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# Report on the individual review of the annual submission of the Netherlands submitted in 2019*

## Note by the expert review team

*Summary*

Each Party included in Annex I to the Convention must submit an annual inventory of emissions and removals of greenhouse gases for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2019 annual submission of the Netherlands, conducted by an expert review team in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol". The review took place from 16 to 21 September 2019 in Bonn.

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\* In the symbol for this document, 2019 refers to the year in which the inventory was submitted, not to the year of publication.

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# Contents

# Abbreviations and acronyms

| | |
|---|---|
| 2006 IPCC Guidelines | *2006 IPCC Guidelines for National Greenhouse Gas Inventories* |
| AAU | assigned amount unit |
| AD | activity data |
| Annex A source | source category included in Annex A to the Kyoto Protocol |
| AR | afforestation and reforestation |
| Article 8 review guidelines | "Guidelines for review under Article 8 of the Kyoto Protocol" |
| C | confidential |
| CBS | Statistics Netherlands |
| CER | certified emission reduction |
| $CH_4$ | methane |
| CM | cropland management |
| $CO_2$ | carbon dioxide |
| $CO_2$ eq | carbon dioxide equivalent |
| Convention reporting adherence | adherence to the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories" |
| CPR | commitment period reserve |
| CRF | common reporting format |
| CSC | carbon stock change |
| DOC | degradable organic carbon |
| $DOC_f$ | fraction of degradable organic carbon that decomposes |
| DOM | dead organic matter |
| EF | emission factor |
| $EF_3$ | emission factor for nitrous oxide emissions from urine and dung deposited by grazing animals on pasture, range and paddock |
| EFISCEN | European Forest Information Scenario (model) |
| ENINA | energy, industry and waste management |
| ERT | expert review team |
| ERU | emission reduction unit |
| EU ETS | European Union Emissions Trading System |
| FAO | Food and Agriculture Organization of the United Nations |
| $F_{IND-COM}$ | fraction of industrial and commercial co-discharged protein into the sewer system |
| FM | forest management |
| FMRL | forest management reference level |
| $F_{NON-CON}$ | fraction of non-consumed protein added to wastewater |
| $Frac_{GRAZ}$ | fraction of livestock nitrogen excreted and deposited onto soil during grazing |
| GHG | greenhouse gas |
| GM | grazing land management |
| HFC | hydrofluorocarbon |
| HWP | harvested wood products |
| IE | included elsewhere |
| IEF | implied emission factor |
| IPCC | Intergovernmental Panel on Climate Change |
| IPPU | industrial processes and product use |
| k | methane generation (decomposition) rate constant |

| KP-LULUCF activities | activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol |
| KP reporting adherence | adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol |
| Kyoto Protocol Supplement | *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol* |
| LULUCF | land use, land-use change and forestry |
| MCF | methane conversion factor |
| N | nitrogen |
| $N_2O$ | nitrous oxide |
| NA | not applicable |
| NE | not estimated |
| NEMA | National Emission Model for Agriculture |
| Nex | nitrogen excretion |
| $NF_3$ | nitrogen trifluoride |
| NFI | national forest inventory |
| NIR | national inventory report |
| NO | not occurring |
| NR | not reported |
| PFC | perfluorocarbon |
| QA/QC | quality assurance/quality control |
| R | reported |
| RMU | removal unit |
| RV | revegetation |
| SEF | standard electronic format |
| $SF_6$ | sulfur hexafluoride |
| SIAR | standard independent assessment report |
| $T_{PLANT}$ | degree of utilization of modern centralized wastewater treatment plants |
| UNFCCC Annex I inventory reporting guidelines | "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories" |
| UNFCCC review guidelines | "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" |
| VS | volatile solid(s) |
| WDR | wetland drainage and rewetting |
| Wetlands Supplement | *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands* |

# I. Introduction[1]

1. This report covers the review of the 2019 annual submission of the Netherlands organized by the secretariat in accordance with the Article 8 review guidelines (adopted by decision 22/CMP.1 and revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention" (decision 13/CP.20). The review took place from 16 to 21 September 2019 in Bonn and was coordinated by Jamie Howland, Nashib Kafle and Roman Payo (secretariat). Table 1 provides information on the composition of the ERT that conducted the review of the Netherlands.

Table 1
**Composition of the expert review team that conducted the review of the Netherlands**

| Area of expertise | Name | Party |
|---|---|---|
| Generalist | Riccardo De Lauretis | Italy |
| | Melissa Weitz | United States of America |
| Energy | Vincent Camobreco | United States of America |
| | Sangay Dorji | Bhutan |
| | Brooke Elizabeth Perkins | Australia |
| IPPU | Thapelo Clifford Mohale Letete | South Africa |
| | Jacek Skoskiewicz | Poland |
| | Alexander Valencia | Colombia |
| Agriculture | Fatou Ndeye Gaye | Gambia |
| | Nidup Peljor | Bhutan |
| | Andrea Pickering | New Zealand |
| LULUCF and KP-LULUCF activities | Markus Didion | Switzerland |
| | Timothy Paul Liersch | Australia |
| | Marina Vitullo | Italy |
| Waste | Fatma Betül Demirok | Turkey |
| | Julius Madzore | Zimbabwe |
| Lead reviewers | Thapelo Clifford Mohale Letete | |
| | Melissa Weitz | |

2. The basis of the findings in this report is the assessment by the ERT of the Party's 2019 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines. The ERT notes that the individual inventory review of the Netherlands' 2018 annual submission did not take place in 2018 owing to insufficient funding for the review process.

3. The ERT has made recommendations that the Netherlands resolve the findings related to issues,[2] including issues designated as problems.[3] Other findings, and, if applicable, the encouragements of the ERT to the Netherlands to resolve them, are also included.

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[1] At the time of publication of this report, the Netherlands had submitted its instrument of ratification of the Doha Amendment; however, the Amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, para. 6, pending the entry into force of the Amendment.

[2] Issues are defined in decision 13/CP.20, annex, para. 81.

[3] Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

4.     A draft version of this report was communicated to the Government of the Netherlands, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

5.     Annex I shows annual GHG emissions for the Netherlands, including totals excluding and including the LULUCF sector, indirect $CO_2$ emissions, and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from KP-LULUCF activities, if elected by the Netherlands, by gas, sector and activity.

6.     Information to be included in the compilation and accounting database can be found in annex II.

## II.     Summary and general assessment of the 2019 annual submission

7.     Table 2 provides the assessment by the ERT of the annual submission with respect to the tasks undertaken during the review. Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.

Table 2
**Summary of review results and general assessment of the inventory of the Netherlands**

| Assessment | | | Issue or problem ID#(s) in table 3 and/or 5[a] |
|---|---|---|---|
| Dates of submission | Original submission: 15 April 2019 (NIR), 15 April 2019 (CRF tables) version 1, 15 April 2019 (SEF tables) | | |
| | Revised submission: 20 August 2019 (SEF tables) | | |
| | Unless otherwise specified, the values from the latest submission are used in this report | | |
| Review format | Centralized | | |
| Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable) | Have any issues been identified in the following areas: | | |
| | (a) Identification of key categories? | Yes | G.11 |
| | (b) Selection and use of methodologies and assumptions? | Yes | I.6, I.23, A.4, L.24 |
| | (c) Development and selection of EFs? | Yes | A.36 |
| | (d) Collection and selection of AD? | Yes | I.8, I.17, A.22, KL.16 |
| | (e) Reporting of recalculations? | No | |
| | (f) Reporting of a consistent time series? | Yes | E.12, E.20, I.27, W.10, W.11, W.14 |
| | (g) Reporting of uncertainties, including methodologies? | Yes | G.10 |
| | (h) QA/QC? | | QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below) |
| | (i) Missing categories/completeness?[b] | Yes | A.1, A.17, L.16, L.23, KL.11, KL.14 |
| | (j) Application of corrections to the inventory? | No | |
| Significance threshold | For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines? | The Party did not report "NE" for any insignificant categories | |

| *Assessment* | | | *Issue or problem ID#(s) in table 3 and/or 5[a]* |
|---|---|---|---|
| Description of trends | Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable? | Yes | |
| Supplementary information under the Kyoto Protocol | Have any issues been identified related to the following aspects of the national system: | | |
| | (a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements? | No | |
| | (b) Performance of the national system functions? | No | |
| | Have any issues been identified related to the national registry: | | |
| | (a) Overall functioning of the national registry? | No | |
| | (b) Performance of the functions of the national registry and the technical standards for data exchange? | No | |
| | Have any issues been identified related to reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the SIAR? | No | |
| | Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission? | No | |
| | Have any issues been identified related to the following reporting requirements for KP-LULUCF activities: | | |
| | (a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5? | Yes | KL.7 |
| | (b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14? | No | |
| | (c) Reporting requirements of decision 6/CMP.9? | No | |
| | (d) Country-specific information to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34? | Yes | KL.13 |
| CPR | Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18? | Yes | |
| Adjustments | Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol? | No | |
| | Did the Party submit a revised estimate to replace a previously applied adjustment? | NA | The Netherlands does not have a previously applied adjustment |
| Response from the Party during the review | Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the | Yes | |

| Assessment | | | Issue or problem ID#(s) in table 3 and/or 5[a] |
|---|---|---|---|
| | UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties? | | |
| Recommendation for an exceptional in-country review | On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review? | No | |
| Questions of implementation | Did the ERT list any questions of implementation? | No | |

[a] The ERT identified additional issues and/or problems in all sectors as well as issues and/or problems related to reporting on KP-LULUCF activities that are not listed in this table but are included in table 5.

[b] Missing categories for which methods are provided in the 2006 IPCC Guidelines may affect completeness and are listed in annex III.

## III. Status of implementation of issues and/or problems raised in the previous review report

8. Table 3 compiles all the recommendations made in previous review reports that were included in the previous review report, published on 30 May 2018.[4] For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2019 annual submission and provided the rationale for its determination, which takes into consideration the publication date of the previous review report and national circumstances.

Table 3
**Status of implementation of issues and/or problems raised in the previous review report of the Netherlands**

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| General | | | |
| G.1 | Article 3, paragraph 14, of the Kyoto Protocol (G.13, 2017) KP reporting adherence | Improve the transparency of the information in the NIR by describing all changes that have occurred since the previous annual submission. | Resolved. The Netherlands reported in its NIR (chap. 15, p.297) that since the previous submission there have been limited changes to the activities on minimizing adverse effects and to actions for supporting and assisting developing countries. The ERT considers the reporting by the Party to be sufficiently transparent. |
| G.2 | CPR (G.4, 2017) (G.8, 2016) (G.8, 2015) KP reporting adherence | Provide the calculated value of the CPR. | Resolved. The Netherlands reported the calculated value of the CPR in its NIR (section 12.1.5, p.289). |
| G.3 | Inventory management (G.9, 2017) KP reporting adherence | Improve the archiving and documentation procedures in order to ensure that all necessary information used to compile the inventory is kept at the most disaggregated level in the inventory team's archiving system, together with the methods and assumptions used, and in order for the inventory team to be able to promptly retrieve | Resolved. The Netherlands reported in its NIR (p.372) that (1) its archiving system is fit for purpose but that it is up to the individual institutes contributing to the inventory whether or not they use it and (2) the current archiving arrangements ensure fast responses to any questions raised by the ERT during the review that need background information or data. |

[4] FCCC/ARR/2017/NLD. The ERT notes that the report on the individual inventory review of the Netherlands' 2018 annual submission has not been published yet. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2017 annual submission.

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | the information, perform the QA/QC functions and provide information to the ERT in a timely manner. | During the review, the Party provided the information requested (including confidential information) in a timely manner. |
| G.4 | Kyoto Protocol units (G.3, 2017) (G.7, 2016) (G.7, 2015) KP reporting adherence | Include information on the application of decision 1/CMP.8, paragraphs 23–26, related to carry-over and the previous period surplus reserve account. | Resolved. The Netherlands reported the information requested in its NIR (section 12.1.7, p.289). |
| G.5 | National registry (G.8, 2017) (G.6, 2016) (G.6, 2015) Transparency | Update the publicly available information in the national registry in accordance with the recommendations in the SIAR. | Resolved. The Netherlands reported in its NIR (section 12.1.4, p.288) that the relevant information is publicly available on the Dutch Emissions Authority website (http://www.emissionsauthority.nl/topics/public-information-kyoto) and that this information is updated annually. |
| G.6 | NIR (G.6, 2017) (G.14, 2016) (G.15, 2015) Transparency | Include all underlying data and methodological information directly within the NIR (particularly for the energy, IPPU and waste sectors) and/or ensure that all required documentation in support of the NIR is provided in the public domain in a timely manner and remove any obsolete documentation from the inventory website. | Resolved. The Netherlands reported the requested information in methodology reports submitted as annex 7 to its NIR. |
| G.7 | NIR (G.10, 2017) Transparency | Improve the overall transparency of the NIR. If, in implementing the recommendations in the report on the review of the 2017 annual submission, the size of the NIR would become impossible to handle, an option would be to use methodological reports as part of annex 3 to the NIR and officially submit those reports to the UNFCCC as addenda to the NIR while including clear cross references between the main body of the NIR and the methodological reports. | Resolved. The Netherlands included the sectoral methodology reports as annex 7 to its NIR. The ERT noted that the Party has resolved all but one of the transparency issues mentioned in the previous review report (see ID# I.17 below); therefore, the ERT considers that the general issue on improving transparency has been resolved. |
| G.8 | QA/QC and verification (G.5, 2017) (G.11, 2016) (G.11, 2015) Transparency | Include information on the QA activities for the national inventory in the NIR, including information on the independent peer review of the inventory and a description of the responsibilities of institutions involved in the national system for specific QA/QC activities. | Resolved. The Netherlands reported in its NIR information on the QA activities developed for the 2019 submission (p.35) and on the role of the institutes involved in the QA/QC activities and the verification process (pp.39–40). |
| G.9 | QA/QC and verification (G.11, 2017) Transparency | Improve the description of the institutional arrangements in the NIR, particularly in relation to the roles of agencies participating in the planning, preparation and management of the GHG inventory, including task force composition; and include more elements of the QA/QC programme in the NIR, particularly in relation to the | Resolved. The Netherlands reported in its NIR additional information on the agencies participating in the task forces responsible for planning, preparing and managing the GHG inventory (sections 1.2.2–1.2.3) and on the QA/QC cycle, including a timeline (figure 1.1). |

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | timeline of activities integrated into the workplan timeline. | |
| G.10 | Uncertainty analysis (G.1, 2017) (G.4, 2016) (G.4, 2015) Convention reporting adherence | Provide the level and trend uncertainty assessment as required by paragraphs 15 and 42 of the UNFCCC Annex I inventory reporting guidelines. | Addressing. The Netherlands reported in its NIR the uncertainty analysis for the latest reported year and the trend (annex 2, section 2.1, p.336). The Party reported that uncertainty levels for AD and EFs for the base year are equal to those for the data for the whole time series, but it did not report the uncertainty analysis for the base year, as requested by the previous ERT.<br><br>During the review, the Party confirmed the information reported in the NIR without providing the analysis requested. |
| Energy | | | |
| E.1 | 1. General (energy sector) – all fuels – $CO_2$, $CH_4$ and $N_2O$ (E.1, 2017) (E.1, 2016) (E.1, 2015) (19, 2014) (23, 2013) Convention reporting adherence | Improve the QC procedures to ensure that all the information provided in the CRF tables and the NIR is consistent (e.g. regarding the methods used to estimate $CO_2$ emissions from the manufacture of solid fuels and other energy industries). | Resolved. The Netherlands reported an overview of its energy sector emission estimates in NIR table 3.1 and of its QA/QC procedures in section 1.2.3.2 (p.34) of the NIR. The ERT noted that the discrepancies between NIR table 3.1 and the CRF tables have been removed. |
| E.2 | 1. General (energy sector) – all fuels – $CO_2$, $CH_4$ and $N_2O$ (E.2, 2017) (E.7, 2016) (E.7, 2015) Transparency | Add the following information to the table in annex 5 to the NIR: (1) a clarification of whether the carbon content factors are reported in terms of gross calorific value or net calorific value; (2) $CH_4$ and $N_2O$ EFs; and (3) references for each of the country-specific and plant-specific EFs provided. | Resolved. The Netherlands clarified in its NIR that the carbon content values it used are reported in terms of net calorific value (annex 5, p.354) and provided a list of EFs for $CH_4$ and $N_2O$, with detailed notes on their application and references to each of the country-specific and plant-specific EFs provided (table A5.2). |
| E.3 | 1. General (energy sector) – all fuels – $CO_2$, $CH_4$ and $N_2O$ (E.3, 2017) (E.8, 2016) (E.8, 2015) Transparency | Include explanations in the NIR to describe the categories or sources and sinks that are reported as "NO" or "NE" and any other relevant information for all categories for which methodologies are provided in the 2006 IPCC Guidelines. | Resolved. The Netherlands explained that AD and emissions for category 1.C ($CO_2$ transport and storage) are reported as "NO" because the activity does not occur. The ERT considers the general issue to have been resolved, and raised a specific recommendation for the unexplained notation key (see ID# E.29 in table 5). |
| E.4 | Comparison with international data – all fuels – all gases (E.4, 2017) (E.10, 2016) (E.10, 2015) Accuracy | Improve the QA/QC processes to ensure the use of accurate and consistent fuel data throughout the GHG inventory. | Resolved. The Netherlands reported in the NIR (section 3.2, p.64) that a revision of the energy statistics had been completed and revised data were incorporated in CRF tables 1.A(b) and 1.D. The ERT noted that the energy data used were consistent with International Energy Agency data. |
| E.5 | Comparison with international data – all fuels – all gases (E.5, 2017) (E.11, 2016) (E.11, 2015) Transparency | Specify in the NIR the allocation of all fuels used in the reference approach and ensure that the allocations correspond with the fuel lists in the national energy balance and International Energy Agency data. | Resolved. The Netherlands reported the allocation of all fuels used in the reference approach with their corresponding allocation in the national energy balance (NIR, annex 5, p.353).<br><br>During the review, at the request of the ERT, the Party provided a national fuel factsheet against which to cross-reference the heating values and EFs for the fuels. |
| E.6 | 1.A.1.a Public electricity and heat | Clarify, in the NIR, the allocation of emissions from incinerated waste | Addressing. The Netherlands reported in its NIR (p.73) that combustion of waste oil and |

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | production – liquid fuels – $CO_2$, $CH_4$ and $N_2O$ (E.7, 2017) (E.13, 2016) (E.13, 2015) Transparency | oils and solvents and justify the applicable AD, EFs and emission trends. | solvents was discontinued in the country for environmental reasons in 2002. Since then, most of the waste oil and solvents have been exported for environmentally friendly processing; and emissions from the small amounts of waste oil and solvents recycled were included under this subcategory (1.A.1.a (public electricity and heat production)). However, the Party has not addressed the recommendation to justify the applicable AD, EFs and emission trends. |
| E.7 | 1.A.1.a Public electricity and heat production – solid fuels – $CO_2$ (E.8, 2017) (E.14, 2016) (E.14, 2015) Transparency | Provide in the NIR the reasons behind the fluctuations in the $CO_2$ IEF throughout the time series. | Resolved. The Netherlands reported the reason for the fluctuation in the $CO_2$ IEF as being the variation in the mix of bituminous coal (EF 94.7 kg/GJ) and blast furnace gas (EF 247.4 kg/GJ) used (NIR, p.79). The Party explained that a larger share of blast furnace gas results in a higher IEF. |
| E.8 | 1.A.1.c Manufacture of solid fuels and other energy industries – gaseous fuels – $CO_2$ (E.10, 2017) (E.16, 2016) (E.16, 2015) Transparency | Provide in the NIR the reasons behind the fluctuations in the $CO_2$ IEF throughout the gas combustion time series and explain how the consistency of the time series and EFs are ensured in estimating $CO_2$ emissions from this category. | Addressing. The Netherlands reported the reason for the fluctuation in the $CO_2$ IEF as being the variation in the EF for the raw natural gas used (NIR, section 3.2.4.2, pp.77–78) and described the uncertainties (NIR, section 3.2.4.3, pp.79–80). The ERT noted, however, that the Party did not provide information on how time-series consistency was ensured in estimating $CO_2$ emissions for this category.

