C completed |
| Completeness | 5E | Although the Guidebook has methods for car and house fires in Chapter 6 it may be more transparent to include these in Chapter 7 as Chapter 6D is more focused on compost and sludge. The ERT encourages Germany to consider including some of these emissions in the next submissions. | § 116 | §139 | DE-5A-2017-0003 | | | | | | Yes | |
| Completeness | 6 | Consider currently missing sources: NH3 emissions from Cats and Dogs from Zoo animals and human ammonia emissions etc. | § 116 | | | | | | | | Partly | Car and house fires have been included for quite a while now (5E). Human NH3 emissions are considered in 6A. Pets will be considered in sub2024. |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | **NECD 2022** | **Implemented?** | **Official Comment for IIR** |
| Accuracy | | Implement a (qualitative and quantitative) uncertainty analysis and use the results to prioritize improvements to the inventory | § 20 24 | § 32 44e 85 | | | | | | | Yes | |
| Accuracy | 1A1b\1A1c\2 | Improvement from Tier 2 to Tier 3 using plant-specific data for some industrial processes including cement production as well as for large combustion plants (e.g. 1A1b 1A1c) | § 19 41 45 46 | | | | | | | | Partly | Included for large combustion plants no plant-specific data for cement production |
| Accuracy | 2A1 | Cement production is a key source for Hg HCB and for NOx PM10 and PAH but Tier 1 is used. The ERT encourages Germany to use plant-specific data collected as part of the LCPD IPPC and E-PRTR to develop a tier 2 or 3 methodology in the near future and to document these in its IIR. | § 79 | § 88 | | | | | | | Yes | plant-specific data approach is not planned |

| Aspect | Sector | Finding summary | CLRTAP 2010 | CLRTAP 2014 | NECD 2017 | NECD 2018 | NECD 2019 | NECD 2020 | NECD 2021 | NECD 2022 | Implemented? | Official Comment for IIR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accuracy | 2L | Include results of ongoing research project to improve from Tier 1 to higher Tier methodology. | § 82 83 | | | | | | | | Yes | |
| Accuracy | 3B | There were errors in the calculation of N excretion rates it is recommended that Germany corrects this. | § 97 | | | | | | | | Yes | |
| **Aspect** | **Sector** | **Finding summary** | **CLRTAP 2010** | **CLRTAP 2014** | **NECD 2017** | **NECD 2018** | **NECD 2019** | **NECD 2020** | **NECD 2021** | | **Implemented?** | **Official Comment for IIR** |
| Comparability | 1A2\2 | Germany reports emissions from sugar production in source category 2D2. It is recommended to report these emissions under 1A2e and include a more detailed description of the sub-categories the methodology used the source of activity data the source of EFs and consistency across the time series (1990-2008). | § 50 | | | | | | | | Yes | Reporting of NMVOC and PM emissions from sugar production in 2H2 (used to be 2D2) is correct according to the Inventory Guidebook 2016. |
| Comparability | 1A3di(ii)\1A4ciii | Emissions reported as IE. The ERT encourages Germany to make separate emission estimates for these sectors in future IIR reports and in the meantime a separate summary table of all categories (fully or partially reported as IE) and where they have been moved would be beneficial. | § 69 | | | | | | | | Yes | |
| Comparability | 1A4aii | Emissions for main pollutants were reported as IE. The ERT encourages the Party to investigate further statistical resources for missing estimates in this sector and include a progress report within the next IIR. | § 67 | | | | | | | | Yes | |