During the review, the Party explained that time-series consistency was maintained by using a constant source for AD over the entire time series (the national energy balance). The ERT considers that the issue could be resolved if this information were included in the NIR. |
| E.9 | 1.A.1.c Manufacture of solid fuels and other energy industries – liquid fuels – $CO_2$, $CH_4$ and $N_2O$ (E.16, 2017) Transparency | Include in the NIR the reason why emissions from liquid fuels are reported for 1990 only. | Addressing. The Netherlands reported that a small amount of liquid fuel was used in 1990 only (NIR, p.75). However, the Party reported $CO_2$ emissions from liquid fuels for 1990–2013 in CRF table 1.A(a)s1. $CH_4$ and $N_2O$ emissions were reported in the same table but, inconsistently with $CO_2$ emissions, only for 1990 (and as "NO" for 1991 onward). |
| E.10 | 1.A.1.c Manufacture of solid fuels and other energy industries – liquid fuels, gaseous fuels, other fossil fuels and biomass – $CO_2$, $CH_4$ and $N_2O$ (E.17, 2017) Completeness | Estimate emissions or fill with notation keys all cells for reporting on manufacture of solid fuels (category 1.A.1.c.i). | Resolved. The Netherlands filled the previously blank cells of CRF table 1.A(a)s1 with "NO" for category 1.A.1.c.i (manufacture of solid fuels). |
| E.11 | 1.A.2.a Iron and steel – solid fuels – $CO_2$, $CH_4$ and $N_2O$ (E.18, 2017) Transparency | Include in the NIR an explanation of the allocation (e.g. mass balance of carbon in coke ovens and blast furnaces) of the emissions from the iron and steel industry. | Resolved. The Netherlands reported in the NIR (p.83) that, because the oxidation of fuels in manufacturing of iron and steel is accounted for under production and combustion in the energy statistics, the corresponding emissions are reported under category 1.A.2 (manufacturing industries and construction) in the energy sector and not in the IPPU sector. The ERT considers that the transparency issue |

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | | has been resolved. For the comparability issue, see ID# E.26 in table 5. |
| E.12 | 1.A.2.c Chemicals – liquid fuels – $CO_2$, $CH_4$ and $N_2O$ (E.11, 2017) (E.17, 2016) (E.17, 2015) Consistency | Use more up-to-date data from the most recently available data sources, such as annual environmental reports or EU ETS data, in order to improve the time-series consistency of $CO_2$, $CH_4$ and $N_2O$ emission estimates from chemical waste gases (if the data are suitable to use for previous years), or, if that is not possible, include in the NIR a detailed category-specific improvement plan and explain how the time-series consistency for the AD is ensured for the emission estimates for this category. | Addressing. The Netherlands included checking and improving the time-series consistency of the estimates of emissions from chemical waste gases under planned improvements in its NIR (sections 3.2.4.2–3.2.4.3 and 3.2.4.6), but the ERT noted that the planned improvements have yet to be implemented. During the review, the Party informed the ERT that EU ETS data may not be suitable for the early years of the time series. |
| E.13 | 1.A.2.f Non-metallic minerals – biomass fuels – $CO_2$, $CH_4$ and $N_2O$ (E.19, 2017) Consistency | Apply the revised energy statistics for 1991–1994 in order to ensure time-series consistency. | Resolved. The Netherlands indicated that it applied revised energy statistics for 1991–1994 (NIR, p.377). The Party reported "NO" for the entire time series for this subcategory. |
| E.14 | 1.A.3.d Domestic navigation – gas/diesel oil and gasoline – $CO_2$, $CH_4$ and $N_2O$ (E.20, 2017) Transparency | Include in the NIR an explanation for how fuel consumption from the energy balance is apportioned between international bunkers and inland navigation. | Resolved. The Netherlands reported in its NIR information on how it apportions fuel consumption from the energy balance between international bunkers and inland navigation (pp.70 and 99). The ERT noted that the Party apportioned the fuel on the basis of a survey of fuel suppliers. |
| E.15 | 1.A.3.e.i Pipeline transport – gaseous fuels – $CH_4$ (E.21, 2017) Comparability | Allocate combustion emissions of $CH_4$ from the natural gas transport network to subcategory 1.A.3.e.i (pipeline transport). | Not resolved. The Netherlands reported in its NIR (p.378) that sufficient data are not available to ensure a consistent time series. During the review, the Party explained that it has no plans to investigate whether it is possible to disaggregate data on $CH_4$ combustion emissions from the natural gas transport network because doing so would not change the total estimate of emissions but only reallocate the emissions. The ERT acknowledges that the split in emissions would not change the total estimate of emissions but notes that splitting the emissions would enhance the comparability of the emission estimates in accordance with the 2006 IPCC Guidelines (vol. 2, table 3.1.1). The ERT also noted that the Party has reported $CO_2$ and $N_2O$ emissions from gaseous fuels for this category for the entire time series. |
| E.16 | 1.A.4.c Agriculture/forestry/fishing – gaseous fuels – $CH_4$ (E.12, 2017) (E.18, 2016) (E.18, 2015) Transparency | Explain in the NIR the reasons for the variation in the $CH_4$ IEF for gaseous fuels, including the quantities of natural gas combusted in gas engines and other appliances for the whole time series. | Resolved. The Netherlands reported in its NIR (p.107) that the variation in the $CH_4$ IEF for gaseous fuels is due to the difference in the $CH_4$ EF used for natural gas combusted in gas engines (which varies between 250 and 450 g/GJ) and the $CH_4$ EF used for natural gas combusted in other plants (5.7 g/GJ), as well as the different ratios of gaseous fuels combusted |

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| | | | in gas engines and other plants in different years. |
| E.17 | 1.B.1.b Solid fuel transformation – solid fuels – $CO_2$ and $CH_4$ (E.23, 2017) Convention reporting adherence | Correct the AD reported for 2013–2015 and ensure that AD are updated annually. | Resolved. The Netherlands revised the AD for 2013, 2014 and 2015 to 1.99, 2.01 and 2.04 Mt, respectively, so the ERT considers this issue to have been resolved. This revision resulted in changes to the corresponding $CO_2$ emission estimates. However, $CH_4$ emission estimates were not recalculated (see ID# E.28 in table 5). |
| E.18 | 1.B.2 Oil and natural gas and other – gaseous and liquid fuels – $CO_2$, $CH_4$ and $N_2O$ (E.24, 2017) Comparability | Report emissions from gas lost by leakage under subcategory 1.B.2.b (natural gas) or, if that is not possible for the annual submission in 2018, include the explanation that fugitive emissions from gas and oil exploration and production were included with fugitive emissions from subcategory 1.B.2.c (venting and flaring) in the NIR and revise CRF table 9. | Resolved. The Netherlands provided in its NIR (p.112) the explanation that fugitive emissions from oil and gas exploration and production are included with fugitive emissions under subcategory 1.B.2.c (venting and flaring), and also updated CRF table 9 with the explanation for its use of "IE". |
| E.19 | 1.B.2.a Oil – liquid fuels – $CO_2$ and $CH_4$ (E.26, 2017) Comparability | Correct the $CO_2$ and $CH_4$ emission estimates for 2015 to remove the combustion-related $CO_2$ and $CH_4$ emissions, and enhance QA/QC procedures to ensure correct reporting. | Addressing. For 2015, the Netherlands removed 356.17 kt $CO_2$ emissions from subcategory 1.B.2.a.4 (refining/storage) but reallocated only 308.98 kt $CO_2$ to subcategory 1.A.1.b (petroleum refining). The ERT noted that $CH_4$ emissions were not recalculated. |
| E.20 | 1.B.2.a.5 Distribution of oil products – liquid fuels – $CO_2$ (E.25, 2017) Consistency | Report $CO_2$ emissions for the whole time series or, if that is not possible for the annual submission in 2018, change the notation keys applied to report these $CO_2$ emissions from "NA" to "IE" for 1990–2001 and include the explanation that $CO_2$ fugitive emissions from oil refining were included in subcategory 1.A.1.b (petroleum refining) for 1990–2001. | Not resolved. The Netherlands reported AD for refineries for 1990–2017, but $CO_2$ emissions were reported only for 2002 onward; and emissions for 1990–2001 were reported as "NA" in CRF table 1.B.2. The ERT noted that the notation key recommended is "IE", because the refinery fugitive emissions were reported in subcategory 1.A.1.b (petroleum refining) for 1990–2001.

During the review, the Party explained that it has not calculated the estimated $CO_2$ emissions because the distances over which transport takes place are relatively short and that, under Dutch circumstances, "oil products" should be read as "fuels used in transport" (i.e. gasoline, diesel and liquefied petroleum gas). The Party also explained that, as a result of the Dutch regulation on volatile organic compounds, all possible sources of fugitive emissions from fuels (refineries, distributors and filling stations) have been equipped with abatement technologies to capture any fugitive emissions, which, according to the Party, justifies the reporting of "NA" for these emissions. The Netherlands informed the ERT that it considers the emissions to be negligible and therefore does not plan to invest effort or resources into estimating them in the future. |
| E.21 | 1.B.2.b Natural gas – gaseous fuels – $CO_2$ (E.27, 2017) Comparability | Report the appropriate notation keys in CRF table 1.B.2 for AD and $CO_2$ and $CH_4$ emissions, ensuring time-series consistency. | Addressing. The Netherlands reported in its NIR (annex 10, p.378) that sufficient data are not available for a consistent time series; however, it reported "IE" for AD and "NO" for $CO_2$ and $CH_4$ emissions in CRF table 1.B.2 for |

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| | | | the category 1.B.2.b.6. The ERT noted that information on how time-series consistency is maintained is not included in the NIR, although the correct notation keys have been used. |
| | | | During the review, the Party informed the ERT that time-series consistency was maintained by using the same data source (the national energy balance) for the entire time series. The ERT considers that providing this explanation in relevant sections of the NIR would enhance its transparency and resolve the issue. |
| E.22 | 1.B.2.c Venting and flaring – liquid and gaseous fuels (E.15, 2017) (E.22, 2016) (E.22, 2015) Comparability | Change the relevant notation keys in CRF table 1s2 for this category from "NE" to "IE" and include an explanation of the use of the notation keys in both the NIR and CRF table 9. | Resolved. The Party continues to report "NE" for indirect GHGs (nitrogen oxides, carbon monoxide, non-methane volatile organic compounds and sulfur dioxide) in CRF table 1s2. The Party did not explain the application of "NE" and "IE" in CRF table 9 or in the NIR. However, the ERT noted that this issue refers to precursor gases and that paragraph 29 of the UNFCCC Annex I inventory reporting guidelines indicates that Parties should (not shall) report on those gases. |
| E.23 | 1.B.2.c Venting and flaring – gas and oil – $CO_2$ and $CH_4$ (E.28, 2017) Transparency | Include in the NIR a section for this category, including a description of the methodology used for estimating emissions from venting and flaring from oil and gas, as well as the AD and EFs. | Resolved. The Netherlands included in the NIR (section 3.3.2, p.112) a summary of the methods used for estimating emissions from combined venting and flaring activities for natural gas and oil, as well as the AD and EFs. |
| E.24 | 1.C $CO_2$ transport and storage – gaseous fuels – $CO_2$ (E.29, 2017) Completeness | (a) Investigate the existence of $CO_2$ emissions from $CO_2$ transport, injection and storage and either estimate emissions or document that they do not occur; (b) Include a section for this category in the NIR. | Resolved. The Netherlands reported that $CO_2$ transport and storage does not occur in the country (NIR, p.115) and reported "NO" for $CO_2$ emissions for this category in CRF table 1.C. |
| IPPU | | | |
| I.1 | 2. General (IPPU) – all gases (I.2, 2017) (I.8, 2016) (I.8, 2015) Transparency | In the event that recalculations affect emissions sources where the underlying data are commercially confidential, strengthen QA/QC procedures and institutional arrangements to (1) ensure that the ENINA task force can access the commercially confidential data in order to assess the recalculations and determine the time series of IEFs on a production basis (where necessary for comparability); (2) compare, where applicable, the annual EU ETS data and/or emissions reported in the annual environmental reports with recalculated inventory estimates; and (3) report on all findings of QA/QC activities transparently in the NIR, or directly provide the information to the ERT, while | Resolved. In its NIR (p.117) the Netherlands reported the procedures used by the ENINA task force to access confidential data. It also described QA/QC activities and explained that EU ETS data are compared with the inventory data as part of the QA/QC procedures for category 2.A (mineral industry) and category 2.A.4.d (other) (NIR, section 4.2.4, p.124), and for category 2.B.1 (ammonia production) (NIR, section 4.3.4, p.134). The ERT noted that, for some categories, the QA/QC description was improved in the NIR with the findings of QA/QC activities, and in the case of categories with confidential data the Party provided QA/QC information directly to the ERT. |

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| | | protecting commercially sensitive data. | |
| I.2 | 2.A.1 Cement production – $CO_2$ (I.17, 2017) Convention reporting adherence | Correct the NIR text regarding the method for estimating emissions from cement production and correct the category description by deleting methodological information regarding the use of sewage sludge. | Resolved. The Netherlands reported a revised methodological description for estimating emissions from cement production in its NIR (pp.120–121) and removed the misleading information on the use of sewage sludge. |
| I.3 | 2.A.2 Lime production – $CO_2$ (I.3, 2017) (I.9, 2016) (I.9, 2015) Completeness | Provide in the NIR AD, EFs and details of the methodology used to estimate emissions from lime production. | Resolved. The Netherlands reported a methodological description for estimating emissions from lime production in its NIR (p.122) and provided AD and EFs in CRF table 2(I).A-Hs1. |
| I.4 | 2.A.2 Lime production – $CO_2$ (I.4, 2017) (I.10, 2016) (I.10, 2015) Convention reporting adherence | Resolve the inconsistencies in the information in the NIR, the information in the ENINA report and the notation keys in the CRF tables regarding the allocation of emissions from lime production. | Resolved. The Netherlands reported emissions from lime production in its NIR (p.122) and allocated them to category 2.A.2. The ERT noted that the Party reported the emissions in accordance with the 2006 IPCC Guidelines, and that the data in the CRF tables and text in the NIR are consistent. |
| I.5 | 2.A.2 Lime production – $CO_2$ (I.5, 2017) (I.11, 2016) (I.11, 2015) Comparability | Work with industrial operators and competent authorities to obtain additional data to enable the correct allocation of the emissions from lime production under the lime production category, in order to report in accordance with the 2006 IPCC Guidelines and improve comparability. | Resolved. The Netherlands reported emissions from lime production in category 2.A.2. The Party provided a methodological description in its NIR (p.122) and reported emission data in CRF table 2(I).A-Hs1. |
| I.6 | 2.A.4 Other process uses of carbonates (2.A.4.b soda ash) – $CO_2$ (I.7, 2017) (I.13, 2016) (I.13, 2015) Accuracy | Conduct further research and consultation with industry and/or statistical agencies on other process uses of carbonates to either access additional AD and EFs or seek verification of the current method and emission estimates in order to ensure the completeness and accuracy of the estimates. | Not resolved. The ERT noted that the description of the methodology for this category in the NIR (p.123) is the same as that in previous NIRs and there is no information about actions taken to improve the completeness and accuracy of the estimates. The ERT also noted that the Netherlands uses a long extrapolation period to assess the latest emissions, which could decrease accuracy. The ERT believes that this issue should be considered further in future reviews to confirm that there is no underestimation of emissions. The ERT considers that this issue could potentially be resolved by investigating EU ETS data. |
| I.7 | 2.A.4 Other process uses of carbonates – $CO_2$ (I.18, 2017) Transparency | Enhance efforts to obtain the missing primary data on limestone consumption for the two coal-fired power plants (or confirm that carbonates are not consumed in flue gas desulfurization) in order to check that emissions were properly calculated and have AD to show the ERT (in accordance with decision 13/CP.20, annex, para. 13, and decision 19/CMP.1, annex, para 16(b)) in order for the ERT to assess the estimation, including replicating the calculations, in accordance with the definition of | Resolved. The Netherlands reported in its NIR (p.123) information on limestone use in its coal-fired power plants, indicating that the data were obtained from EU ETS reports on all coal-fired power plants. |

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| | | transparency in the UNFCCC Annex I inventory reporting guidelines. | |
| I.8 | 2.B.1 Ammonia production – $CO_2$ (I.8, 2017) (I.14, 2016) (I.14, 2015) Accuracy | Estimate emissions from ammonia production, taking into account $CO_2$ emissions and sequestration from urea production by collecting new AD (annual urea production, urea imports and exports, and urea application to soils) through research and/or consultation with industry and statistical agencies in order to improve the accuracy and comparability of emission estimates. | Not resolved. The Netherlands reported in its NIR (p.131) that data on urea production and use are still not available. During the review, the Party confirmed that it was not able to implement the recommendation because of the lack of available data on urea production and use. The ERT noted that the accuracy of the estimates has therefore not improved. |
| I.9 | 2.B.1 Ammonia production – $CO_2$ (I.9, 2017) (I.15, 2016) (I.15, 2015) Transparency | Document details of the inventory data and methodologies for all categories affected in this cross-sectoral issue. | Resolved. The Netherlands reported in its NIR (p.131) more detailed information than in its previous NIR on methodologies for ammonia production. Regarding urea production and use, the Party reported that not enough information is available and it is assumed that the amount of $CO_2$ recovered is zero. For category 3.H (urea application), the Party reported enough information (see ID# A.11 below). |
| I.10 | 2.B.1 Ammonia production – $CO_2$ (I.10, 2017) (I.16, 2016) (I.16, 2015) Comparability | Report $CO_2$ emissions from ammonia production using a method that is consistent with the 2006 IPCC Guidelines, reporting emissions from all natural gas uses (i.e. both fuel and feedstock use) in this category. | Not resolved. The Netherlands reported in its NIR (pp.134–136) that no recalculations were made for this category. The ERT noted that information in the NIR (p.117) indicates that natural gas used as a fuel was reported under the energy sector but natural gas used as a feedstock was reported under the IPPU sector. During the review, the Party confirmed that emissions from natural gas used as a fuel are reported under the energy sector, not the IPPU sector, and that the recommendation has not been addressed. |
| I.11 | 2.B.1 Ammonia production – $CO_2$ (I.11, 2017) (I.17, 2016) Accuracy | Review and strengthen the QA/QC procedures for this category, including by (1) providing the ENINA task force with access to confidential production data and deriving a time series of annual production-based IEFs, (2) comparing the annual inventory and EU ETS estimates for ammonia production and (3) reporting on the findings of QA/QC activities transparently in the submission or directly to future ERTs if there is a need to protect commercially sensitive data. | Resolved. The Netherlands reported in its NIR (p.117) that some of the QA/QC procedures were strengthened. (For documentation of the QA/QC procedures, see NIR, annex 7, the ENINA methodology report of Peek et al., p.167). The Party also reported that the ENINA task force has access to all confidential information and that any ERT could have access to it. |
| I.12 | 2.B.4 Caprolactam, glyoxal and glyoxylic acid production – $N_2O$ (I.20, 2017) Transparency | Provide an explanation in the NIR regarding the time series and assumptions behind the derivation of the $N_2O$ EF used for estimating $N_2O$ emissions from caprolactam production for the two distinct time | Resolved. The NIR (annex 7, ENINA methodology report, p.55) includes the assumptions behind the derivation of the $N_2O$ EF used for estimating $N_2O$ emissions from caprolactam production for the two time periods. |

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| | | periods 1990–2004 and 2005 to the latest year. | |
| I.13 | 2.B.8 Petrochemical and carbon black production – $CO_2$ (I.13, 2017) (I.19, 2016) (I.19, 2015) Transparency | Document the QA/QC activities and outcomes for the chemical and petrochemical sources in the IPPU sector. | Addressing. The Netherlands reported in its NIR (p.134) that a document containing the outcomes of the QA/QC checks for this category is available for the ERT on request owing to confidentiality concerns of the plant operators. However, the Party did not document the QA/QC activities themselves. |
| I.14 | 2.B.9 Fluorochemical production – HFCs (I.14, 2017) (I.20, 2016) (I.20, 2015) Transparency | Include in the NIR the procedural clarifications provided during the review week (i.e. the process by which the operators' data in annual environmental reports are verified annually by the competent authority and reviewed by the Dutch inventory IPPU expert). | Resolved. The Netherlands improved the description of its QA/QC and verification procedures in its NIR (p.134). The ERT noted that information on QA/QC and verification for this category (2.B.9) was sufficiently transparent. |
| I.15 | 2.B.9 Fluorochemical production – HFCs (I.21, 2017) Transparency | Report the HFC-23 load in the untreated flow based on flow meter results and stream composition in the NIR or in the ENINA report, and report the type of HFCs separately in the CRF tables, or, if it is difficult to implement this recommendation soon, investigate ways to present information on AD in the NIR that demonstrate the completeness of reporting until the recommendation can be implemented. | Not resolved. The Netherlands did not report in its NIR the flow meter results and stream composition. The ERT noted that the Party provided only total HFC-23 emissions from HCFC-22 production. The ERT also noted that AD were not reported in the NIR.<br><br>During the review, the Party explained that it was not able to report HFC-23 load in the untreated flow based on flow meter results and stream composition in its NIR or in the ENINA methodology report (NIR, annex 7) owing to confidentiality concerns of the plant operators. |
| I.16 | 2.C.1 Iron and steel production – $CO_2$ (I.22, 2017) Comparability | (a) Report $CO_2$ emissions from electric arc furnace steel production under subcategory 2.C.1.a (steel) and clearly explain in the NIR that $CO_2$ emissions from electric arc furnace steel production are reported under that category in order to avoid misunderstanding;<br><br>(b) Report $CO_2$ emissions from direct reduced iron as "NO" because there are no $CO_2$ emissions from iron produced using that technology in the country. | Addressing.<br><br>(a) The Netherlands indicated that $CO_2$ emissions from electric arc furnace steel production are now reported in subcategory 2.C.1.a (steel) (NIR, section 3.2.5.5, p.138). However, the ERT noted that there were no recalculations of $CO_2$ emissions for category 2.C.1.a between the 2017 and 2019 submissions;<br><br>(b) The ERT noted that the notation key used for $CO_2$ and $CH_4$ emissions in subcategory 2.C.1.c (direct reduced iron) was not updated: "NA" is still used, whereas it should be "NO". |
| I.17 | 2.C.1 Iron and steel production – $CO_2$ (I.23, 2017) Accuracy | (a) Assess the carbon flow and carbon balance in each process in the iron and steel industry in order to ensure the completeness and transparency of reporting;<br><br>(b) Conduct QA/QC activities for the AD, as described in the 2006 IPCC Guidelines (vol. 3, chap. 4.2.4.1), provide a quantitative summary of QA/QC activities in order to demonstrate that the reporting is correct (e.g. QA/QC procedure for subcategories 2.C.1.d (sinter) and 2.C.1.e (pellet) (see document FCCC/ARR/2017/NLD, | Not resolved. The Netherlands did not include the assessment of the carbon flow and carbon balance in each process in the iron and steel industry and also did not include a quantitative summary of QA/QC activities for iron and steel production in its NIR.<br><br>During the review, the Party explained that the methodological description was provided in the NIR (annex 7, ENINA methodology report, p.43); however, the ERT noted that the information does not relate to carbon balance data and QA/QC activities. The ERT believes that this issue should be considered further in future reviews to confirm that there is no underestimation of emissions. |

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| | | ID# I.24) and for reporting the allocation to the energy sector subcategories 1.B.1.b, 1.A.1.a, 1.A.2.a and 1.A.1.c) and report a summary of the results of QA/QC activities (see document FCCC/ARR/2017/NLD, ID# I.25). | |
| I.18 | 2.C.1 Iron and steel production – $CO_2$ and $CH_4$ (I.24, 2017) Comparability | Ensure that all emissions are reported under iron and steel production subcategories in the IPPU sector, in accordance with the 2006 IPCC Guidelines. | Not resolved. The Netherlands reported emissions from sinter and pellet in category 2.C.1.f (other non-specified), but they should be reported in categories 2.C.1.d (sinter) and 2.C.1.e (pellet). |
| I.19 | 2.C.1 Iron and steel production – $CO_2$ (I.25, 2017) Accuracy | Ensure all relevant emissions are reported under this category, and clearly explain which emissions have been allocated to the energy sector and which to the IPPU sector under iron and steel production subcategories. | Resolved. The Netherlands provided sufficient explanations in its NIR (pp.80–88) on the allocation of emissions from iron and steel production between the energy and IPPU sectors. The ERT noted that emissions related to fuel combustion are reported under the energy sector in subcategories 1.A.1.c.i (manufacture of solid fuels) and 1.A.2.a (iron and steel); the emissions from non-combustion activities in coke production are reported in subcategory 1.B.1.b (solid fuel transformation) (NIR, pp.110–111); while process-related emissions are reported under the IPPU sector in subcategories 2.A.4.d (other) and 2.C.1 (iron and steel production). |
| I.20 | 2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.26, 2017) Accuracy | Report categories 2.F.2–2.F.5 at a minimum level of aggregation in CRF tables 2(II), 2(II)B-Hs2 and 10s5, and enhance efforts to have access to primary data (per gas amount), directly providing the information to the ERT when requested during the review, or, if it is difficult to implement this recommendation soon, investigate ways to present information on AD in the NIR that demonstrate the completeness of reporting until such a time when the recommendation can be implemented. | Resolved. The Netherlands reported in its NIR that emissions for categories 2.F.2–2.F.5 were reported and the primary data are not available, and that the data are available only in aggregate owing to the commercial sensitivity of the data (p.387).

During the review, in response to a question raised by the ERT, the Party provided disaggregated AD and emissions for categories 2.F.2–2.F.5, enabling the ERT to determine that there is no underestimation or overestimation of emissions. Further, the ERT noted that the Party provided a reasonable explanation as to why disaggregated data cannot be reported in the submission (i.e. commercial sensitivity and concerns of the companies involved in the activity). |
| I.21 | 2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.27, 2017) Transparency | Report in the NIR the EFs used for each subcategory in order to enhance transparency, or submit the ENINA report annexed to the NIR as an official submission and revise the NIR text to reference it, while avoiding duplicating text in the NIR and the ENINA report. | Resolved. The Netherlands provided the ENINA methodology report in annex 7 to its NIR. |
| I.22 | 2.F.1 Refrigeration and air conditioning – HFCs (I.15, 2017) (I.21, 2016) (I.21, 2015) Comparability | Correct the notation key "NA" to "IE" for industrial refrigeration and mobile air conditioning in accordance with paragraph 37 of the UNFCCC Annex I inventory reporting guidelines. | Not resolved. The Netherlands reported emissions from manufacture and disposal of industrial refrigeration and mobile air conditioning as "NA" in CRF table 2(II)B-Hs2.

During the review, the Party explained that the notation keys were revised for category 2.F; |

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| | | | however, the ERT noted that emissions from manufacture and disposal of industrial refrigeration and mobile air conditioning are still reported as "NA", instead of "IE" (see also #IDs I.27 and I.28 in table 5). |
| I.23 | 2.F.1 Refrigeration and air conditioning – HFCs, PFCs and $SF_6$ (I.16, 2017) (I.22, 2016) (I.22, 2015) Accuracy | Conduct QA/QC and verification of the method used to estimate emissions from refrigeration and air conditioning, in accordance with paragraph 41 of the UNFCCC Annex I inventory reporting guidelines, and report on the outcomes thereof. | Not resolved. The Netherlands reported in its NIR (p.146) that it was not able to conduct QA/QC of the method used for estimating emissions from refrigeration and air conditioning owing to the lack of available data. During the review, the Party explained that relevant text in the NIR and the ENINA methodology report (NIR, annex 7) had been improved. However, the ERT noted that the results of the QA/QC procedures were not reported. The ERT believes that this issue should be considered further in future reviews to confirm that there is no underestimation of emissions. |

Agriculture

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| A.1 | 3. General (agriculture) – $CH_4$ and $N_2O$ (A.8, 2017) Completeness | Collect livestock data and estimate emissions associated with mules and asses for the period 1990–2009, or, alternatively, use an extrapolation technique to ensure time-series consistency. | Not resolved. The Netherlands reported in its NIR (p.158) that it assumes that prior to 2010 mules and asses were included in the animal category of horses; therefore, the Party changed its reporting of emissions associated with mules and asses for prior to 2010 from "NO" to "IE". The ERT noted, however, that CRF tables 3s1, 3.As1 and 3.B(a)s1 still show "NO" for mules and asses for prior to 2010. During the review, the Party indicated that it would update the CRF tables accordingly in the next submission. |
| A.2 | 3. General (agriculture) – $CH_4$ and $N_2O$ (A.9, 2017) Transparency | Include in the NIR complete descriptions of the AD and EF trends and emission estimates for other mature cattle. | Resolved. The Netherlands reported AD and included a discussion on the time-series trend for livestock population numbers, $CH_4$ emissions from enteric fermentation, manure management $CH_4$ EFs, $N_2O$ emissions from manure management and emission estimates for other mature cattle in its NIR (sections 5.1 (p.156), 5.2.2 (p.160) and 5.3.1 (p.165)). |
| A.3 | 3.A.4 Other livestock – $CH_4$ (A.11, 2017) Transparency | Include distinct data in the CRF tables for rabbits and mink. | Resolved. The Netherlands reported population numbers for rabbits and fur-bearing animals in CRF tables 3.As1 and 3.B(a)s1. |
| A.4 | 3.B Manure management – $CH_4$ and $N_2O$ (A.1, 2017) (A.2, 2016) (A.2, 2015) (41, 2014) (52, 2013) Accuracy | Continue and enhance efforts to improve the consistency between the $CH_4$ and $N_2O$ emission estimates and report correct values for the fractions of the different manure management systems in the NIR and the CRF tables. | Addressing. The Netherlands improved the description of manure management in the NIR (section 5.3.1, p.163) and corrected the values for the fraction of the different manure management systems in CRF table 3.B(a)s2 (e.g. for growing cattle, swine and poultry). The ERT noted, however, that although the descriptions for manure management have been revised, especially for the category other cattle, further improvements could be made in reporting the distribution of manure management systems for other livestock types |

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| | | | in the NIR, and that CRF table 3.B(a)s2 is still missing values for shares of the different manure management systems for the livestock categories sheep, fur-bearing animals, rabbits, horses, goats, and mules and asses for the entire time series ("NO" and "NA" are reported). |
| | | | During the review, the Party provided the data for the fractions of the different manure management systems missing from CRF table 3.B(a)s2 for the livestock categories sheep, fur-bearing animals, rabbits, horses, goats, and mules and asses. Further, the Party provided documentation on the methodology and data used to calculate $CH_4$ and $N_2O$ emissions from manure management, and noted that an update to the paper on standardized calculation methods for animal manure and nutrients (CBS, 2012) was in progress and will be reflected in future submissions. |
| A.5 | 3.B Manure management – $CH_4$ (A.3, 2017) (A.6, 2016) (A.6, 2015) Transparency | Enhance the methodology description for this category by providing in the NIR additional information on and references for MCFs, and include the results of the new research on the maximum $CH_4$-producing capacity of manure and MCFs as soon as they become available. | Resolved. The Netherlands reported a recalculation for this category in the NIR (section 5.3.5), improved the description of the methodology in the NIR (section 5.3), included a methodology description (section 4) and updated values of MCFs in CRF tables 3.B(a)s1 and 3.B(a)s2. |
| A.6 | 3.B.3 Swine – $CH_4$ (A.4, 2017) (A.7, 2016) (A.7, 2015) Transparency | Include in the NIR an explanation for the different trends between $CH_4$ emissions and changes in the swine population. | Addressing. The Netherlands reported that this recommendation was addressed alongside ID# A.3 from the report on the review of the 2017 submission (FCCC/ARR/2017/NLD) (i.e. ID# A.5 above) by detailing the relationship between the swine population and relevant parameters in its NIR (section 5.3). The ERT noted, however, that the information on the swine population does not fully explain the trend in $CH_4$ emissions from swine. |
| | | | During the review, the Party explained that the adult swine population had remained stable, as indicated in the NIR; however, the number of piglets born has been increasing and these piglets are accounted for in the calculation of the IEF, which results in a decreasing trend in the IEF results. The ERT considers that the issue could be resolved if this information were provided in the NIR. |
| A.7 | 3.B.5 Indirect $N_2O$ emissions – $N_2O$ (A.12, 2017) Transparency | Explain in the NIR the implementation of national policies and how this results in the non-occurrence of indirect $N_2O$ emissions due to N leaching and run-off. | Resolved. The Netherlands reported that the text on national policies and their relationship with indirect $N_2O$ emissions has been updated in its NIR (reported as section 7.2 of the methodology report of Lagerwerf et al. provided in annex 7 to the NIR, but the ERT noted that the information is actually in section 7.4.1 (p.66) of the same methodology report). |
| A.8 | 3.D Direct and indirect $N_2O$ emissions from agricultural soils – $N_2O$ | Include in the NIR numeric data on annual removal of agricultural crop residues. | Not resolved. The Netherlands reported in its NIR (annex 10, p.388) that data on the removal of agricultural crop residues are in van Bruggen et al. (2017, table 3.4, p.45). The ERT noted, |

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| | (A.5, 2017) (A.8, 2016) (A.8, 2015) Transparency | | however, that the methodology report submitted with the NIR (annex 7) was by Lagerwerf et al. and there is no table 3.4 on page 45 of that report. Therefore, the information cannot be found. |
| | | | During the review, the Party provided the draft paper of van Bruggen et al. (2018), which contains the required numerical data on the annual removal of agricultural crop residues. The ERT considers that this issue could be resolved if the papers containing the data were correctly referenced in the NIR and if the links between the papers of van Bruggen et al. (2017) and Lagerwerf et al. were described clearly in the NIR. |
| A.9 | 3.D.a Direct $N_2O$ emissions from managed soils – $N_2O$ (A.6, 2017) (A.4, 2016) (A.4, 2015) (42, 2014) Transparency | Include in the NIR the method and related parameters used to derive country-specific Nex rate and $Frac_{GRAZ}$. | Addressing. The Netherlands reported in its NIR that the method and parameters used for deriving the country-specific Nex rate are described in CBS (2012), a yearly update of which is published (in Dutch), with van Bruggen et al. (2017) being the most recent update. The ERT noted that the method and parameters used for deriving the country-specific Nex rate are not described in the NIR or the methodology report of Lagerwerf et al. in annex 7 to the NIR, but some links describing the country-specific method that is used to calculate the Nex rate are provided in annex 10 to the NIR. |
| | | | During the review, the Party supplied the link to the paper on standardized calculation methods for animal manure and nutrients (CBS, 2012). The ERT considers that providing the links to this paper (not just in annex 10 to the NIR) and a summary of how Nex rates are determined in the NIR, with a time series of Nex rates included as part of the methodology report or another document to be submitted with the NIR, would resolve this issue. |
| A.10 | 3.F Field burning of agricultural residues – $CH_4$ and $N_2O$ (A.13, 2017) Transparency | Include in the NIR the explanation that article 10, paragraph 2, of the Netherlands Environmental Law prohibits the field burning of agriculture residues. | Resolved. The Netherlands reported updated information on the field burning of agricultural residues in the NIR (section 5.1, p.154), namely that the field burning of agricultural residues does not occur in the country as the practice is prohibited. The Party also provided a reference to its Environmental Management Act in that same section. |
| A.11 | 3.H Urea application – $CO_2$ (A.7, 2017) (A.9, 2016) (A.9, 2015) Transparency | Include a section in the NIR with information on the methodology used for estimating $CO_2$ emissions from urea application under the agriculture sector, the allocation of emissions in accordance with the 2006 IPCC Guidelines and link with the reporting of emissions from ammonia production under the IPPU sector. | Resolved. The methodology description in NIR sections 5.1 (p.155) and 5.4.2 (p.175) has been updated. The ERT noted that there is now a cross reference to section 4.3.1 of the NIR, referencing the IPPU chapter of the NIR. |

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**LULUCF**

| ID# | Issue and/or problem classification | Recommendation made in previous review report | ERT assessment and rationale |
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| L.1 | 4. General (LULUCF) (L.1, 2017) (L.1, 2016) (L.1, 2015) (table 3, 2014) (59, 2013) (120–123, 2012) Completeness | Obtain data and report estimates for all mandatory categories (currently reported as "NE") for which methodologies and EFs are available:<br><br>(a) CSC in living biomass (gains and losses) under cropland remaining cropland;<br><br>(b) CSC in DOM under land converted to cropland, except for forest land converted to cropland;<br><br>(c) CSC in living biomass (losses) under wetlands, settlements and other land converted to cropland;<br><br>(d) CSC in DOM under cropland, wetlands, settlements and other land converted to grassland;<br><br>(e) CSC in living biomass (losses) under wetlands, settlements and other land converted to grassland;<br><br>(f) CSC in living biomass (gains) under land converted to other wetlands;<br><br>(g) CSC in living biomass (gains) under land converted to settlements;<br><br>(h) CSC in living biomass (losses) under wetlands and other land converted to settlements;<br><br>(i) CSC in living biomass (gains) under land converted to other land;<br><br>(j) CSC in DOM under land converted to settlements, except for forest land converted to settlements;<br><br>(k) CSC in DOM under cropland, grassland, wetlands and settlements converted to other land. | Resolved. The Netherlands improved transparency for all categories listed in the recommendation, identifying either that methodologies for estimating emissions are not available or that a default tier 1 method assumes no carbon stock or no CSC, and why the use of a tier 1 assumption is justifiable for a key category under the national circumstances. The following categories are discussed in the NIR: living biomass under cropland (p.207), DOM under cropland (p.206), DOM under grassland (p.208, non-trees outside forest; p.209, trees outside forest), living biomass and DOM under wetlands (p.213), living biomass and DOM under settlements (p.214), and living biomass and DOM on other land (pp.215–216). The ERT noted the lack of information regarding the assumptions for living biomass and DOM in reed swamps where they are converted to other land uses, while acknowledging there are no default methods or factors for these types of wetlands in the 2006 IPCC Guidelines.<br><br>During the review, the Party explained that it has no data on carbon in reed swamps and therefore neither carbon stock gains nor carbon stock losses are included for conversions to or from wetlands. The ERT agrees with this conclusion (for the ERT encouragements, see ID# L.22 in table 5). |
| L.2 | 4. General (LULUCF) – $CO_2$ (L.2, 2017) (L.3, 2016) (L.3, 2015) Comparability | Correct the notation key "NE" to "NO" for those pools in which the Party considers no CSC occurs, provide estimates for those pools and categories for which it believes zero carbon change does not apply, or provide the justification for reporting "NE" for the pools in which the amount of CSC is insignificant in line with paragraph 37 of the UNFCCC Annex I inventory reporting guidelines. | Addressing. The Netherlands significantly improved its use of notation keys by including references in table 6.1 of the NIR (referring to the relevant sections of the NIR) and a background paper where the justifications are provided. However, the ERT noted that the notation key used for CSC in litter under other land converted to forest land in CRF table 4.A was changed to "NO" rather than retained as a justified "NE", which is inconsistent with NIR table 6.1 and the other subcategories of land converted to forest land.<br><br>During the review, the Party explained that the above-mentioned use of "NO" appeared to be an error and would be corrected in the next submission. The ERT noted that, at their 16th meeting, GHG inventory lead reviewers in 2019 recommended that the correct notation key for a tier 1 assumption of carbon stock |

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| | | | equilibrium is "NA"; however, this is considered as a separate recommendation (see ID# L.18 in table 5). |
| L.3 | 4. General (LULUCF) – $CO_2$ (L.3, 2017) (L.4, 2016) (L.4, 2015) Accuracy | Transparently report in the NIR which pools of key categories are significant, and obtain the data and report the estimates of emissions and removals for those significant pools under the key categories, using higher-tier methodologies. | Resolved. The Netherlands outlined the key categories and tier methodologies in table 6.1 of the NIR. The choices and explanations of methods are resolved under ID#s L.1 and L.2 above. |
| L.4 | 4. General (LULUCF) – $CO_2$ (L.12, 2017) Transparency | (a) Add to the NIR an explanation for the lack of AD before 1990, and extend the description by adding graphs showing the problem of extrapolating the AD back from 1990; <br><br>(b) Make further efforts or explore alternative ways of deriving appropriate data (e.g. through extrapolation based on surrogate data). | Addressing. The Netherlands partially explained the grounds on which pre-1990 AD are inadequate in the NIR (pp.194–195). However, the information and assertions are not supported by statistical data (e.g. graphs), and the ERT did not note any planned improvements regarding the derivation of appropriate data, as recommended. The ERT therefore reiterates the conclusions of previous ERTs that the non-consideration of land use prior to 1990 is not consistent with the 2006 IPCC Guidelines (vol. 4, equation 2.5). <br><br>During the review, the Party explained that older spatial information is available, including topographic maps, but previous attempts to include these maps in the inventory resulted in inconsistencies in the time series. The ERT considers that such data could still be of use as surrogate data, or that the Party could explore interpolation with Landsat observation data, which are available in a time series since 1972 on a 25 m grid, given that the Netherlands appears to have the geospatial capabilities to analyse and utilize a data set of this resolution. |
| L.5 | Land representation (L.13, 2017) Transparency | (a) Provide in the NIR an explanation for the increase in total land-use change in 2009–2013, including explaining the inter-survey period of the AD and the rotation frequency, and provide a qualitative description referring to relevant policies (e.g. Natura 2000 or the European Union Common Agricultural Policy) with respect to total annual land-use change, including non-forest land to forest land and forest land to non-forest land, as well as rotations between grassland and cropland; <br><br>(b) Use the same format for the land-use change matrices as those in CRF table 4.1 and CRF table NIR-2 in order to avoid confusion in future annual submissions. | Resolved. The Netherlands (1) reported information explaining the trends in AD for total land-use change in its NIR (section 6.3, p.194) and (2) presented the same land-use change matrices in the NIR (section 6.3, p.194–196) as appear in the CRF tables 4.1 and NIR-2. In addition, the Party discussed land-use changes including non-forest land to forest land and forest land to non-forest land, as well as rotations between grassland and cropland (section 6.3, pp.194–197). |
| L.6 | 4.A.1 Forest land remaining forest land – $CO_2$ (L.4, 2017) (L.5, | Calibrate the 2013 and 2014 values for CSC in living biomass per area for gains and net CSC in deadwood, and take historical trends into account, to ensure accuracy and | Resolved. The Netherlands changed its method for estimating CSC in deadwood to using trend extrapolation techniques with data from the past two NFIs. Living biomass continues to be modelled using EFISCEN, which is designed |

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| | 2016) (L.5, 2015) Accuracy | time-series consistency in the estimates of removals. | for modelling forest growing stock, and has been calibrated using data from the sixth NFI for time-series consistency. EFISCEN is described in the methodology report of Arets et al. (pp.40–41), which is provided in the NIR (annex 7) and referenced in the NIR (p.198). |
| | | | During the review, the Party explained that data from the seventh NFI will become available in 2021, and estimates would be further revised accordingly. |
| L.7 | 4.A.1 Forest land remaining forest land – $CO_2$ (L.5, 2017) (L.6, 2016) (L.6, 2015) Accuracy | Update the CSC for land areas involving forest land as and when information from the next NFI becomes available. | Resolved. The ERT noted that this issue has been resolved because, although the seventh NFI has not yet been carried out, substantive plans to update the inventory in 2022 when data from the seventh NFI are expected to be available have been articulated in the NIR (section 6.4.6). |
| L.8 | 4.A.1 Forest land remaining forest land – $CO_2$ (L.6, 2017) (L.7, 2016) (L.7, 2015) Transparency | Provide in the NIR (1) an explanation of the implications of CSC in forests and (2) the assumptions made for the estimates and provide references to justify this assumption. | Addressing. The Netherlands describes the history of pre-1990 forest establishment in its NIR (section 6.3, pp.194–195), and section 4.2 of the methodology report of Arets et al. in annex 7 to the NIR includes sound descriptions of methods. However, the substantive issue remains unresolved: the rate of CSC in forests is exceptionally high (among the highest of Parties included in Annex I to the Convention), and the underlying assumptions for this rate of CSC remain unsupported by sufficient information and references in the NIR on the national circumstances that would make the Party's IEFs plausible. |
| | | | During the review, the Party referred the ERT to Moraal et al. (2004), specifically section 7.1.1 on the history of forests and the estate profile, which shows a strong increase in the area of deciduous forests through to 2001. The ERT notes that the emission profile in the inventory conceptually fits with a forest estate that previously had significant increases in planted areas and is now ageing. On this basis, the strong but declining average growth rate could be considered as reasonable if supporting information and explanations of the kind provided during the review were included in the NIR. |
| | | | The ERT considers that reporting in the NIR transparent information supported by statistical information or appropriate charts from referenced sources regarding the national circumstances of Dutch forests and their implications for average growth rates would resolve this issue. |
| L.9 | 4.A.1 Forest land remaining forest land – $CO_2$ (L.15, 2017) Transparency | Correct and extend the description of the steps involved in calculating CSC in living biomass, and provide additional information on the primary data sets used (e.g. tables or graphs containing gains and | Resolved. The Netherlands significantly improved the methodological explanations in the methodology report of Arets et al. (p.35) provided in the NIR (annex 7). A seven-step explanation of the steps involved in calculating CSC and charts showing the average carbon stocks in forests were provided. |

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| | | | losses of biomass for the whole time series). |
| L.10 | 4.B Cropland – $CO_2$ (L.8, 2017) (L.9, 2016) (L.9, 2015) Convention reporting adherence | Correct the errors in reporting land-use area data in the CRF tables and ensure complete and consistent coverage of land areas within the country. | Addressing. The Netherlands reported an area for the cultivation of histosols in CRF table 3.D. The ERT noted that this area still cannot be reconciled with the areas of organic soils reported in CRF tables 4.C and 4.B. |
| | | | During the review, the Party explained that the cultivation of histosols comprises only the organic soils under agriculture, and provided a spreadsheet showing the disaggregation of grassland under peaty soils between "grassland vegetation" and "nature". From this spreadsheet, the ERT was able to confirm that the issue of double counting had been resolved. The ERT suggests that the Party provide sufficient stratification of its grassland areas in CRF table 4.C and/or in the NIR to allow identification of the area of cultivated organic soils and an assessment of consistency with CRF table 3.D. |
| L.11 | 4.C Grassland – $CO_2$ (L.16, 2017) Completeness | Estimate CSC in orchards according to methods provided in the 2006 IPCC Guidelines and provide information in the NIR on the method applied. | Resolved. The Netherlands reported estimates of CSC from orchards under grassland and described the methods applied to derive them. This information can be found in the NIR (pp.208–210) and in more detail in the methodology report of Arets et al. (chap. 6) (NIR, annex 7). |
| L.12 | 4.C.1 Grassland remaining grassland – $CO_2$ (L.9, 2017) (L.2, 2016) (L.2, 2015) (45, 2014) (60, 2013) (83, 2012) Completeness | Obtain data and report estimates for the carbon pools living biomass and DOM reported as "NE", for which methods and EFs are available. | Resolved. The Netherlands reported, under grassland remaining grassland, estimates for CSC in all pools except the following: |
| | | | (a) DOM: page 208 of the NIR provides a justification for a tier 1 assumption of equilibrium and reports DOM as "NO"; |
| | | | (b) Losses of living biomass in subdivision "trees outside forest–trees outside forest": the description on page 211 of the NIR of trees outside forest justifies no living biomass losses by the absence of harvesting; |
| | | | (c) Mineral soils in subdivision "trees outside forest–trees outside forest": the default justification for equilibrium in lands remaining in a land-use category holds, consistent with the methods that are described in the NIR (e.g. p.183). |
| | | | Each of these pools is reported as "NO" in CRF table 4.C, as discussed in ID# L.2 above. |
| L.13 | 4.C.1 Grassland remaining grassland – $CO_2$ (L.10, 2017) (L.10, 2016) (L.10, 2015) Comparability | Correct the errors in the allocation of areas and the estimates of emissions/removals between grassland remaining grassland and land converted to grassland, and enhance the QA/QC procedures to ensure accurate reporting on this issue in the NIR and the CRF tables. | Not resolved. The Netherlands improved transparency regarding the allocation of areas and estimates of emissions and removals for grassland in section 6.6.1 of the NIR; however, the misallocation of areas and the estimates of emissions and removals between grassland remaining grassland and land converted to grassland is still present. Land converted to grassland within the past 20 years continue to be allocated to grassland remaining grassland if |

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| | | | a transition between "nature" and "grassland vegetation" occurred. |
| | | | During the review, the Party explained that its subcategory "nature under grassland" has the same soil and biomass carbon stock as grassland; thus conversions between these categories do not involve CSC. The ERT noted that this explanation is not relevant to concerns regarding application of the 2006 IPCC Guidelines (chap. 3.3 on land representation), as per previous review recommendations. |
| L.14 | 4.C.2 Land converted to grassland – $CO_2$ (L.17, 2017) Transparency | Include in the NIR an explanation of the inter-annual changes in the IEFs for mineral soils in cropland converted to grassland. | Resolved. The Netherlands provided in the NIR (section 6.6.3) the necessary information on time-series consistency, specifically on how inter-annual changes in IEFs in mineral soils result from changes in trends in land-use changes. |
| L.15 | 4(I) Direct $N_2O$ emissions from N inputs to managed soils – $N_2O$ (L.11, 2017) (L.11, 2016) (L.11, 2015) Comparability | Revise the notation key "NE" to "IE" for those indirect $N_2O$ emissions that are reported in the agriculture sector, and provide a more transparent explanation of notation key use. | Resolved. The Netherlands corrected the notation key used in CRF table 4(I), which now shows that all $N_2O$ emissions from N inputs to managed soils are reported as "IE". An appropriate explanation of notation key use is included in the NIR (p.214). |
| L.16 | 4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – $CO_2$ and $N_2O$ (L.18, 2017) Completeness | Provide estimates of the areas of forest land on organic soils where drainage might still be occurring, report the associated $CO_2$ and $N_2O$ emissions in the CRF tables using IPCC default or country-specific EFs, and describe the applied methodology and IEF transparently in the NIR. | Addressing. The Netherlands included and transparently described calculations for estimating $CO_2$ emissions from the drainage of organic soils on forest land in the NIR (p.187), and described the inclusion of these emissions in organic soils under the relevant land-use category (NIR, p.185). However, $N_2O$ emissions are reported as "IE" under direct N inputs to managed soils in the methodology report of Arets et al. (p.12) (NIR, annex 7) and are reported as "IE" in CRF table 4(II), but the ERT noted that these emissions are reported as "NO" in CRF table 4(I). |
| | | | During the review, the Party acknowledged that the $N_2O$ emissions from drainage of organic soils on forest land should indeed be reported under the LULUCF sector, and indicated that it would include them in CRF table 4(II) in the next submission. |
| L.17 | 4(V) Biomass burning – $CO_2$, $CH_4$ and $N_2O$ (L.19, 2017) Transparency | Include in the NIR a description of the methodology used for estimating emissions from biomass burning, providing information on how the NFI covers forest fires, showing how this is marginally reflected in the calculation of the available fuel and explaining the unlikeliness of double counting occurring. | Resolved. The Netherlands provided in its NIR a description of forest fires in the country and explained how they are expected to have a limited effect on the NFI (p.201). |

Waste

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| W.1 | 5.A Solid waste disposal on land – $CH_4$ (W.1, 2017) (W.2, | Include important AD, such as the amount and composition of disposed waste, in the NIR. | Addressing. The Netherlands included the requested AD in NIR table 7.3. The ERT noted that the Party provided for 2016 the amount of waste landfilled and the DOC value for each |

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| | 2016) (W.2, 2015) (52, 2014) Transparency | | waste group but did not provide these values for the entire time series. |
| | | | During the review, the Party provided the amount and composition of waste landfilled for 2005–2017. The Party explained that the section in the NIR "Fraction of degradable organic carbon" describes how the DOC value is calculated for an individual year – NIR table 7.3 is an illustration of this approach. The values for 2016 in NIR table 7.2 are derived from NIR table 7.3. The amount of waste landfilled in 2017 does not contribute to emissions from landfills in 2017. When preparation of the NIR commenced, the total composition of waste in 2017 was not yet known, but was added later during the preparation process. The Party updated NIR table 7.3 with figures for 2017. The Party also explained that a complete overview of waste composition is not included in the NIR because it would comprise an unwieldy table. The separate Excel files that were submitted during the review provide an overview of the amount of waste landfilled by European list of waste code. The total amount of DOC was calculated using the individual DOC value for each code, determined by Tauw (2011). This method is used for 2005 onward. The ERT considers that providing the amount of waste landfilled and DOC value for each waste group throughout the time series in the NIR would resolve this issue. |
| W.2 | 5.A Solid waste disposal on land – $CH_4$ (W.2, 2017) (W.7, 2016) (W.7, 2015) Transparency | Provide in the NIR an explanation of the selection of the parameters used in the first-order decay method, including delay time and methane correction factor. | Resolved. The Netherlands provided in its NIR an explanation of the parameters used in the first-order decay method (section 7.2.2), including the use of the methane correction factor for semi-aerobic landfills (p.229). |
| W.3 | 5.A Solid waste disposal on land – $CH_4$ (W.3, 2017) (W.8, 2016) (W.8, 2015) Convention reporting adherence | Correct the notation key used in CRF table 5.A in accordance with paragraph 37 of the UNFCCC Annex I inventory reporting guidelines. | Resolved. The Netherlands continues to report "IE" for AD, EFs and emissions for semi-aerobic landfills in CRF table 5.A. However, the Party included an explanation for notation key use as a node comment in CRF table 5.A for subcategory 5.A.1.b. The ERT noted that the use of "IE" is also explained in the NIR (p.229). According to this explanation, a few landfills in the country are semi-aerobic, but all waste landfilled at these sites is included in the emissions from anaerobic landfills. |
| W.4 | 5.A Solid waste disposal on land – $CH_4$ (W.5, 2017) (W.10, 2016) (W.10, 2015) Consistency | Provide justifications for (1) the default value of fraction of $CH_4$ in generated landfill gas being used for the years 2005–2014; (2) the interpolation between country-specific and default values for fraction of $CH_4$ in generated landfill gas for the years 2001–2004 being considered the best approach to estimate the $CH_4$ emissions and to maintain time-series consistency; | Addressing. The Netherlands provided an explanation in the NIR (sections 7.2.2 and 7.2.5). According to the information provided in section 7.2.2, the country-specific value (57.4 per cent) is used for fraction of $CH_4$ in generated landfill gas for 1990–2004 and the IPCC default value (50 per cent) is used for 2005 onward. The Netherlands provided a justification in the NIR (p.229) for using default values for fraction of $CH_4$. |

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| | | and (3) the correspondence of approaches to estimating $CH_4$ emissions from solid waste disposal sites to the guidance provided in the 2006 IPCC Guidelines. If unable to provide the justifications and if unable to obtain a country-specific value for the fraction of $CH_4$ in generated landfill gas for the period 2001–2014, continue to use the country-specific value (57.4 per cent) and recalculate the $CH_4$ emissions from waste disposal on land using this country-specific value for the entire time series 1990–2014. | During the review, the Party provided further information on $CH_4$ recovery (see ID# W.18 in table 5), in response to a question raised by the ERT. The ERT noted that the percentage of $CH_4$ in recovered landfill gas for the whole time series provided in an Excel file is different from the reported information in the NIR. According to this information, the Party is using a constant country-specific value (57.4 per cent) for 1990–2001, and varying country-specific values between 45.5 and 54.5 per cent in recovered landfill gas for the rest of the time series (i.e. between 2002 and 2017). The ERT considers that providing consistent and clear information for the use of values for fraction of $CH_4$ in landfill gas throughout the time series in the NIR would resolve this issue. |
| W.5 | 5.A.1 Managed waste disposal sites – $CH_4$ (W.11, 2017) Transparency | Report in the NIR that $CH_4$ emissions from semi-aerobic landfills are included with the emissions from managed solid waste disposal sites to clarify the use of the notation key "IE". | Resolved. The Netherlands included an explanation for its use of "IE" in a node comment in CRF table 5.A. It also reported in the NIR (p.229) that $CH_4$ emissions from semi-aerobic landfills are included in the emissions from managed solid waste disposal sites. |
| W.6 | 5.A.1 Managed waste disposal sites – $CH_4$ (W.12, 2017) Transparency | Provide in the NIR information describing the types, composition and amount of waste landfilled and how the AD for the time series 1945–2015 were compiled. | Resolved. The Netherlands provided information describing the types, composition and amount of waste landfilled as well as how the AD were compiled in its NIR (section 7.2.2). |
| W.7 | 5.A.1 Managed waste disposal sites – $CH_4$ (W.13, 2017) Transparency | Include in the NIR the data used for the estimation of emissions only (e.g. exclude the waste generation rate reported in NIR table 7.3), together with a detailed explanation of the data. | Resolved. The Netherlands adjusted NIR table 7.4 (NIR table 7.3 in the 2017 submission) to include only the relevant data used for estimating emissions. The Party included a detailed explanation of these data in the NIR (section 7.2.2). |
| W.8 | 5.A.1 Managed waste disposal sites – $CH_4$ (W.14, 2017) Transparency | Include in the NIR data on waste composition and the method applied to derive the DOC values. | Resolved. The Netherlands included an explanation for the method applied to derive the DOC values in the NIR (section 7.2.2, p.226, under "Fraction of degradable organic carbon" and in table 7.3). For the recommendation on providing amount and composition of waste landfilled, see ID# W.1 above. |
| W.9 | 5.A.1 Managed waste disposal sites – $CH_4$ (W.15, 2017) Transparency | Report in the NIR the reasons for the decrease in DOC values throughout the time series, in particular between 2000 and 2001, and explain the low values reported for the period 2000–2015. | Addressing. The Netherlands provided an explanation for the decrease in DOC values for 2005 onward in the NIR (section 7.2.2, under "Fraction of degradable organic carbon"). The Party provided information on DOC values throughout the time series in NIR table 7.2 and information on DOC values of each waste group for 2016 in NIR table 7.3; however, it did not explain the specific reasons for the decrease between 2000 and 2001 or for the low values reported for 2000–2015. |
| W.10 | 5.A.1 Managed waste disposal sites – $CH_4$ (W.16, 2017) Consistency | (a) Apply country-specific k values for the period 2001 onward in order to ensure time-series consistency; (b) Until the studies for obtaining these country-specific k values are | Addressing. The Netherlands reported that the recommendations of the previous ERT were implemented in the national model (NIR, annex 10, p.401). The information related to k values is presented in section 7.2.2 under "k-value". The ERT noted that the Party did not apply |

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
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| | | concluded, apply (1) the country-specific value for k (0.0693) for the period 1990–2004 and (2) the IPCC default value for k (0.05) for 2005 onward; <br><br> (c) Explain in the NIR the use of the k values throughout the time series. | country-specific k values for 2001 onward in order to ensure time-series consistency. The Party used a k value of 0.094 for up to and including 1989, decreased the value to 0.0693 for 1995, further decreased it to 0.05 for 2005 and kept it constant thereafter (NIR, p.225). The ERT also noted that an explanation of the use of k values is included in the NIR (p.225) but not throughout the time series and not under the NIR section "k-value". In addition, there are contradictory explanations of k values in the NIR. According to page 228, the k value is a value for slowly degrading waste (wood, paper, textiles) in a wet and temperate climate zone. The IPCC default value (2006 IPCC Guidelines, vol. 5, table 3.3) is between 0.03 and 0.06, but a k value of 0.05 is used in the Dutch model. However, in NIR table 7.4, the k value is presented as 0.09 for 1990, 0.07 for 1995 and 2000, and 0.05 for 2005 onward. <br><br> During the review, the Party confirmed that all the parameters used in the national model are described in the NIR (p.225). The Party also explained that it used a landfill gas model with country-specific values between 1990 and 2004. The country-specific k values were derived from a study by Oonk et al. (1994). The k value was later adjusted in a study by Spakman et al. (2003) owing to changes in the composition and degradability of waste. In 2010, the Netherlands tried to validate the country-specific values but the study concluded that it was not possible (Tauw, 2011). Therefore, the landfill model uses the IPCC default k values for 2005 onward. The assumption was made that the country-specific values are applicable until 2004. The ERT considers that item (b) of the recommendation is resolved but items (a) and (c) are still not resolved. |
| W.11 | 5.A.1 Managed waste disposal sites – CH$_4$ (W.17, 2017) Consistency | (a) Derive country-specific DOC$_f$ values for the period 2001 onward in order to ensure time-series consistency; <br><br> (b) Until the studies for obtaining these country-specific DOC$_f$ values are concluded, apply (1) the country-specific value for DOC$_f$ (0.58) for the period 1990–2004 and (2) the IPCC default value for DOC$_f$ (0.5) for 2005 onward; <br><br> (c) Explain in the NIR the use of the DOC$_f$ values throughout the time series. | Addressing. The Netherlands reported that the recommendations of the previous ERT were implemented in the national model (NIR, annex 10, p.401). The information related to DOC$_f$ values is presented in section 7.2.2 under "Degradable organic carbon that decomposes (DOCf)". The ERT noted that the Party did not derive country-specific DOC$_f$ values for 2001 onward in order to ensure time-series consistency. The Party used a DOC$_f$ value of 0.58 for 1990–2004 and 0.5 for 2005 onward (NIR, p.225). The ERT also noted that an explanation of the use of DOC$_f$ values is included in the NIR (p.225) but not throughout the time series and not under the section "DOC$_f$". In addition, it is not clear in the NIR whether the previous ERT recommendations have been implemented. The ERT noted inconsistent information between pages 225 and 227 of the NIR; for example, it is understood from the NIR (p.227) that the Party |

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | | is using the IPCC default value of 0.5 for the whole time series. |
| | | | During the review, the Party confirmed that all the parameters used in the national model are described in the NIR (p.225): "Fraction of DOC actually dissimilated (DOCF): 0.58 until 2004 (see Oonk et al., 1994); decreasing to 0.5 in 2005 (IPCC parameter) and remaining constant thereafter". The Party also explained that it used a landfill gas model with country-specific values for between 1990 and 2004. The country-specific $DOC_f$ values were derived from a study by Oonk et al. (1994). In 2010, the Netherlands tried to validate the country-specific values but the study concluded that it was not possible (Tauw, 2011). Therefore, the landfill model uses the IPCC default $DOC_f$ values for 2005 onward. The assumption was made that the country-specific values are applicable until 2004. The ERT considers that item (b) of the recommendation is resolved but items (a) and (c) are still not resolved. |
| W.12 | 5.A.1 Managed waste disposal sites – $CH_4$ (W.18, 2017) Consistency | (a) Derive country-specific fraction of $CH_4$ in generated landfill gas values for the period 2001 onward in order to ensure time-series consistency; <br><br> (b) Until the studies for obtaining these country-specific values are concluded, apply (1) the country-specific value (57.4 per cent) for the period 1990–2004 and (2) the IPCC default value (50 per cent) for 2005 onward; <br><br> (c) Explain in the NIR the use of the fraction of $CH_4$ in generated landfill gas value throughout the time series from 1990. | Addressing. The Netherlands reported that the recommendations of the previous ERT were implemented in the national model (NIR, annex 10, p.402). The information related to fraction of $CH_4$ in generated landfill gas values is presented in the NIR (section 7.2.2 under "Fraction of methane generated in landfill gas"). The ERT noted that an explanation of the use of fraction of $CH_4$ in generated landfill gas values is included in the NIR throughout the time series from 1990 (p.229). <br><br> During the review, the Party provided further information on $CH_4$ recovery (see ID# W.18 in table 5) in response to a question raised by the ERT. The ERT noted that the Party is using a constant country-specific value (57.4 per cent) for 1990–2001, and varying country-specific values for $CH_4$ in recovered landfill gas between 45.5 and 54.5 per cent for the remaining time series between 2002 and 2017. The ERT considers that providing in the NIR consistent and clear information on the use of values for fraction of $CH_4$ in landfill gas throughout the time series would resolve this issue. |
| W.13 | 5.B Biological treatment of solid waste – $CH_4$ and $N_2O$ (W.6, 2017) (W.3, 2016) (W.3, 2015) (56, 2014) Transparency | Report a complete time series of AD of separately collected organic waste from households for $CH_4$ and $N_2O$ emissions from composting and digesting for the period 2009–2012. | Resolved. The Netherlands included the requested data in NIR table 7.5 and CRF table 5.B. |
| W.14 | 5.B.1 Composting – $CH_4$ (W.7, 2017) (W.11, 2016) (W.11, 2015) Consistency | Ensure the consistency of the reported time series for the $CH_4$ EF and include in the NIR the reason for the decrease in the $CH_4$ EF after 2009. | Addressing. In annex 10 to the NIR (p.399) the Netherlands stated that the reason for the decrease in the EF could be found in section 7.3.2 (pp.231–232) of the NIR. In section 7.3.2 of the NIR the Party explained that, in 2010, an |

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
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| | | | independent study on the CH$_4$ EFs for composting was carried out in which they were compared with EFs in other, predominantly European, countries (DHV, 2010). The Party further explained that the CH$_4$ EF for composting was modified as of the 2011 NIR (on the basis of 2009 data) and the EF could not be modified retroactively on the basis of the DHV (2010) study and all other EFs are unchanged. The ERT noted that the reason for the decrease in the CH$_4$ EF after 2009 was not included in the NIR as requested by the previous ERT. The ERT suggests using one of the recalculation techniques in the 2006 IPCC Guidelines (vol. 1, chap. 5) to ensure time-series consistency, noting that the use of such recalculation techniques may involve expert judgment regarding any changes (or lack of changes) in the practice of composting in the country. |
| W.15 | 5.D Wastewater treatment and discharge – N$_2$O (W.9, 2017) (W.14, 2016) (W.14, 2015) Transparency | Clearly document the country-specific methodology and provide background information in the NIR. | Resolved. The Netherlands improved relevant text in the NIR (section 7.5.2, p.241) and in annex 7 to the NIR (ENINA methodology report, method 2.3.2.4.6, pp.121–122). The ERT noted that the country-specific methodology and the background information for wastewater treatment and discharge were documented clearly. |
| W.16 | 5.D Wastewater treatment and discharge – CH$_4$ (W.19, 2017) Transparency | Include in the NIR detailed data on DOC for domestic and industrial wastewater and sludge and describe how the data were derived (see table 7.5 of the 2017 NIR). | Resolved. The Netherlands added detailed data on DOC for domestic and industrial wastewater and sludge in NIR table 7.9. A description of the data is also provided in the NIR (section 7.5.2, p.237). |
| W.17 | 5.D.2 Industrial wastewater – CH$_4$ (W.10, 2017) (W.6, 2016) (W.6, 2015) (55, 2014) Accuracy | Provide a numerical estimate of the recovered CH$_4$ in anaerobic industrial wastewater treatment plants. | Resolved. The Netherlands continues to report the total recovered CH$_4$ (from domestic and industrial wastewater treatment plants) in NIR table 7.8. Some data on the recovered CH$_4$ in anaerobic industrial wastewater treatment plants are provided in NIR table 7.9 and an explanation of the estimation is included in the NIR (section 7.5.2, p.241). In addition, the Party changed its reporting of "NA" for amount of CH$_4$ for energy recovery in category 5.D.2 to "IE" in CRF table 5.D, and provided an explanation in the NIR (p.240). The Party explained in the NIR (annex 10, pp.399–400) that no distinction is made regarding the type of substrate or type of installation in the statistics. Therefore, CH$_4$ recovery cannot be quantified separately in anaerobic industrial wastewater treatment plants. The ERT considers the explanation in the NIR is sufficiently transparent and that the issue is resolved. |

KP-LULUCF activities

| KL.1 | General (KP-LULUCF activities) (KL.8, 2017) Transparency | Extend the information provided in the NIR such that the calculation process for the background level and margin to exclude natural disturbances is documented | Resolved. The Netherlands provided sufficient information to transparently present the calculation of the background level and margin separately for FM and AR in the NIR (section 11.4.4, pp.280–281), and this information |

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | transparently and shows that the calculation is based on area-specific emissions and that the background value and margin for both afforestation and FM were provided separately (not summed). | allowed the ERT to check if calculations are in accordance with the Kyoto Protocol Supplement. |
| KL.2 | AR – $CO_2$ (KL.9, 2017) KP reporting adherence | (a) Ensure consistency between the values provided in the CRF tables and the NIR and correct errors, as necessary; <br><br>(b) Correct the use of the notation keys and use them consistently throughout the NIR (i.e. use "NR" for pools where the tier 1 "not a source principle" applies and for which a justification has been given in the NIR). | Addressing. The Netherlands reported CSC in litter as "NO" in NIR table 11.2 but as "NE" in CRF table 4(KP-I)A.1. CRF table NIR-1 continues to report CSC in litter as "R" (reported) rather than as "NR". The ERT did not find any further discrepancies between CRF table NIR-1 and other CRF tables. The ERT notes that at their 16th meeting the GHG inventory lead reviewers in 2019 recommended that the correct notation key for a tier 1 assumption of KP-LULUCF activities not being a source is "NE". <br><br>During the review, the Party explained that it would take the above-mentioned recommendation into account for the next submission. |
| KL.3 | AR – $CO_2$ (KL.10, 2017) Transparency | (a) Improve the description in the NIR of the applied methodology and IEF, differentiating between afforestation of forest younger than 20 years and afforestation of forest older than 20 years for litter and deadwood; <br><br>(b) Transparently report in the NIR the estimation method applied and the IEF for living biomass for afforestation of forest younger and older than the applied conversion time of 30 years. | Resolved. The Netherlands improved clarity in NIR section 11.3.1.1, articulating that methods are consistent with those used under Convention accounting (NIR, section 6.4.2.2), where litter and deadwood do not accumulate until 20 years after establishment and living biomass accumulation reduces to the rate of forest remaining forest at 30 years after establishment. |
| KL.4 | Deforestation – $CO_2$ (KL.4, 2017) (KL.5, 2016) (KL.5, 2015) Transparency | Include in the NIR a justification for the high value of CSC per area of litter pool for the area of deforestation in 1990. | Resolved. The Netherlands provided sufficient justification for the high value of CSC, explaining that geomorphological characteristics of the country result in higher levels of litter, and also provided the research that underpins this justification (NIR, section 11.3.1.1). |
| KL.5 | FM – $CO_2$, $CH_4$ and $N_2O$ (KL.5, 2017) (KL.6, 2016) (KL.6, 2015) Accuracy | In conducting technical corrections of the FMRL, address the recommendation made in the report of the technical assessment of the FMRL (FCCC/TAR/2011/NLD) and reflect historical emissions from natural disturbances (see also document FCCC/IRR/2016/NLD, table 3). | Addressing. The Netherlands has elected to account for activities under Article 3, paragraph 4, at the end of the commitment period and therefore, according to decision 2/CMP.7 (annex, para. 14), the technical correction shall be applied when accounting. While the ERT agrees that accounting is made at the end of the commitment period for Parties that chose to account at the end of the commitment period, the ERT considers that the reporting obligation applies to all annual submissions. <br><br>During the review, the Party explained (NIR, section 11.5.2.3) that it had transparently identified the need for technical corrections, |

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
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| | | | and that the technical corrections would be quantifiably reported in a future NIR. |
| KL.6 | FM – $CO_2$ (KL.13, 2017) Transparency | Include reference documents in the NIR (in section 11.3.1.2) in order to demonstrate that for litter and mineral soils in Dutch forests, the 'not a source' approach can be applied. | Resolved. The ERT noted that the NIR (section 11.3.1.2) includes a justification for applying the 'not a source' approach to litter in Dutch forests, and also includes conclusions from the methodology report of Arets et al. (NIR, annex 7). The reporting of "NO" for mineral soils under FM is justified in Convention accounting on the basis of no transition occurring. |
| KL.7 | HWP – $CO_2$ (KL.6, 2017) (KL.7, 2016) (KL.7, 2015) Transparency | Provide in the NIR (1) information on the methodologies, parameters (e.g. half-lives) and assumptions used for the estimation of $CO_2$ emissions from HWP; (2) an explanation of the treatment of HWP, including what is included or excluded as the emissions from HWP, and on which assumption their estimation is based in accounting those emissions; and, in particular, (3) information on the adherence to IPCC guidance in terms of the exclusion of imports and deforestation, inherent HWP, and the relationship between reporting under the Convention and the projection of HWP in the FMRL. | Addressing. The Netherlands provided the description of the calculation of HWP in the NIR (section 6.10), which resolved items (1) and (2) of the issue; however, the ERT noted that information was missing, specifically related to decision 2/CMP.8 on inherited emissions, emissions accounted for in the first commitment period, and the exclusion of imported HWP. The Netherlands provided in the NIR (section 11.4.5) an explanation for HWP emissions being accounted for in the first commitment period and for the exclusion of imported HWP. However, the Party did not explain how inherited emissions are consistent with the projection of HWP in the FMRL. The NIR states that material inflow is included from 1990 onwards (p.282), which suggests that inherited emissions for products produced prior to 1990 have not been taken into account. The ERT noted the lack of AD on pre-1990 production in CRF table 4.Gs2. During the review, the Party explained that guidance in the Kyoto Protocol Supplement (section 2.8.3) identifies that data for FM must begin in 1990. The ERT considers that the provision for commencing in 1990 is only relevant to AR. For FM, the means of accounting for inherited emissions depends upon the construction of the FMRL and, unless an approach is taken that permits the exclusion of inherited emissions prior to the commencement of the commitment period, methods should make the best use of available AD, such as by using FAO data, which commences in 1961, or country-specific data, if available. The Party acknowledged that there is a methodological inconsistency between inherited emissions and the projection of HWP in the FMRL and that this would be addressed in a future technical correction. The ERT considers that this planned improvement should be either implemented or more transparently explained in the next NIR (see ID# KL.16 in table 5). |
| KL.8 | HWP – $CO_2$ (KL.11, 2017) Transparency | Include in the NIR the definition of the category other and a justification for the applied half-life. | Resolved. The Netherlands provided in the NIR an improved explanation for the HWP pool other and choice of half-life (section 11.4.5). This explanation articulates the purpose of the |

| ID# | Issue and/or problem classification[a, b] | Recommendation made in previous review report | ERT assessment and rationale |
|---|---|---|---|
| | | | "other round wood" pool as being for the use of whole stems in building foundations, roads, waterworks, fences and poles, and so the choice of a 35-year half-life is justified. |
| KL.9 | Direct and indirect $N_2O$ emissions from N fertilization – $N_2O$ (KL.7, 2017) (KL.8, 2016) (KL.8, 2015) Transparency | Provide in the NIR the reasons for excluding direct and indirect $N_2O$ emissions from N fertilization from the reporting on KP-LULUCF activities. | Resolved. The Netherlands justified its reporting of emissions for this category in land subject to AR and FM as "NO" by noting that maximizing wood production is not a high priority in the country and that the application of additional fertilizers is not economically valuable under the Party's national circumstances (NIR, section 11.3.1.2). Regarding reporting "IE" for deforestation in CRF table 4(KP-II)1, the ERT noted that these emissions are included in the agriculture sector. |
| KL.10 | General – KP-LULUCF activities – $CO_2$ (KL.14, 2017) Completeness | Provide estimates of the areas of afforestation and FM on organic soils where drainage might still be active, report the associated $CO_2$ and $N_2O$ emissions in the CRF tables using IPCC default or country-specific EFs, and describe the applied methodology and IEF transparently in the NIR. | Resolved. The Netherlands included and transparently described in the NIR (p.187) calculations for $CO_2$ emissions from the drainage of organic soils on forest land. |
| KL.11 | $CH_4$ and $N_2O$ emissions from drained and rewetted organic soils – $N_2O$ (KL.14, 2017) Completeness | Provide estimates of the areas of afforestation and FM on organic soils where drainage might still be active, report the associated $CO_2$ and $N_2O$ emissions in the CRF tables using IPCC default or country-specific EFs, and describe the applied methodology and IEF transparently in the NIR. | Not resolved. The Netherlands reported $N_2O$ emissions as "NE" in CRF table 4(KP-II)2 for AR, deforestation and FM. During the review, the Party acknowledged that $N_2O$ emissions from organic soils under forest land should be reported under the LULUCF sector and consequently also under AR and FM under KP-LULUCF activities, and indicated that it would report the $N_2O$ emissions in CRF table 4(KP-II)2 in the next submission. |

[a]  References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) in which the issue and/or problem was raised. Issues are identified in accordance with paras. 80–83 of the UNFCCC review guidelines and classified as per para. 81 of the same guidelines. Problems are identified and classified as problems of transparency, accuracy, consistency, completeness or comparability in accordance with para. 69 of the Article 8 review guidelines in conjunction with decision 4/CMP.11.

[b]  The report on the review of the 2018 annual submission of the Netherlands was not available at the time of the 2019 review. Therefore, the previous recommendations reflected in table 3 are taken from the 2017 annual review report. For the same reason, 2018 is excluded from the list of review years in which the issue could have been identified.

## IV. Issues identified in three successive reviews and not addressed by the Party

9.     In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues included in table 4 have been identified in three successive reviews, including the review of the 2019 annual submission of the Netherlands, and have not been addressed by the Party.

Table 4
**Issues and/or problems identified in three successive reviews and not addressed by the Netherlands**

| ID# | Previous recommendation for the issue identified | Number of successive reviews issue not addressed[a] |
|---|---|---|
| General | | |

| ID# | Previous recommendation for the issue identified | Number of successive reviews issue not addressed[1] |
|---|---|---|
| G.10 | Provide the level and trend uncertainty assessment as required by paragraphs 15 and 42 of the UNFCCC Annex I inventory reporting guidelines | 3 (2015/2016–2019) |
| Energy | | |
| E.6 | Clarify, in the NIR, the allocation of emissions from incinerated waste oils and solvents and justify the applicable AD, EFs and emission trends | 3 (2015/2016–2019) |
| E.8 | Provide in the NIR the reasons behind the fluctuations in the $CO_2$ IEF throughout the gas combustion time series and explain how the consistency of the time series and EFs are ensured in estimating $CO_2$ emissions from this category | 3 (2015/2016–2019) |
| E.12 | Use more up-to-date data from the most recently available data sources, such as annual environmental reports or EU ETS data, in order to improve the time-series consistency of $CO_2$, $CH_4$ and $N_2O$ emission estimates from chemical waste gases (if the data are suitable to use for previous years), or, if that is not possible, include in the NIR a detailed category-specific improvement plan and explain how the time-series consistency for the AD is ensured for the emission estimates for this category | 3 (2015/2016–2019) |
| IPPU | | |
| I.6 | Conduct further research and consultation with industry and/or statistical agencies on other process uses of carbonates to either access additional AD and EFs or seek verification of the current method and emission estimates in order to ensure the completeness and accuracy of the estimates | 3 (2015/2016–2019) |
| I.8 | Estimate emissions from ammonia production, taking into account $CO_2$ emissions and sequestration from urea production by collecting new AD (annual urea production, urea imports and exports, and urea application to soils) through research and/or consultation with industry and statistical agencies in order to improve the accuracy and comparability of emission estimates | 3 (2015/2016–2019) |
| I.10 | Report $CO_2$ emissions from ammonia production using a method that is consistent with the 2006 IPCC Guidelines, reporting emissions from all natural gas uses (i.e. both fuel and feedstock use) in this category | 3 (2015/2016–2019) |
| I.13 | Document the QA/QC activities and outcomes for the chemical and petrochemical sources in the IPPU sector | 3 (2015/2016–2019) |
| I.22 | Correct the notation key "NA" to "IE" for industrial refrigeration and mobile air conditioning in accordance with paragraph 37 of the UNFCCC Annex I inventory reporting guidelines | 3 (2015/2016–2019) |
| I.23 | Conduct QA/QC and verification of the method used to estimate emissions from refrigeration and air conditioning, in accordance with paragraph 41 of the UNFCCC Annex I inventory reporting guidelines, and report on the outcomes thereof | 3 (2015/2016–2019) |
| Agriculture | | |
| A.4 | Continue and enhance efforts to improve the consistency between the $CH_4$ and $N_2O$ emission estimates and report correct values for the fractions of the different manure management systems in the NIR and the CRF tables | 5 (2013–2019) |
| A.6 | Include in the NIR an explanation for the different trends between $CH_4$ emissions and changes in the swine population | 3 (2015/2016–2019) |
| A.8 | Include in the NIR numeric data on annual removal of agricultural crop residues | 3 (2015/2016–2019) |

| ID# | Previous recommendation for the issue identified | Number of successive reviews issue not addressed[a] |
|---|---|---|
| A.9 | Include in the NIR the method and related parameters used to derive country-specific Nex rate and Frac$_{GRAZ}$ | 4 (2014–2019) |
| **LULUCF** | | |
| L.2 | Correct the notation key "NE" to "NO" for those pools in which the Party considers no CSC occurs, provide estimates for those pools and categories for which it believes zero carbon change does not apply, or provide the justification for reporting "NE" for the pools in which the amount of CSC is insignificant in line with paragraph 37 of the UNFCCC Annex I inventory reporting guidelines | 3 (2015/2016–2019) |
| L.8 | Provide in the NIR (1) an explanation of the implications of CSC in forests and (2) the assumptions made for the estimates and provide references to justify this assumption | 3 (2015/2016–2019) |
| L.10 | Correct the errors in reporting land-use area data in the CRF tables and ensure complete and consistent coverage of land areas within the country | 3 (2015/2016–2019) |
| L.13 | Correct the errors in the allocation of areas and the estimates of emissions/removals between grassland remaining grassland and land converted to grassland, and enhance the QA/QC procedures to ensure accurate reporting on this issue in the NIR and the CRF tables | 3 (2015/2016–2019) |
| **Waste** | | |
| W.1 | Include important AD, such as the amount and composition of disposed waste, in the NIR | 4 (2014–2019) |
| W.4 | Provide justifications for (1) the default value of fraction of CH$_4$ in generated landfill gas being used for the years 2005–2014; (2) the interpolation between country-specific and default values for fraction of CH$_4$ in generated landfill gas for the years 2001–2004 being considered the best approach to estimate the CH$_4$ emissions and to maintain time-series consistency; and (3) the correspondence of approaches to estimating CH$_4$ emissions from solid waste disposal sites to the guidance provided in the 2006 IPCC Guidelines. If unable to provide the justifications and if unable to obtain a country-specific value for the fraction of CH$_4$ in generated landfill gas for the period 2001–2014, continue to use the country-specific value (57.4 per cent) and recalculate the CH$_4$ emissions from waste disposal on land using this country-specific value for the entire time series 1990–2014 | 3 (2015/2016–2019) |
| W.14 | Ensure the consistency of the reported time series for the CH$_4$ EF and include in the NIR the reason for the decrease in the CH$_4$ EF after 2009 | 3 (2015/2016–2019) |
| **KP-LULUCF activities** | | |
| KL.5 | In conducting technical corrections of the FMRL, address the recommendation made in the report of the technical assessment of the FMRL (FCCC/TAR/2011/NLD) and reflect historical emissions from natural disturbance (see also document FCCC/IRR/2016/NLD, table 3) | 3 (2015/2016–2019) |
| KL.7 | Provide in the NIR (1) information on the methodologies, parameters (e.g. half-lives) and assumptions used for the estimation of CO$_2$ emissions from HWP; (2) an explanation of the treatment of HWP, including what is included or excluded as the emissions from HWP, and on which assumption their estimation is based in accounting those emissions; and, in particular, (3) information on the adherence to IPCC guidance in terms of the exclusion of imports and deforestation, inherent | 3 (2015/2016–2019) |

| ID# | Previous recommendation for the issue identified | Number of successive reviews issue not addressed[a] |
|-----|--------------------------------------------------|-----------------------------------------------------|
|     | HWP, and the relationship between reporting under the Convention and the projection of HWP in the FMRL | |

[a] The report on the review of the 2018 annual submission of the Netherlands has not yet been published. Therefore, 2018 was not included when counting the number of successive years in table 4. As the reviews of the Party's 2015 and 2016 annual submissions were conducted together, they are not considered successive and 2015/2016 is considered as one year.

## V. Additional findings made during the individual review of the 2019 annual submission

10. Table 5 contains findings made by the ERT during the individual review of the 2019 annual submission of the Netherlands that are additional to those identified in table 3.

Table 5
**Additional findings made during the individual review of the 2019 annual submission of the Netherlands**

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
|---|---|---|---|
| **General** | | | |
| G.11 | Key category analysis | The Party did not report in the NIR the results of a key category analysis for the base year. The ERT noted that this is not in accordance with paragraphs 14 and 39 of the UNFCCC Annex I inventory reporting guidelines. | Yes. Convention reporting adherence |
| | | During the review, the Party explained that the key category analysis for the base year is available in CRF table 7, and that while the key category analysis is useful for prioritizing inventory improvements, a separate key category analysis of the base year outside CRF Reporter is not useful. The ERT noted that the key category analysis is also used for identifying the categories that need to be estimated with a more advanced tier because they are or have been key along the time series. Moreover, CRF table 7 only lists the key categories without indicating their level and the accumulated percentages and in the NIR (pp.48–49) the Party states that it uses a country-specific aggregation of sources. | |
| | | The ERT recommends that the Netherlands provide a key category analysis for the base year in the NIR, in accordance with paragraphs 14 and 39 of the UNFCCC Annex I inventory reporting guidelines. | |
| G.12 | Kyoto Protocol units | An inconsistency between information provided by the Party in the SEF tables and international transaction log records on transfers and acquisitions between previous period surplus reserve accounts was identified in the SIAR. This inconsistency (regarding information required by decision 22/CMP.1, para. 88(b)) resulted from the Party providing incorrectly formatted SEF tables. The SIAR assessors recommended that the Netherlands provide the SEF tables in the correct format. The Party resubmitted the SEF tables on 20 August 2019, which resolved the issue identified in the SIAR. | Not an issue/problem |
| **Energy** | | | |
| E.25 | 1. General (energy sector) – all fuels – all gases | The Party provided the ENINA methodology report of Peek et al. contained in annex 7 to the NIR. The ERT acknowledges the usefulness of having the methodologies annexed to the NIR and commends the Party for its initiative in doing so. However, the absence from the NIR of brief descriptions of the methodologies used for estimating emissions reduces the transparency of the NIR. | Not an issue/problem |
| | | The ERT encourages the Netherlands to provide in the main body of the NIR brief descriptions of the methodologies, AD, EFs and assumptions applied in estimating emissions for each category and subcategory, even if it provides a methodology report as an annex to the NIR. | |
| E.26 | 1.A.2.a Iron and steel – solid fuels – $CO_2$, $CH_4$ and $N_2O$ | The Netherlands reported in its NIR (p.83) that, because the oxidation of fuels in manufacturing of iron and steel is accounted for under production and combustion in the energy statistics, the corresponding emissions are reported under category 1.A.2 (manufacturing industries and construction) in the energy sector and not in the IPPU sector. The ERT noted that the 2006 IPCC Guidelines (vol. 2, chap. 1.6.2.1) require the non-energy use of fuels to be reported in the IPPU sector. The ERT also noted that the Party did not provide an explanation for its allocation of emissions between the IPPU and energy sectors. | Yes. Comparability |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
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| | | During the review, the Party explained that residual gases are produced during the process of manufacturing iron and steel and these residual gases are combusted for energy purposes. | |
| | | The ERT recommends that the Netherlands report $CO_2$, $CH_4$ and $N_2O$ emissions from non-energy use in the IPPU sector. | |
| E.27 | 1.A.2.c Chemicals – all fuels – $CO_2$ | On page 43 of the ENINA methodology report (NIR, annex 7), the Party reported that $CO_2$ emissions resulting from the use of fossil fuels as feedstocks for the production of silicon carbide, carbon black, ethylene and methanol are included under the energy sector (category 1.A.2.c (chemicals)). The ERT noted that this is not in accordance with the 2006 IPCC Guidelines (vol. 2, section 1.6.2.1), particularly in terms of the allocation of fuels between energy and non-energy uses. | Yes. Comparability |
| | | During the review, the Party explained that all feedstock emissions are accounted for in the energy statistics as production and combustion of residual gases, and thus reported under the energy sector (category 1.A (fuel combustion – sectoral approach)). For example, petroleum coke is used to produce silicon carbide. In this process, chemical waste gas is also produced. Because this chemical waste gas is incinerated for energy purposes, the emissions are reported in category 1.A. | |
| | | The ERT recommends that the Netherlands provide in the NIR information on emissions resulting from the use of fossil fuels as feedstocks for the production of silicon carbide, carbon black, ethylene and methanol. The ERT also recommends that the Party allocate the non-energy use emissions to the IPPU category where they occur, if applicable. | |
| E.28 | 1.B.1.b Solid fuel transformation – solid fuels – $CH_4$ | The Netherlands revised the AD and recalculated $CO_2$ emissions. However, $CH_4$ emissions were not recalculated. | Yes. Accuracy |
| | | The ERT recommends that the Netherlands recalculate $CH_4$ emissions or explain that the revised AD used in the 2019 submission did not have an impact on $CH_4$ emissions. | |
| E.29 | 1.B.2 Oil, natural gas and other emissions from energy production – liquid fuels – $CO_2$ and $CH_4$ | The Party reported AD for this category in CRF table 1.B.2 for categories 1.B.2.a.5 (distribution of oil products) and 1.B.2.a.6 (other) using "NE" and reported the corresponding emissions using "NA" and "NO". An explanation for the use of these notation keys is not included in the NIR. The ERT noted that a justification for exclusion in terms of the likely level of emissions being missing from the NIR is not in accordance with the 2006 IPCC Guidelines (vol. 1, table 8.1). | Yes. Comparability |
| | | During the review, the Party explained that, as a result of the Dutch regulation on volatile organic compounds, all possible sources of fugitive emissions from fuels (refineries, distributors and filling stations) have been equipped with abatement technologies to capture any fugitive emissions and therefore emissions were considered to be "NA". | |
| | | The ERT recommends that the Netherlands provide in the NIR a justification for using "NA" and "NE" in reporting AD and emissions for this category. | |
| IPPU | | | |
| I.24 | 2.B.8 Petrochemical and carbon black | For subcategory 2.B.8.c (ethylene dichloride and vinyl chloride monomer), in CRF table 2(I).A-Hs1 the Party reported the AD as "C" but reported the emissions and recovery data as "NO". The ERT was not able to find a description for the subcategory in the NIR or in the ENINA methodology report (NIR, annex 7). The ERT noted | Yes. Comparability |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
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| | production – $CO_2$ and $CH_4$ | that the use of inconsistent notation keys is not in accordance with paragraph 37 of the UNFCCC Annex I inventory reporting guidelines. | |
| | | During the review, the Party indicated that the notation key would be corrected to "NO" in the CRF tables in the next submission. | |
| | | The ERT recommends that the Netherlands use "NO" for reporting the AD in CRF table 2(I).A-Hs1 for subcategory 2.B.8.c (ethylene dichloride and vinyl chloride monomer) for the years in which emissions were not occurring. | |
| I.25 | 2.C.6 Zinc production – $CO_2$ | In CRF table 2(I).A-Hs2, for category 2.C.6 (zinc production), the Party reported the AD as "C", whereas in the NIR it reported this source as "NO" (p.137). Emissions and recovery data were reported as "NO", while information on the IEF for $CO_2$ was reported as "IE" and "NO". The ERT noted that inconsistent use of notation keys is not in accordance with paragraph 37 of the UNFCCC Annex I inventory reporting guidelines. | Yes. Convention reporting adherence |
| | | During the review, the Party indicated that the notation key would be corrected to "NO" in the CRF tables in the next submission. | |
| | | The ERT recommends that the Netherlands use notation keys in a consistent manner and use "NO" for reporting AD and IEFs for this category in CRF table 2(I).A-Hs2. | |
| I.26 | 2.F.1 Refrigeration and air conditioning – HFCs | The Party did not report the AD and emissions for subcategory 2.F.1.b (domestic refrigeration) in CRF table 2(II).B-Hs2 (all cells of the table left blank), and did not provide an explanation for their absence in the NIR or in the ENINA methodology report (NIR, annex 7). The ERT noted that domestic refrigeration is a potential source of emissions. | Yes. Transparency |
| | | During the review, the Party explained that there are no emissions for subcategory 2.F.1.b in the Netherlands because HFCs are not used for domestic refrigeration and the chlorofluorocarbons used in the 1990s have been replaced by propane. | |
| | | The ERT recommends that the Netherlands include in the NIR an explanation of why HFC emissions from domestic refrigeration (subcategory 2.F.1.b) have not occurred in the country since 1990. | |
| I.27 | 2.F.1 Refrigeration and air conditioning – HFCs | The Party reported emissions for subcategories 2.F.1.a (commercial refrigeration), 2.F.1.d (transport refrigeration) and 2.F.1.f (stationary air conditioning) as "NO" for 1990–2012. However, the ENINA methodology report (NIR, annex 7) reports that emissions for category 2.F.1 have been occurring in the Netherlands since 1995 (section 2.2.3.9, p.64). | Yes. Consistency |
| | | During the review, the Party explained that fluorinated gas emissions for the above-mentioned subcategories were in fact occurring and that information in the NIR (section 4.7.2) indicates that, since 2013, a new method has been used for collecting data because the relevant reports from PriceWaterhouseCoopers (stock model) were no longer available. The Netherlands clarified that it is able to report emissions by subcategory with this new method, which is based on the refrigerants registration system. The Party informed the ERT that the previous and new methods are completely different and cannot be compared. The ERT noted that the clarification provided during the review is contrary to information in the NIR (section 4.7.3, p.145), where it is stated that for stationary refrigeration | |

|  |  | (2.F.1.f) two methods were used for estimating emissions: the stock model method for 1990–2012 and the method based on the refrigerants registration system for 2013 onward. |  |
|  |  | The ERT recommends that the Netherlands (1) report HFC emissions for subcategories 2.F.1.a (commercial refrigeration), 2.F.1.d (transport refrigeration) and 2.F.1.f (stationary air conditioning) for 1990–2012 in the country in order to improve time-series consistency; and (2) revise the description in the NIR of the data-collection methods such that clear information on the method currently being used is provided. |  |
|  |  | In addition, the ERT encourages the Party to investigate the reasons for any discrepancies between data from the stock model and the refrigerant registration system. |  |
| I.28 | 2.F.1 Refrigeration and air conditioning – HFCs | The Party reported "NA" for emissions from manufacture and disposal for subcategories 2.F.1.a (commercial refrigeration), 2.F.1.d (transport refrigeration) and 2.F.1.f (stationary air conditioning) in CRF table 2(II).B-Hs2, whereas the ENINA methodology report (NIR, annex 7) reports that these activities occur and are reported under operating stock. The ERT noted that not reporting emissions at the most disaggregated level of each source category is not in accordance with paragraph 36 of the UNFCCC Annex I inventory reporting guidelines. | Yes. Comparability |
|  |  | During the review, the Party explained that these emissions can be reported separately, but there are not enough potential cells in the CRF tables to present the 16 figures; namely, emissions from leakage from working systems, filling installations, dismantling installations and refrigerant management for each sector (commercial refrigeration, industrial refrigeration, transport refrigeration and stationary air conditioning). The Party clarified that there is no manufacture of equipment and that emissions from working systems form the largest share of the four components. According to information provided by the Party for commercial refrigeration, emissions of HFC-134a were 27,749 kg for leakage, 301 kg for filling, 172 kg for dismantling and 440 kg for refrigerant management for 2015; that is, leakage comprised 97 per cent of the total emissions. The Party indicated that similar shares are seen in the other sectors. |  |
|  |  | The ERT recommends that the Netherlands (1) report emissions from operating stock and disposal separately in CRF table 2(II).B-Hs2, or (2) report "IE" rather than "NA" for years in which emissions occurred and "NO" for years in which emissions were not occurring, if reporting separate emissions from disposal is not possible owing to confidentiality concerns of the operators. |  |
|  |  | In addition, the ERT encourages the Party to report the estimated emissions from refrigerant containers in the operating stock for category 2.F.6 (other) and provide in the NIR an explanation as to where these emissions are included. |  |
| I.29 | 2.G.3 N$_2$O from product uses – N$_2$O | The Party reported in CRF table 2(I).A-Hs2 the AD for subcategory 2.G.3.b (other (N$_2$O from aerosol cans)) as 27,710,000 kt for 2017. However, the methodology report of Jansen et al. (NIR, annex 7) provides the AD in numbers of N$_2$O-containing aerosol cans sold (section 5.2, p.25), indicating that the AD reported in the CRF tables is the number of cans containing N$_2$O as propellant. The ERT noted that the AD should be reported in kt to be in accordance with the UNFCCC Annex I inventory reporting guidelines. Not doing so results in an unreasonable IEF for N$_2$O (0.0000000075 t/t for 2017) and affects the comparability of data for the category. | Yes. Comparability |
|  |  | During the review, the Party confirmed that the AD in the CRF tables are reported as number of cans rather than in kt. |  |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
|---|---|---|---|
| | | The ERT recommends that the Netherlands report the AD for category 2.G.3.b (other ($N_2O$ from aerosol cans)) in kt in the next submission. | |

**Agriculture**

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
|---|---|---|---|
| A.12 | 3. General (agriculture) – $CH_4$ and $N_2O$ | The Party reported in the methodology paper of Lagerwerf et al. submitted with the NIR (annex 7) that it used NEMA to estimate its $CH_4$ and $N_2O$ (and other gas) emissions in the agriculture sector. However, the paper also states that the Party used tier 2 and 3 methods for estimating $CH_4$ emissions from enteric fermentation of cattle. It is not clear from information in the submission how NEMA and the tier 2 and 3 methods interact with one another; that is, whether the tier 2 and 3 methods are part of NEMA and whether they use the same variables. The ERT noted that this lack of information is not in accordance with the 2006 IPCC Guidelines (vol. 1, section 1.4) on transparency. Owing to this lack of transparency, it is difficult for the ERT to assess whether in using the model (NEMA) the Party has followed good practice and neither overestimated nor underestimated the GHG emissions from agriculture, and also to determine whether there is consistency in the emission estimates. | Yes. Transparency |
| | | During the review, the Party provided information on NEMA and clarified that all agriculture emissions are calculated using this model, with the other methods being used for calculating AD for input to NEMA. For mature dairy cattle, a tier 3 method is used; and for other cattle, a tier 2 method. | |
| | | The ERT recommends that the Netherlands improve transparency by providing, preferably in the overview section of the agriculture chapter of the NIR, an explanation of how the model (NEMA) and methods (tier 2 and 3) used for estimating emissions for the agriculture sector work together. | |
| A.13 | 3. General (agriculture) – $CH_4$ and $N_2O$ | The Party did not provide in the NIR information on the composition or digestibility of feed. The ERT considers that this is important to include as feed directly influences the emissions from cattle. | Yes. Transparency |
| | | During the review, the Party provided links to relevant data and methodology reports, including the paper on standardized calculation methods for animal manure and nutrients (CBS, 2012) that contains the AD for 1990–2008. The Party indicated that it is working on an update to this paper, but it is not ready yet. In the meantime, AD are estimated on the basis of separate reports for each year published on the CBS website. | |
| | | The ERT recommends that the Netherlands include the methodology reports referred to during the review, or links to them, in relevant sections of the NIR, and, when the updated paper on standardized calculation methods for animal manure and nutrients (CBS, 2012) is available, include it in future submissions. | |
| A.14 | 3. General (agriculture) – $CO_2$, $CH_4$ and $N_2O$ | The Party reported for agriculture that only for category 3.G (liming) are there any planned improvements (NIR, section 5.5.4, p.178). The ERT noted that, as noted throughout the 2006 IPCC Guidelines (e.g. vol. 1, sections 1.4–1.5, with procedures to help drive inventory improvement throughout vol. 1, chap. 6), continuous inventory improvement is encouraged. | Not an issue/problem |
| | | During the review, the Party explained that it has areas for planned improvement, but felt that they were too minor to mention in the NIR. For example, the Party plans to improve the EF for a specific type of poultry housing and to conduct a literature search to determine if there is an EF for the application of treated manure to soils. | |
| | | The ERT encourages the Netherlands to include in the NIR its planned improvements to the inventory. | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
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| A.15 | 3. General (agriculture) – $CH_4$ and $N_2O$ | The Party reported in its NIR that the number of rabbits showed a continuous decreasing trend from 1990 to 2017 (p.158), but it did not provide an explanation for this trend. As a result, it is difficult for the ERT to assess the accuracy of the emission estimates for rabbits. The ERT noted that this reporting is not in accordance with the 2006 IPCC Guidelines (vol. 1, section 1.4).<br><br>During the review, the Party explained that the decreasing trend results from decreased demand for rabbit meat and fur.<br><br>The ERT recommends that the Netherlands include in the NIR an explanation for the decreasing trend in the number of rabbits; namely, that demand for rabbit meat and fur has decreased. | Yes. Transparency |
| A.16 | 3. General (agriculture) – $CH_4$ and $N_2O$ | The Party reported that milk production data for 1990–1999 were based on CBS dairy statistics, and milk production data for 2000 onward were based on preliminary data from the Dutch Dairy Board (CBS, 2012, p.22). The Party did not explain how the two data sets have been assessed or manipulated to ensure consistency in milk production data for the entire time series. The Party did not indicate whether the preliminary data from the Dutch Dairy Board are updated with the final milk production figures each year in the NIR. The ERT noted that, owing to the lack of clarity in this information, there is a potential issue of consistency in the time series for AD and possible inaccuracies owing to data not being updated.<br><br>During the review, the Party explained that both data sets contain data gathered via a questionnaire from dairy factories and a correction is made by CBS for the milk withheld by the farmer (e.g. for own consumption). Even though two different organizations gathered the data, their content is the same and therefore the time series is consistent. The Party confirmed that the data set is updated yearly with the relevant production figures.<br><br>The ERT recommends that the Netherlands include in the NIR the explanation of how the two data sets on milk production (i.e. that based on CBS dairy statistics and that based on Dutch Dairy Board data) have been assessed or manipulated to ensure consistency in milk production data for the entire time series. The ERT also recommends that the Party confirm that the data set on milk production is updated yearly with the final production figures and that the previous year's estimates are recalculated accordingly, if appropriate. | Yes. Transparency |
| A.17 | 3. General (agriculture) – $CH_4$ and $N_2O$ | The Party did not report any emissions from alpacas and llamas, and stated in the NIR (p.33) that these animals are not kept commercially in the country. However, the ERT noted that there are several sources of information indicating there are alpacas in the Netherlands (e.g. https://www.alpaca-benelux.com/ (in Dutch), https://dutchreview.com/news/weird/number-of-alpacas-in-the-netherlands-has-doubled-in-five-years/ and https://gracielahuam.com/en/diary/the-alpaca-industry-in-the-netherlands/).<br><br>During the review, the Party noted that, according to CBS, there are no alpacas or llamas in the Netherlands.<br><br>Noting some evidence that there may now be alpaca farms in the Netherlands, the ERT recommends that the Party investigate the issue of the existence of alpacas and llamas in the country and, if relevant, estimate emissions or, in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, justify that the emissions are insignificant. | Yes. Completeness |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
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| A.18 | 3. General (agriculture) – $CH_4$ and $N_2O$ | The Party reported "NE" and "NA" for typical animal mass (cattle) in CRF table 3.As2. During the review, the Party explained that it uses a country-specific calculation method for animal mass, which results in the use of multiple weights for more animal categories than are present in the CRF tables. The data used are too complex to average to a single value. Therefore an average value is not included in the CRF tables. However, the ERT noted that the paper on standardized calculation methods for animal manure and nutrients (CBS, 2012) provided to the ERT during the review includes average weights for the three cattle categories. The ERT recognizes that in tier 2 and 3 methods the disaggregation of animal categories and the methodology used can be complex, meaning that averages are often not simple to obtain. However, the ERT noted that averages can be important for comparison with other countries, and for understanding the factors underlying the values of country-specific EFs. In response, the Party indicated that it would investigate whether it is possible to include these typical animal mass data in the CRF tables for the next submission and whether the data are representative. | Yes. Comparability |
| | | The ERT recommends that the Netherlands investigate whether representative averages of cattle weight can be estimated and, if so, provide these estimates in the NIR and in CRF table 3.As2 in order to improve comparability. | |
| A.19 | 3. General (agriculture) | The Party reported in its NIR (pp.162, 170, 176 and 178) that there are no category-specific QA/QC and verification procedures for the agriculture sector as all procedures are included in the general QA/QC procedures discussed in chapter 1 of the NIR. The ERT determined, however, that there appear to be no category-specific procedures discussed in chapter 1 of the NIR. The ERT noted that the lack of category-specific QA/QC procedures is not good practice and is not in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 6). | Yes. Convention reporting adherence |
| | | During the review, the Party explained that its Pollutant Release and Transfer Register has a general QA/QC approach, including verification of any methodology changes, data integrity checks and collegial cross-checking. The NIR and CRF tables are peer reviewed and subject to a system of audits performed by the national inventory entity. This entity and the institutions contributing to the Pollutant Release and Transfer Register must approve the data set used in the estimations before its publication. The Party feels that given these mechanisms, additional category-specific procedures are not needed. The ERT, in part on the basis of the evidence provided by issues that have been raised during this review, does not agree with the Party's assessment. The 2006 IPCC Guidelines define QC as a system of routine technical activities to assess and maintain the quality of the inventory as it is being compiled performed by personnel compiling the inventory (vol. 1, section 6.5), and state that the inventory report should also include information on the implementation of a QA/QC plan (vol. 1, section 8.4). | |
| | | The ERT recommends that the Netherlands develop a QA/QC plan in accordance with the 2006 IPCC Guidelines (vol. 1, section 6.5) for agriculture and include in the NIR details of all its QA/QC procedures; and, if they do not already occur, develop a timeline to include: | |
| | | (a) Procedures to ensure the accuracy of data transcription to the calculations used; | |
| | | (b) Comparisons of emissions estimated using tier 2 and 3 methods with those estimated using a tier 1 method, providing in the body of the NIR explanations of any differences; | |
| | | (c) Comparisons of country-specific EFs and other variables with those of other countries, providing in the body of the NIR explanations of any differences; | |

| | | (d) Reviews of country-specific EFs, parameters, variables and allocations that are not updated annually and are used in the estimation of emissions; | |
| | | (e) Peer review of the NIR before submission to the secretariat to ensure references are accurate; | |
| | | (f) Peer review of the methodology report for the agriculture sector submitted with the NIR by an external agriculture inventory expert to ensure transparency, completeness and consistency. | |
| | | Noting that carrying out an extensive QA/QC process may be resource intensive and not feasible in the first year following this recommendation, the ERT also recommends that the Party document in its QA/QC plan when it expects to be able to implement each procedure, and that the QA/QC plan be submitted as a supplementary document to the NIR in future submissions and be updated regularly. The ERT considers that documenting these details is important to aid future ERTs in understanding the QA/QC procedures of the Netherlands. | |
| A.20 | 3.A.1 Cattle – $CH_4$ | The Party reported in its NIR that enteric $CH_4$ emissions from mature cattle are estimated using a tier 3 method (Bannink et al., 2011). While there is some information on this method in the methodology report of Lagerwerf et al. in annex 7 to the NIR, certain details are missing, including a complete list of the AD used (i.e. variables informing the recorded production level), how some variables are determined (e.g. feed intake and dietary characteristics) and what the internal parameters are (and therefore those parameters that do not change each year). The ERT noted that this lack of information is not in accordance with the 2006 IPCC Guidelines (vol. 1, section 1.4) on transparency and makes it difficult to understand how the model works and what variables are used in the model, and therefore to determine how the enteric $CH_4$ emissions are calculated for mature cattle. Owing to this lack of transparency, it is difficult for the ERT to assess whether in using the method the Party has followed good practice and neither overestimated nor underestimated the GHG emissions from cattle. | Yes. Transparency |
| | | During the review, the Party provided documents and links to others with much of the missing details on the method. The ERT noted that, while references to these documents were in the Party's NIR, it is important that enough information be included in the NIR itself to allow a basic understanding of the more complex models and methods used. If more technical information is required, the references can be consulted. | |
| | | The ERT recommends that the Netherlands provide in the methodology report submitted with its NIR the following details on the tier 3 method it uses for estimating emissions from mature dairy cattle: | |
| | | (a) The assumptions made concerning the degradation characteristics of starch, crude protein and fibre, and where any data used are sourced from; | |
| | | (b) The calculations for manure and mineral data prepared by the working group on uniformity of calculations to determine dry matter intake, including the equations and variables and where these have been sourced from; | |
| | | (c) The variables informing the recorded production level and where these are sourced from; | |
| | | (d) The internal parameters (and therefore those parameters that do not change each year) and how they were determined; | |
| | | (e) How the variables used in the enteric fermentation calculations relate to those used for estimating $CH_4$ and $N_2O$ emissions from manure management. | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
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| | | If the Party considers it is not practical to include all the information above in the NIR, the ERT recommends that the Party include in the NIR references to external sources where the information is presented. | |
| A.21 | 3.A.1 Cattle – $CH_4$ | The Party reported in the methodology report of Lagerwerf et al. submitted with the NIR (annex 7) that the model assumes that only female cattle graze (p.30), but also that the remainder of the energy requirement for the recoded production level is covered by the intake of grass from grazing (p.38). The first statement implies that male cattle do not graze, but the Party did not clarify where the remainder of their energy requirements comes from. The ERT noted that the conflicting information makes it unclear where feed for male cattle to meet their energy requirements comes from. | Yes. Transparency |
| | | During the review, the Party provided a summary of feed allocation to animals in the Netherlands, as follows: "It is known from statistical overviews how much feed is available. Part of this is allocated to grazing animals with a fixed ration, split into a ration for the stable period and for the grazing period (sheep, goats, young cattle). Animals with a fixed ration also have a fixed part of pasture in the pasture period. The feed materials that are left then go to dairy cows. In the stable period this is a ration without fresh grass, based on the feed requirement that in turn depends mainly on milk production. The cows eat the rest of the feed when they are in the stable. The feed requirement that still remains (grazing time or feeding fresh grass in the stable) is provided in the form of fresh grass. For animals such as male cattle that are kept in the stables all year round, a fixed ration is used, which means there is no 'remainder of the energy requirement'. The latter applies only to dairy cows in the pasture period". The complete explanation can be found in the paper on standardized calculation methods for animal manure and nutrients (CBS, 2012). | |
| | | The ERT recommends that the Netherlands review the methodology report for agriculture submitted with the NIR to remove the ambiguity about feeding requirements for male cattle. | |
| | | In addition, the ERT encourages the Party to include in the NIR the summary provided to the ERT during the review to help understanding of how emissions from animals are estimated in the Netherlands. | |
| A.22 | 3.A.1 Cattle – $CH_4$ and $N_2O$ | The Party reported values for the average weight of dairy cows in table 3.10 of the paper on standardized calculation methods for animal manure and nutrients (CBS, 2012). These values are constant for the entire time series. The Party did not note whether since the publication of the paper this weight has been reassessed to determine if it has been increasing. The ERT noted that reporting a constant average weight of dairy cattle based on a 2012 study without reassessing whether the average weight has changed in later years may have an impact on the accuracy of the estimates for the later years. Owing to the lack of transparency in how average weight of dairy cows was calculated, it is difficult for the ERT to assess whether the Party has followed good practice and neither overestimated nor underestimated the GHG emissions from cattle. As dairy cattle are a key source of emissions, and animal weight influences these emissions, it is important that the data used for estimating the emissions are accurate. | Yes. Accuracy |
| | | During the review, the Party did not provide any specific information on this finding, but in responding to another question did note that the paper on standardized calculation methods for animal manure and nutrients (CBS, 2012) is being updated. | |
| | | The ERT recommends that the Netherlands reassess its dairy cow average weight to determine if it has increased over time, and either revise the weight data in its inventory or justify the applicability of the current values. The | |

| | | ERT also recommends that the Party include in the NIR the results of the assessment of average dairy cow weight as well as a description of how the average weight was determined from such an assessment. | |
| A.23 | 3.B Manure management – $CH_4$ | The Party reported in its NIR that country-specific VS values are used in the tier 2 calculation of emissions from manure management for cattle, swine and poultry (pp.166–167). However, these values were not reported in the NIR or in the methodology report of Lagerwerf et al. in annex 7 to the NIR. The ERT noted that not stating the VS values used in the calculation is not in accordance with the 2006 IPCC Guidelines (vol. 4, section 10.4.5). Owing to this lack of transparency, it is difficult for the ERT to assess whether in using the tier 2 method the Party has followed good practice and neither overestimated nor underestimated the GHG emissions from manure management. | Yes. Transparency |
| | | During the review, the Party provided links to references containing the country-specific VS values and a copy of the draft paper (van Bruggen et al., 2018) that contains the most recent VS values used in the emission calculations. | |
| | | The ERT recommends that the Netherlands report in its NIR the VS values for the most recent year, if the methodology report containing the most recent country-specific VS values is not publicly available at the time of the NIR submission. | |
| | | In addition, the ERT encourages the Party to produce tables of the time series of the country-specific VS values so that all values are in one place and trends can be assessed. | |
| A.24 | 3.B Manure management – $CH_4$ | The ERT noted that further improvements could be made to increase the transparency of the submission; for example, providing the country-specific VS values used in the tier 2 calculation of emissions from manure management for cattle, swine and poultry; reporting the VS and other values used in calculating $CH_4$ emissions from manure management in the NIR or a methodology report; and providing further information on the different manure treatments. The ERT also noted that MCF values are still missing from CRF table 3.B(a)s2. | Yes. Transparency |
| | | During the review, the Party provided the data missing from CRF table 3.B(a)s2 and further documentation on the methodology and AD used. | |
| | | The ERT recommends that the Party provide the missing CRF table values, reference the van Bruggen et al. (2018) paper in the section in the NIR on the $CH_4$ IEF for manure management, and describe the links between the sectoral methodology papers more clearly in the NIR. | |
| A.25 | 3.B Manure management – $N_2O$ | The Party reported in its NIR that between 1990 and 2017 Nex rate per animal decreased (p.165). However, there is no explanation for the decrease so it is difficult for the ERT to assess whether the estimates of $N_2O$ emissions from manure management are accurate. The ERT noted that this reporting is not in accordance with the 2006 IPCC Guidelines (vol. 1, section 1.4). | Yes. Transparency |
| | | During the review, the Party explained the decreasing trend in Nex rate per animal. Between 1990 and 2013, animal production was optimized, resulting in higher production rates with lower dietary crude protein for all animal categories. From 2014 onward, the amount of dietary crude protein stabilized. In 2017, Nex rate increased again for cattle because of a decrease in the proportion of maize in the diet and an increase of grass – grass has a higher N content than maize. Besides the increased share of grass in the feed, nutrient requirements increased | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
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| | | through a higher average milk production and a greater body weight. For dairy cattle, Nex rate increased from 130 kg N per animal in 2016 to 144 kg N per animal in 2017 (CBS, 2018). | |
| | | The ERT recommends that the Netherlands include in the NIR an explanation of the trend in Nex rate per animal type. | |
| A.26 | 3.B Manure management – $N_2O$ | The Party reported in its NIR that sheep, goats, horses, and mules and asses produce only solid manure (p.169). However, these animals urinate; urine is not solid and can therefore affect the amount of emissions produced. As the statement is confusing it is difficult for the ERT to determine whether all emissions sources are being included in the calculation of $N_2O$ emissions from manure management, and therefore whether the Party has followed good practice and neither overestimated nor underestimated the GHG emissions from manure management. | Yes. Transparency |
| | | During the review, the Party explained that in the Dutch housing systems for these animal categories, the bedding material, which is used for the comfort of the animals, absorbs most of their urine. In addition, these animals spend most of their time on pasture. | |
| | | The ERT recommends that the Netherlands improve clarity by adjusting the statement that sheep, goats, horses, and mules and asses produce only solid manure (p.169 of the 2019 NIR) by including in the NIR the explanation that in the Dutch housing systems for these animal categories, the bedding material, which is used for the comfort of the animals, absorbs most of their urine, and that these animals spend most of their time on pasture. | |
| A.27 | 3.B Manure management – $CH_4$ and $N_2O$ | The Party reported in its NIR that the manure treatments common in the Netherlands are manure separation, nitrification or denitrification, the creation of mineral concentrates, the incineration of manure, and the drying and digesting of manure (p.167). These are not common IPCC definitions of manure management, and there was no description of each system to help clarify what it might consist of. As such, it is difficult for the ERT to determine whether the methodology used for estimating emissions from manure management is consistent with the 2006 IPCC Guidelines. | Yes. Transparency |
| | | During the review, the Party provided a thorough description of the manure management systems used. | |
| | | The ERT recommends that the Netherlands include in the NIR a description of each of the manure management systems used in the country, those being manure separation, nitrification or denitrification, the creation of mineral concentrates, the incineration of manure, and the drying and digesting of manure. | |
| A.28 | 3.B Manure management – $CH_4$ and $N_2O$ | The Party reported in its NIR that the methodologies used for calculating $CH_4$ and $N_2O$ emissions from manure management are based on different AD (p.155). The ERT noted that this is not in accordance with the 2006 IPCC Guidelines (vol. 4, section 10.4.3) because the AD used should be consistent across livestock categories throughout the inventory. As there is no explanation of how consistency has been retained with the use of different AD, it is difficult for the ERT to determine if good practice has been followed. | Yes. Transparency |
| | | During the review, the Party clarified that for sheep, swine, goats and rabbits, when the proportion of manure (and therefore the amount of N) in each manure management system is estimated, data on all animals (adults and young) for each species are used in the calculation. Therefore, this calculated value is the absolute amount of all N excreted by that species that is managed in a system, and does not need to be multiplied by the animal population to calculate the absolute $N_2O$ emissions from manure management for that species. However, for $CH_4$ emissions, a country-specific EF is used (kg $CH_4$ per animal) and therefore needs to be multiplied by the species | |

| | | population to calculate the absolute $CH_4$ emissions from manure management for a species. So, while they have been used differently, the same AD on animal population (adults and young) have been used for calculating both $CH_4$ and $N_2O$ emissions. For dairy cattle, all categories have their own values for Nex rate and VS. The Party noted that it would make this clearer in the next NIR. | |
| | | The ERT recommends that the Netherlands include in the NIR the information provided to the ERT during the review clarifying that the same animal population numbers are used to calculate $CH_4$ and $N_2O$ emissions from manure management. | |
| A.29 | 3.B Manure management – $CH_4$ and $N_2O$ | The Party reported in its NIR that, if the manure is treated, it is assumed that the storage time is shortened since it is beneficial for the farmer (p.167). However, the Party did not provide any evidence (i.e. references to studies, expert opinion) to support this statement. There is also no information on how much shorter a storage time is assumed. The ERT noted that this lack of supporting evidence is not in accordance with the 2006 IPCC Guidelines (vol. 1, section 1.4). Owing to this lack of transparency, it is difficult for the ERT to assess whether the Party has followed good practice and neither overestimated nor underestimated the GHG emissions from manure management. | Yes. Transparency |
| | | During the review, the Party explained that when manure is digested, it is stored for a shorter period of time because it is most efficient to digest the manure within 24 hours of being produced. If the manure is digested after storage for longer periods of time, the efficiency drops. As it is good practice, it is assumed that all manure that is digested is not stored. The emissions associated with the digestion of manure are lower than the emissions associated with the storage of manure. Therefore, if more manure is treated in a digester (and not stored), less emissions are produced. | |
| | | The ERT recommends that the Netherlands adjust the statement that if the manure is treated, it is assumed that the storage time is shortened since it is beneficial for the farmer (p.167 of the 2019 NIR), in order to clarify that manure digestion is assumed to occur within 24 hours after manure has been produced, because digestion efficiency decreases when manure is stored for a longer time. | |
| A.30 | 3.B Manure management – $CH_4$ and $N_2O$ | The Party discussed in the NIR (section 5.3.2) the decreasing trend in emissions from manure management. However, the ERT, looking at NIR figures 5.2–5.3, noted that it is evident that since approximately 2013 emissions from manure management have been increasing. There is no explanation in the NIR as to what has caused this increase in $CH_4$ and $N_2O$ emissions from manure management since 2013. | Yes. Transparency |
| | | During the review, the Party explained that this increase in emissions is caused by an increase in emissions from cattle. From 2013 to 2017, Nex rate in cattle increased as a result of increases in production and body weight, both resulting in an increased feed intake. In 2017, the amount of N in grass was exceptionally high owing to a dry summer, which increased the N consumed and the N excreted. This increase in Nex rate compensates (especially in 2017) for the decrease in animal numbers, resulting in an increase in emissions. The increases in production and body weight also caused an increase in VS excretion, which in turn also resulted in an increase in $CH_4$ emissions. | |

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| | | The ERT recommends that the Netherlands include in the NIR a discussion of the emission trends under manure management to ensure clarity regarding the factors affecting these trends, and also include information that explains the fluctuations in the trends, such as the increased N content in grass in 2017 due to a dry summer. | |
| A.31 | 3.B Manure management – $CH_4$ and $N_2O$ | The ERT noted that in CRF table 3.B(a)s2 the MCF values are missing (reported as "NO") for swine for digesters and other manure management systems and for poultry for other manure management systems for the entire time series. During the review, the Party provided this information. | Yes. Transparency |
| | | The ERT recommends that the Party report in CRF table 3.B(a)s2 the MCF values for swine for digesters and other manure management systems and for poultry for other manure management systems for the entire time series. | |
| A.32 | 3.B.1 Cattle – $CH_4$ and $N_2O$ | The Party reported in the methodology report of Lagerwerf et al. in annex 7 to the NIR that, for cattle, all of the manure is produced in animal housing, including during the summer months (p.25). However, on page 30, the paper indicates that this applies only to female cattle. The conflicting information makes it unclear where manure was produced for male cattle. | Yes. Convention reporting adherence |
| | | During the review, the Party provided an overview of the fractions of manure produced in animal housing and on pasture. This information clarified that all manure from male cattle was produced in a housing system, while some manure from female cattle was produced while they were grazing. | |
| | | The ERT recommends that the Netherlands review its methodology report for agriculture submitted with the NIR to ensure that information contained in it is internally consistent to ensure clarity, in particular when describing where manure was produced for cattle categories. | |
| | | The ERT encourages the Party to include, in the NIR or the methodology report, the summary table provided to the ERT during the review detailing the time series of fractions of cattle manure produced in animal housing and on pasture. | |
| A.33 | 3.D Direct and indirect $N_2O$ emissions from agricultural soils – $N_2O$ | The Party reported in its NIR (p.172) that in 2017 $N_2O$ emissions from grazing increased by about 1.3 per cent compared with 2016 and emissions from synthetic N fertilizer use increased by 3.5 per cent. However, elsewhere in the NIR (p.173) there is a discussion of decreasing emission trends between 1990 and 2017. There is no explanation of the increase in emissions between 2016 and 2017. | Yes. Transparency |
| | | During the review, the Party explained that the milk cooperatives in the country encourage farmers to have more animals on pasture, resulting in increased emissions from grazing. In addition, the summer of 2017 had extreme weather, which resulted in different uses of N fertilizer compared with other years. The Party noted that, with an uncertainty of 66 per cent for grazing and 43 per cent for fertilizer use, fluctuations can be expected. | |
| | | The ERT recommends that the Netherlands expand on the explanation in the NIR of the trends in direct $N_2O$ emissions from agricultural soils, in particular for the latest years, to include (1) the milk cooperatives' encouragement to farmers to have more animals on pasture, which resulted in increased emissions from grazing in pasture land, and (2) how the weather of the summer of 2017 resulted in different uses of synthetic N fertilizer in comparison with other years. | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
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| A.34 | 3.D Direct and indirect $N_2O$ emissions from agricultural soils – $N_2O$ | The Party reported in its NIR that the reduction in crop residues left on the field is due mainly to a decrease in grassland renewal (p.174). However, there is no explanation for the reduction in grassland renewal. | Yes. Transparency |
| | | During the review, the Party explained that, in the Netherlands, policy measures have been taken to reduce N leaching to the surface water, and these measures encourage farmers to have more permanent grassland. This leads to a reduction in grassland renewal. | |
| | | The ERT recommends that the Netherlands include in the NIR an explanation for the reduction in grassland renewal, referencing the relevant policy measures explained to the ERT during the review, and its connection to the reduction in crop residues left on the field. | |
| A.35 | 3.D Direct and indirect $N_2O$ emissions from agricultural soils – $N_2O$ | The Party reported in NIR table 5.12 the country-specific EFs and referenced their sources for direct $N_2O$ emissions from agricultural soils. However, there is no reference for the EF for compost or an explanation as to why this EF (0.004 kg $N_2O$-N/kg N excreted) is so much lower than the IPCC default value (0.01 kg $N_2O$-N/kg N excreted) in the 2006 IPCC Guidelines (vol. 4, table 10.21). Owing to this lack of transparency, it is difficult for the ERT to assess whether the Party has followed good practice and neither overestimated nor underestimated the GHG emissions from agricultural soils. | Yes. Transparency |
| | | During the review, the Party explained that the Netherlands developed a country-specific methodology for estimating $N_2O$ emissions from fertilizers and manure applied to soils (Velthof and Mosquera, 2011). For compost, no experimental data on emissions are available. The EF for compost was set as equal to that of surface-applied manure because compost is also surface applied. Using the default IPCC EF for compost and country-specific EFs for manure would mean that the EF of compost is higher than that of manure. This is not plausible because most of the N in compost is present as organic N, whereas more than half of the N in manure is present as mineral N, which can be rapidly transformed into $N_2O$ after application to soils. It is expected that $N_2O$ emissions from compost are lower than those from manure. | |
| | | The ERT recommends that the Netherlands include in the NIR a reference for the country-specific EF for compost applied to soils. The ERT also recommends that, if the EF is based on expert judgment, the Party ensure that it is documented that it in accordance with 2006 IPCC Guidelines (vol. 1, annex 2A.1). The ERT encourages the Party to explain why this EF is significantly lower than the IPCC default value. | |
| A.36 | 3.D.a.3 Urine and dung deposited by grazing animals – $N_2O$ | The Party has the highest $EF_3$ for urine and dung deposited by grazing animals for 1990–2017 of all reporting Parties (NIR table 5.12). | Yes. Accuracy |
| | | During the review, the Party provided the ERT with an article on seasonal variations in $N_2O$ losses from managed grasslands in the Netherlands (Velthof et al., 1996) as the source of its country-specific $EF_3$ of 0.033 kg $N_2O$-N/kg N. Upon reading the article, the ERT determined that it appears that the EF is high because of the high emissions from the clay soil and peat soil studied, and noted that there is a high groundwater level in both soils compared with the other soils in general. The authors of the article note that the uncertainty and error in this and other studies are high, and would only be reduced by more research. The ERT noted that this study was carried out 23 years ago and that there is no explanation in the article as to how the results were used to calculate the current $EF_3$. | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
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| | | Noting that the Party has drained much of its soils over the years, resulting in a potentially very low groundwater level, the ERT recommends that the Netherlands review the research on its $EF_3$ for urine and dung deposited by grazing animals to determine if the current $EF_3$ is still applicable to the Party's agricultural systems, and, until such time as this review and any further research has been carried out, improve transparency by explaining in the NIR how research results were used to calculate the current $EF_3$. | |
| A.37 | 3.D.b Indirect $N_2O$ emissions from managed soils – $N_2O$ | The Party reported in its NIR (p.166) that indirect $N_2O$ emissions from managed soils have decreased owing to reduction measures. However, no explanation of these reduction measures is provided. | Yes. Transparency |
| | | During the review, the Party provided a link to a Ministry of Infrastructure and Water Management web page presenting an overview of the many reduction measures in place (https://rwsenvironment.eu/subjects/environmental-0/system-environmental/). | |
| | | The ERT recommends that the Netherlands include in the NIR the link to the Ministry of Infrastructure and Water Management web page presenting an overview of the measures in place to reduce indirect $N_2O$ emissions from managed soils. | |
| LULUCF | | | |
| L.18 | 4. General (LULUCF) – $CO_2$ | The ERT draws to the attention of the Party the outcomes of the 16th meeting of GHG inventory lead reviewers, held in 2019, which include the recommendation that the correct notation key for the application of a tier 1 assumption of carbon stocks being in equilibrium is "NA". | Yes. Comparability |
| | | During the review, the Party noted that the meeting of lead reviewers occurred after the publication of its NIR, and that these outcomes would be taken into consideration for the next submission. | |
| | | The ERT recommends that the Netherlands report "NA" for cases where a tier 1 assumption of carbon stocks in equilibrium is applied. | |
| L.19 | 4.A.1 Forest land remaining forest land – $CO_2$ | The Party reported CSC in mineral soils as "NO" in CRF table 4.A for forest land remaining forest land. The ERT noted that "NO" might not be correct owing to the strong growth of living biomass in forests of the Netherlands where breakdown and turnover could contribute to increasing soil carbon. | Yes. Comparability |
| | | During the review, the Party acknowledged that an increase in carbon stocks in mineral soils may be occurring, but as it does not have a regular soil monitoring programme, such an increase could not be measured. The Party explained its plans to monitor more regular changes in soil carbon in the future. | |
| | | The ERT recommends that the Netherlands report "NA" for cases where a tier 1 assumption of carbon stocks in equilibrium is applied (see ID# L.18 above). | |
| | | In addition, the ERT encourages the Party to pursue initiatives to estimate the changes in mineral soil carbon over time. | |
| L.20 | 4.A.1 Forest land remaining forest land – $CO_2$ | The Party reported using EFISCEN for modelling CSC in living biomass in forests for 2014 onward in the absence of updated NFI data (NIR, p.198). | Yes. Transparency |
| | | During the review, in consideration of ID# L.6 in table 3, the Party explained how EFISCEN ensures time-series consistency for living biomass by referring the ERT to the methodology report of Arets et al. (section 4.2.1) | |

| | | contained in the NIR (annex 7), which describes calibration of the model using data from the sixth NFI. However, it was not clear to the ERT how calibration ensures proper time-series consistency. According to the 2006 IPCC Guidelines (vol. 1, section 5.3.3.1), when using the overlap method to combine two estimation techniques (as appears to be the case of the Netherlands), it is preferable to include multiple years when evaluating the relationship between two models, because comparing only one year may lead to bias and it is not possible to evaluate trends. The ERT could identify evidence of only a single year used in overlap (2013) for calibration with NFI data. | |
| | | The ERT recommends that the Netherlands provide in the NIR information regarding the use and calibration of EFISCEN, including evidence that the model is able to reproduce observed trends for before 2013 in the CSC of living biomass. | |
| L.21 | 4.D Wetlands – $CH_4$ | The Party reported in its NIR (p.213) that emissions of $CH_4$ from wetlands are not estimated owing to lack of data. | Not an issue/problem |
| | | During the review, the ERT asked the Party what source data might be missing and whether the latest guidance from the Wetlands Supplement and the *2019 IPCC Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* was being considered. The Party responded that it had not yet studied the latter guidance document in detail and is considering it to determine possible future improvements. | |
| | | The ERT encourages the Netherlands to use the Wetlands Supplement in preparing its annual inventories for wetlands for future annual submissions. | |
| L.22 | 4.D Wetlands – $CO_2$ | The ERT noted that the Netherlands has no data on carbon in reed swamps and therefore neither carbon stock gains nor carbon stock losses are included in the inventory for conversions to or from wetlands (see ID# L.1 in table 3). The ERT agrees with this conclusion. | Not an issue/problem |
| | | The ERT encourages the Netherlands to include in the NIR an explanation of the current limitations of data on reed swamps. The ERT also encourages the Party to investigate methods to assess the carbon in reed swamps, incorporating any advice and methods available in the Wetlands Supplement. | |
| L.23 | 4.D.1.1 Peat extraction remaining peat extraction – $CO_2$ and $N_2O$ | The Party reported the current status of peat extraction in the Netherlands in the methodology report of Arets et al. provided in the NIR (annex 7). However, the Party did not include information for the earlier years of the time series. | Yes. Completeness |
| | | During the review, the Party explained that the last commercial peat extraction occurred in 1992 in the east of the country. However, the ERT noted that the Party reported emissions of all gases from peat extraction remaining peat extraction in CRF table 4.D and from peat extraction lands in CRF table 4(II) as "NO" for the entire time series (including 1990–1992, when peat extraction occurred). | |
| | | The ERT recommends that the Netherlands estimate the emissions arising from peat extraction between 1990 and 1992 and report $CO_2$ and $N_2O$ emissions in CRF table 4(II) under peat extraction lands and provide in the NIR information regarding the history of peat extraction practices in the country, including when this practice is last known to have occurred. | |

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| L.24 | 4.G HWP – $CO_2$ | The Party reported that emissions from HWP are calculated using the same methods as those used for HWP under the Kyoto Protocol using the Kyoto Protocol Supplement (NIR, section 6.10.1). These calculations include removing the fraction of harvest allocated to deforestation and applying a tier 1 method of instant oxidation. The ERT noted that this reporting is incorrect because reporting under the Convention does not contain a provision for treating wood products arising from different sources using different methodological tiers. This is particularly relevant to the Netherlands, which applies the tier 2 methodology, and where areas of plantations with meaningful wood products established prior to 1990 are being deforested within the definitions of the Kyoto Protocol (NIR, p.197) and where the wood products arising from deforestation are taken to have the same material profile as those from other sources. | Yes. Accuracy |
| | | During the review, the Party confirmed the understanding of the ERT of its calculation methods, including that it does not have specific information on the profile of products from deforestation sources. The Party highlighted footnote 12 to CRF table 4.Gs1 as the grounds on which to use the methods specified in the Kyoto Protocol Supplement. This footnote states that a Party should refer to volume 4 of the 2006 IPCC Guidelines or any other IPCC methodological guidance reflecting this production approach. The ERT considers that the Party has overinterpreted the footnote and in turn draws the Party's attention to section 2.8 of the Kyoto Protocol Supplement, which states that the Kyoto Protocol methods to be used are similar to those specified under the production approach of the 2006 IPCC Guidelines, but decision 2/CMP.7 imposes some additional constraints and limits the extent of HWP which can be included in the Kyoto Protocol estimates. Figure 2.8.1 of the Kyoto Protocol Supplement is clear on the circumstances under which Parties are required to use the tier 1 approach where the 2006 IPCC Guidelines would advise otherwise. It follows that guidance from the Kyoto Protocol Supplement is in some places inconsistent with the 2006 IPCC Guidelines owing to decision 2/CMP.7 and so should be used with caution for reporting under the Convention. | |
| | | The ERT recommends that the Netherlands include, in its tier 2 methods and reporting for HWP under the Convention, the accumulation and decay of wood products in use arising from activities that would be defined as deforestation under the Kyoto Protocol. | |
| L.25 | 4.G.2 Paper and paperboard – $CO_2$ | The Party reported in CRF table 4.Gs1 that carbon has not been accumulating in the paper products pool since 1994. However, AD on domestic production, imports and exports of paper and paper products were reported in CRF table 4.Gs2. | Yes. Convention reporting adherence |
| | | During the review, the Party explained that the calculation of the share of wood pulp used in paper and paper product production arising from domestic sources (using equation 2.8.2 of the Kyoto Protocol Supplement) has been negative since 1993 and as a consequence the domestic production of paper and paper products has been set to zero for 1994 onward. The Party provided the source statistics supporting these calculations. The ERT noted that in 2017 pulp production was 37,400 t whereas pulp exports were 1,045,400 t. This suggests either a significant re-exporting practice, which should be explained in the NIR, or an inconsistent inclusion of recycled paper in export data but not in production data. The Party explained that data from FAOSTAT, the statistical database of FAO (see http://www.fao.org/faostat/en/#home) were used as the source data, but did not go into details on the reasoning behind developments over time or on the relationships among reported production, imports and exports, which the ERT considers a lack of necessary QC in the consideration of source data. The ERT notes the Party's access to country-specific data on wood products from Probos, a Dutch source of statistics | |

| | | that provides information to FAO (see ID# KL.16 below), which could provide a more reliable source of production and trade data on wood pulp. | |
| | | The ERT recommends that the Netherlands apply QC procedures to its source data for HWP to ensure that recycling practices are consistently accounted for in the balance of production, exports and imports of paper and paper products. The ERT also recommends that the Party include in the NIR a table of statistical information showing the balance of produced, imported and exported wood pulp, and explain the industrial and trade practices that justify accumulation of carbon stocks in the paper pool being reduced to zero for 1994 onward. | |
| L.26 | 4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – $CO_2$ | The Party has revised its approach to the mapping of organic soils. It described in the methodology report of Arets et al. (p.65) in annex 7 to the NIR that the area of organic soils is now recognized to be declining and that this is due to a combination of ongoing oxidation and disturbance. As the area of organic soils has been declining, the Netherlands reported the areas of organic soils constant at the 2014 level as a conservative assumption considering that smaller areas of organic soils produce less emissions. The ERT considers that this may not be a reasonable assumption in accordance with the 2006 IPCC Guidelines (vol. 1, section 5.2.3) on time-series consistency if the disturbance could result in the instant oxidation of lost organic soils, such as through excavation. The ERT notes that the information included in annex 7 to the NIR (in Arets et al., section 11.3) is not sufficient to allow an accurate assessment of the estimates. | Yes. Transparency |
| | | During the review, the Party explained that disturbance of organic soils under agricultural use only includes commonly applied management practices such as ploughing, and that excavation of organic soils is not practised in the Netherlands. The Party clarified that a reassessment of the EFs for drained organic soils is ongoing in the context of new information becoming available on declining areas. | |
| | | The ERT recommends that the Netherlands provide in its NIR further information on the nature of the disturbances and other activities causing the decline in the area of organic soils, including evidence to support the claim that the excavation of organic soils is not occurring in the country. | |
| | | In addition, the ERT encourages the Party to continue its investigations to confirm the appropriateness of its EFs for drained organic soils to ensure that these are consistent with the decline in organic soil areas over time, and to present the findings in the NIR. | |
| L.27 | 4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – $CO_2$ and $CH_4$ | The Party reported that rewetting of organic soils does not occur in the Netherlands (NIR, p.185). However, the supporting methodology report of Arets et al. (p.73) in annex 7 to the NIR and CRF table 9 report that there is a small area of rewetted organic soils in the Netherlands that is not mapped. | Yes. Transparency |
| | | During the review, the Party explained that the NIR text was erroneous and would be updated in the next submission. The Party also explained that specific information on recent rewetting activities for nature restoration is not available, but it is likely that these activities involve fewer than 1,000 ha of the previously drained soils for which estimates of emissions from drainage reported in the inventory are higher than the emissions from the rewetted organic soils that were not reported. The Party considers not estimating these emissions to be a conservative approach. | |
| | | The ERT recommends that the Netherlands update its NIR to include a correct description of rewetting activities in the Netherlands. | |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
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| | | The ERT encourages the Netherlands to estimate the $CO_2$ and $CH_4$ emissions and removals from rewetted organic soils and report them in CRF table 4(II). | |
| L.28 | 4(V) Biomass burning – $CO_2$, $CH_4$ and $N_2O$ | The Party reported that emissions from fires are calculated using a tier 1 method. The annual area affected by fires is estimated on the basis of the average area of forest and other land types affected by fires between 1980 and 1992. Modelling of emissions uses year-specific carbon stocks in living biomass and default combustion factors (NIR, p.201; methodology report of Arets et al., annex 7 to the NIR, pp.67–68) (see ID# KL.17 below). The ERT noted its concerns about the method used to deduce fire AD because of the apparent lack of AD for after 1992 (methodology report of Arets et al., p.67), which also causes complications for the Kyoto Protocol reporting discussed under ID# KL.13 below. | Not an issue/problem |
| | | During the review, the Party explained that previous efforts, in 2016, using targeted geospatial techniques had been successful in identifying fire-affected areas in 2014 (54 ha) and 2015 (10 ha), but the cost to achieve these results was disproportionate to the quality improvement of the inventory. | |
| | | The ERT encourages the Netherlands to collect appropriate AD and calculate and report GHG emissions from fires using the collected AD, noting that geospatial techniques for identifying areas affected by fire are undergoing continuous improvement, including through mechanisms available to member States of the European Union (e.g. European Forest Fire Information System). | |
| Waste | | | |
| W.18 | 5.A.1 Managed waste disposal sites – $CH_4$ | The Party reported $CH_4$ recovery and flaring in managed solid waste disposal sites. The Party indicated that $CH_4$ recovery takes place at 53 sites in the country (NIR, p.223) and that the amount of recovered landfill gas is published in an annual report of the Ministry of Infrastructure and Water Management (on waste processing in the Netherlands) (NIR, p.225). The ERT noted that this paper is in Dutch. The ERT also noted that the NIR provides information on a number of solid waste disposal sites recovering $CH_4$ in table 7.4, but does not provide information on $CH_4$ recovery throughout the time series, or a brief description of what the reporting of gas recovery quantities is based on. | Yes. Transparency |
| | | During the review, the Party explained that a working group on waste registration annually collects data related to landfill gas capture and its distribution between landfill gas engines and flares by all operators of landfill sites. The operators receive a questionnaire in which they report (1) the total amount of recovered landfill gas, divided into flares and combustion engines for energy recovery; and (2) the percentage of $CH_4$ in the recovered landfill gas. In all cases, the amount of recovered landfill gas is measured and only the percentage of $CH_4$ in older landfill sites is sometimes estimated. In 2017, the $CH_4$ content of recovered landfill gas was estimated for 13 landfill sites. The results of the questionnaire, by location, are published yearly in table B-5 of the above-mentioned report. For historical years, data on the amounts of extracted landfill gas were supplied up to 1998 by the Landfill Gas Advice Centre. There are no data available on the amounts of extracted landfill gas for 1999 and 2000. The amounts of extracted landfill gas for these years were estimated by the ENINA task force on the basis of the figures from previous years. Since 2001, data on recovered landfill gas have been supplied by the working group on waste registration. The Party provided a table that gives an overview of the amounts of recovered landfill gas, the average $CH_4$ content and the amount flared for energy purposes. The Party also provided the ERT with an Excel file containing the amounts for the entire time series. | |

| | | The ERT recommends that the Netherlands provide in the NIR more detailed information on the sources of $CH_4$ recovery and flaring data for the entire time series, as well as explanatory information on the amount of recovered $CH_4$ that is estimated, calculated or measured. | |
| W.19 | 5.D Wastewater treatment and discharge – $N_2O$ | The Party did not provide information on or values for population, protein consumption, fraction of N in protein, $F_{NON-CON}$, $F_{IND-COM}$ or $T_{PLANT}$ required for estimating $N_2O$ emissions from wastewater treatment and discharge in the additional information table of CRF table 5.D. | Yes. Comparability |
| | | During the review, the Party explained that it does not use protein consumption as AD to estimate $N_2O$ emissions from wastewater treatment and discharge. Reporting the above-mentioned parameters is thus not relevant and could be confusing. For estimating $N_2O$ emissions from advanced urban wastewater treatment, the Netherlands uses pollution equivalent representing the total load of biodegradable substances in the mixture of domestic and industrial wastewater treated in urban wastewater treatment plants. More information on this and the rationale for using pollution equivalent load as AD is included in the NIR (section 7.5.2, p.241) and the ENINA methodology report (section 2.3.2.4.2, p.115) (NIR, annex 7). For calculating indirect $N_2O$ emissions from surface water as a result of N discharge via wastewater treatment plant effluents, industrial discharges and sewer overflows, the Netherlands uses actual measured loads as AD. More information on this is included in the NIR (section 7.5.2, p.242) and the above-mentioned methodology report (section 2.3.2.4.6, p.121). | |
| | | The ERT recommends that the Netherlands report "NA" for all the parameters in the additional information table of CRF table 5.D, and provide in the documentation box of that CRF table a reference to the section of the NIR that contains an explanation of why the AD are not applicable to the national circumstances. | |
| KP-LULUCF activities | | | |
| KL.12 | General (KP-LULUCF activities) – $CO_2$ | The ERT draws to the attention of the Party the outcomes of the 16th meeting of GHG inventory lead reviewers, held in 2019, which include the recommendation that the correct notation key for reporting carbon pools for which the Party has reported verifiable information that the pool is not a net source under KP-LULUCF activities is "NE". | Yes. Comparability |
| | | During the review, the Party noted that the meeting of lead reviewers occurred after the publication of its NIR, and that these outcomes would be taken into consideration for the next submission. | |
| | | The ERT recommends that the Netherlands report "NE" for cases where emissions are not reported on the basis of the justification that they are not a net source. | |
| KL.13 | General (KP-LULUCF activities) – $CO_2$, $CH_4$ and $N_2O$ | The Party reported information on the methods applied for natural disturbances in its NIR (pp.279–281) (see ID# KL.1 in table 3). The ERT noted that the background levels and margins appear to have been derived incorrectly, that the choice of calibration period appears to create the expectation of net credits during the commitment period owing to an increasing trend in emissions (see ID# KL.17 below regarding methods for calculating emissions from fires), and that there is a lack of transparent information regarding how natural disturbances are beyond the control of and not materially influenced by the Party during the commitment period as a result of demonstrable efforts to prevent, manage and control these occurrences (as per decision 2/CMP.7, annex, para. 34). In addition, the ERT could not identify what kinds of wildfires could occur that would be able to trigger the natural disturbances provision given the national circumstances of the Netherlands. | Yes. Accuracy |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
|---|---|---|---|
| | | During the review, the Party agreed that there had been an error in its calculation of the background levels and margins and provided recalculated estimates for the background levels (2.77 Gg $CO_2$ eq for FM and 0.077 Gg $CO_2$ eq for AR) and margins (0.27 Gg $CO_2$ eq for FM and 0.0014 Gg $CO_2$ eq for AR). The ERT notes that, with the revised background levels and margins applied to current methods, the natural disturbances provisions would be triggered in 2015, 2016 and 2017 owing to increased biomass levels in forests resulting in fire emissions exceeding the background level and margin when using a constant area of fire, even though no observable disturbance event occurred. The Party acknowledged that its GHG emissions from fires were increasing over time. | |
| | | Also during the review, the Netherlands provided some information regarding public awareness and elevated alert levels with respect to the risk of fires, although the ERT considers that this information could be enhanced to more substantially satisfy the requirements of decision 2/CMP.7. The Party did not elaborate on the kinds of significant fire events that it intends to account for, although the ERT suspects that major peatland fires in dried organic (forest) soils could easily trigger the use of the provision. The Party explained that one prerequisite for applying the natural disturbance provision would be that the spatial and geographic extent of the disturbances are known. This means that in practice it is not likely that the Netherlands will apply the natural disturbances provision, and it would consider doing this only in case the disturbance would be so large that the additional efforts to spatially explicitly record the disturbances would be justified. The ERT considers that this explanation overlooks how the existing use of tier 1 methods does not require that the spatial and geographical event of fire be known for the calculation of emissions that already exceed a revised background level and margin for 2015 onward. For such a suggestion to become relevant, the Party would need to amend its methods for calculating emissions from fires, as applied to the natural disturbances provision. This is the basis for the encouragement made under ID# KL.17 below and recommendation (b) below as an alternative means of addressing the issue. The Party may also wish to consult with and seek advice from other Parties that currently apply the provision to help identify a workable solution. | |
| | | The ERT recommends that the Netherlands: | |
| | | (a) Correct its calculation methods for natural disturbances, report updated estimates for the background level and margin (subject to other improvements to the calculations of fire emissions) and identify the required technical correction to the FMRL in its NIR; | |
| | | (b) Reconsider its choice of calibration period and/or the scope of wildfire for the purpose of natural disturbances in order to avoid the expectation of net credits and debits, giving consideration to the availability of AD on wildfire occurrence and associated calculations of emissions from fires in accordance with ID# KL.17 below; | |
| | | (c) Provide information in accordance with decision 2/CMP.7, annex, paragraph 34, demonstrating that natural disturbance occurrences were or are beyond the control of, and not materially influenced by, the Party in the commitment period by demonstrating practicable efforts to prevent, manage or control the occurrences. This would include providing information on both the strategies for managing the threat of major windstorms and the efforts to suppress and prevent fires. | |
| KL.14 | Deforestation – $CO_2$ | The Party reported that it does not estimate the carbon accumulation in litter or, where the forest is less than 20 years old, in deadwood for lands under AR, and considers this a conservative assumption given the lack of | Yes. Completeness |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
|---|---|---|---|
| | | reliable data and the high uncertainties (NIR, section 11.3.1.2). The ERT noted that, where lands under AR are subsequently deforested during the commitment period, the Party's assumption may cease to be a conservative assumption because emissions from deforestation would be underestimated owing to the carbon accumulated in DOM prior to the commitment period not being included. | |
| | | During the review, the Party confirmed that no build-up of DOM is calculated or reported under AR in this way, and thus no emissions from DOM are calculated or reported when these lands are deforested. | |
| | | The ERT recommends that the Netherlands estimate and report the $CO_2$ emissions associated with the loss of DOM from deforested lands previously classified under AR, or, if this is not possible, justify why the exclusion of these emissions would not result in an underestimation of emissions from deforestation for the litter and deadwood pools. | |
| KL.15 | FM – $CO_2$, $CH_4$ and $N_2O$ | In the CRF accounting table, the Party reported its FM cap as 7,811.94 kt $CO_2$ eq. According to the report on the review of the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of the Netherlands, this value represents 3.5 per cent of the total base-year GHG emissions excluding LULUCF, and including indirect $CO_2$ emissions, final value, as calculated by the ERT based on the revised base-year GHG emissions (FCCC/IRR/2016/NLD, table 4). In order to obtain the FM cap, this value needs to be multiplied by eight for the eight years of the commitment period, giving a value of 62,495.51 kt $CO_2$ eq, and it shall remain fixed for the second commitment period in accordance with decision 6/CMP.9, paragraph 12. | Yes. KP reporting adherence |
| | | The ERT recommends that the Netherlands correctly report its FM cap as 62,495.51 kt $CO_2$ eq, consistent with the information in the report on the review of the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of the Netherlands. | |
| KL.16 | HWP – $CO_2$ | The Party identified errors in the FAO forest products statistics (see http://www.fao.org/forestry/statistics/en/) and made corrections to them using statistics provided by Probos, a Dutch source of statistics that provides information to FAO (NIR, p.283). The ERT noted that, in accordance with the 2006 IPCC Guidelines (vol. 4, figure 12.1), Parties should use country-specific data sources and methods wherever possible. | Yes. Accuracy |
| | | During the review, the Party explained that it uses FAO data as they are available in English and stored in a single database, and because Probos supplies FAO with the data. | |
| | | The ERT recommends that the Netherlands consider full implementation of Probos as a country-specific data source or explain in the NIR why it has concluded that FAO data remain the superior source. | |
| KL.17 | Biomass burning – $CO_2$, $CH_4$ and $N_2O$ | The Party reported that emissions from fires are calculated using a tier 1 method. The annual area affected by fires is estimated on the basis of the average area of forest land affected by fires between 1980 and 1992. Modelling of emissions uses year-specific carbon stocks in living biomass and default combustion factors (NIR, p.273; methodology report of Arets et al., annex 7 to the NIR, pp.67–68) (see ID# L.28 above). The ERT noted its concerns about the method used to deduce AD because of the apparent lack of AD for after 1992, especially given the Party's intention to apply the natural disturbances provision with respect to wildfire over a calibration period without AD, which creates a trend in emissions (see ID# KL.13 above). While the method of calculating | Not a problem |

| ID# | Finding classification | Description of the finding with recommendation or encouragement | Is finding an issue and/or a problem?[a] |
|---|---|---|---|
| | | emissions from fires is technically acceptable as a means of estimating emissions from fires for Kyoto Protocol accounting purposes, it creates significant complications for the application of the natural disturbances provision.<br><br>During the review, the Party explained that previous efforts, in 2016, using targeted geospatial techniques had been successful in identifying fire-affected areas in 2014 (54 ha) and 2015 (10 ha), but the cost to achieve these results was disproportionate to the quality improvement of the inventory.<br><br>The ERT encourages the Netherlands to collect appropriate AD and calculate and report GHG emissions from fires using the collected AD, noting that geospatial techniques for identifying areas affected by fire are undergoing continuous improvement including through mechanisms available to member States of the European Union (e.g. European Forest Fire Information System). | |

[a]  Recommendations made by the ERT during the review are related to issues as defined in para. 81 of the UNFCCC review guidelines, or problems as defined in para. 69 of the Article 8 review guidelines.

## VI. Application of adjustments

11.     The ERT did not identify the need to apply any adjustments to the 2019 annual submission of the Netherlands.

## VII. Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol

12.     The Netherlands has elected commitment period accounting and therefore the issuance and cancellation of units for KP-LULUCF activities is not applicable to the 2019 review.

## VIII. Questions of implementation

13.     No questions of implementation were identified by the ERT during the individual review of the Party's 2019 annual submission.

# Annex I

## Overview of greenhouse gas emissions and removals for the Netherlands for submission year 2019 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as submitted by the Netherlands in its 2019 annual submission

1.      Tables 1–4 provide an overview of total GHG emissions and removals as submitted by the Netherlands.

Table 1
**Total greenhouse gas emissions for the Netherlands, base year[a]–2017**
(kt $CO_2$ eq)

| | Total GHG emissions excluding indirect $CO_2$ emissions | | Total GHG emissions including indirect $CO_2$ emissions[b] | | Land-use change (Article 3.7 bis as contained in the Doha Amendment)[c] | KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)[d] | KP-LULUCF activities (Article 3.4 of the Kyoto Protocol) | |
| | Total including LULUCF | Total excluding LULUCF | Total including LULUCF | Total excluding LULUCF | | | CM, GM, RV, WDR | FM |
|---|---|---|---|---|---|---|---|---|
| FMRL | | | | | | | | −1 425.00 |
| Base year | 228 920.63 | 222 429.16 | 229 837.82 | 223 346.35 | 752.27 | | NA | |
| 1990 | 227 285.10 | 220 793.63 | 228 202.29 | 221 710.82 | | | | |
| 1995 | 237 439.95 | 231 011.59 | 238 091.89 | 231 663.53 | | | | |
| 2000 | 225 376.01 | 219 304.19 | 225 907.57 | 219 835.75 | | | | |
| 2010 | 218 932.08 | 213 363.03 | 219 390.28 | 213 821.23 | | | | |
| 2011 | 204 826.97 | 199 235.36 | 205 283.64 | 199 692.03 | | | | |
| 2012 | 200 894.04 | 195 346.94 | 201 347.07 | 195 799.97 | | | | |
| 2013 | 200 694.20 | 194 953.95 | 201 143.55 | 195 403.30 | | 510.23 | NA | −1 069.97 |
| 2014 | 192 912.40 | 187 281.88 | 193 341.76 | 187 711.24 | | 549.57 | NA | −1 070.07 |
| 2015 | 201 205.91 | 195 560.41 | 201 657.63 | 196 012.13 | | 591.08 | NA | −1 039.86 |
| 2016 | 200 963.45 | 195 384.32 | 201 414.18 | 195 835.04 | | 633.02 | NA | −1 054.17 |
| 2017 | 198 860.00 | 193 259.92 | 199 313.04 | 193 712.97 | | 700.55 | NA | −990.04 |

*Note*: Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions.

[a]  "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for $CO_2$, $CH_4$ and $N_2O$ and 1995 for HFCs, PFCs, $SF_6$ and $NF_3$. The Netherlands has not elected any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

[b]  The Party reported indirect $CO_2$ emissions in CRF table 6.

[c]  The value reported in this column refers to 1990.

[d]  Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.

Table 2
**Greenhouse gas emissions by gas for the Netherlands, excluding land use, land-use change and forestry, 1990–2017**
(kt $CO_2$ eq)

| | $CO_2{}^a$ | $CH_4$ | $N_2O$ | HFCs | PFCs | Unspecified mix of HFCs and PFCs | $SF_6$ | $NF_3$ |
|---|---|---|---|---|---|---|---|---|
| 1990 | 163 345.38 | 31 849.97 | 18 039.59 | 5 606.33 | 2 662.85 | NO | 206.70 | NO, IE |
| 1995 | 173 681.94 | 29 702.61 | 18 167.56 | 7 570.52 | 2 279.92 | NO | 260.97 | NO, IE |
| 2000 | 172 474.16 | 24 282.71 | 16 152.11 | 4 765.18 | 1 902.81 | NO | 258.78 | NO, IE |
| 2010 | 182 644.32 | 19 406.62 | 8 633.89 | 2 668.84 | 313.77 | NO | 153.79 | NO, IE |
| 2011 | 169 567.23 | 18 858.56 | 8 417.46 | 2 448.41 | 275.20 | NO | 125.17 | NO, IE |
| 2012 | 166 331.28 | 18 442.46 | 8 253.36 | 2 411.92 | 188.45 | NO | 172.50 | NO, IE |
| 2013 | 166 213.76 | 18 432.06 | 8 432.23 | 2 061.64 | 143.76 | NO | 119.86 | NO, IE |
| 2014 | 159 256.44 | 18 018.49 | 8 560.15 | 1 649.10 | 93.21 | NO | 133.86 | NO, IE |
| 2015 | 166 902.55 | 18 216.78 | 8 815.55 | 1 833.55 | 104.22 | NO | 139.49 | NO, IE |
| 2016 | 166 837.73 | 18 347.51 | 8 487.42 | 1 876.41 | 151.81 | NO | 134.16 | NO, IE |
| 2017 | 164 931.49 | 18 030.55 | 8 721.13 | 1 826.38 | 77.03 | NO | 126.38 | NO, IE |
| **Per cent change 1990–2017** | **1.8** | **−43.4** | **−51.7** | **−67.4** | **−97.1** | **NA** | **−38.9** | **NA** |

*Note*: Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions.
*a* Including indirect $CO_2$ emissions as reported in CRF table 6.

Table 3
**Greenhouse gas emissions by sector for the Netherlands, 1990–2017**
(kt $CO_2$ eq)

| | Energy | IPPU | Agriculture | LULUCF | Waste | Other |
|---|---|---|---|---|---|---|
| 1990 | 158 673.02 | 23 770.36 | 25 077.39 | 6 491.47 | 14 190.04 | NO |
| 1995 | 169 333.47 | 25 565.97 | 24 177.95 | 6 428.36 | 12 586.14 | NO |
| 2000 | 167 141.07 | 22 171.82 | 20 698.38 | 6 071.82 | 9 824.49 | NO |
| 2010 | 178 928.19 | 12 320.65 | 17 973.31 | 5 569.05 | 4 599.08 | NO |
| 2011 | 165 521.47 | 12 189.98 | 17 653.83 | 5 591.61 | 4 326.76 | NO |
| 2012 | 162 451.64 | 11 828.78 | 17 421.84 | 5 547.10 | 4 097.71 | NO |
| 2013 | 162 175.27 | 11 457.64 | 17 876.61 | 5 740.25 | 3 893.78 | NO |
| 2014 | 155 140.00 | 10 874.87 | 18 040.00 | 5 630.52 | 3 656.37 | NO |
| 2015 | 162 546.14 | 11 361.38 | 18 659.60 | 5 645.49 | 3 445.01 | NO |
| 2016 | 162 572.78 | 11 087.90 | 18 888.65 | 5 579.14 | 3 285.72 | NO |

| | Energy | IPPU | Agriculture | LULUCF | Waste | Other |
|---|---|---|---|---|---|---|
| 2017 | 160 182.04 | 11 523.19 | 18 927.23 | 5 600.07 | 3 080.50 | NO |
| **Per cent change 1990–2017** | **1.0** | **−51.5** | **−24.5** | **−13.7** | **−78.3** | **NA** |

*Notes*: (1) Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions. (2) Totals include indirect $CO_2$ emissions reported in CRF table 6.

Table 4

**Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year[a]–2017, for the Netherlands**

(kt $CO_2$ eq)

| | Article 3.7 bis as contained in the Doha Amendment[b] | Activities under Article 3, paragraph 3, of the Kyoto Protocol | | FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol | | | | |
|---|---|---|---|---|---|---|---|---|
| | Land-use change | AR | Deforestation | FM | CM | GM | RV | WDR |
| FMRL | | | | −1 425.00 | | | | |
| Technical correction | | | | NE | | | | |
| Base year | 752.27 | | | | NA | NA | NA | NA |
| 2013 | | −600.27 | 1 110.50 | −1 069.97 | NA | NA | NA | NA |
| 2014 | | −601.01 | 1 150.57 | −1 070.07 | NA | NA | NA | NA |
| 2015 | | −601.05 | 1 192.13 | −1 039.86 | NA | NA | NA | NA |
| 2016 | | −600.61 | 1 233.63 | −1 054.17 | NA | NA | NA | NA |
| 2017 | | −602.07 | 1 302.62 | −990.04 | NA | NA | NA | NA |
| **Per cent change base year–2017** | | | | | **NA** | **NA** | **NA** | **NA** |

*Note*: Values in this table include emissions from land subject to natural disturbances, if applicable.

[a] The Netherlands has not elected to report on any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol, and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

[b] The value reported in this column refers to 1990.

2.    Table 5 provides an overview of key relevant data from the Netherlands' reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 5

**Key relevant data for the Netherlands under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the 2019 annual submission**

| Key parameters | Values |
|---|---|
| Periodicity of accounting | (a)    AR: commitment period accounting |
| | (b)    Deforestation: commitment period accounting |
| | (c)    FM: commitment period accounting |
| | (d)    CM: not elected |
| | (e)    GM: not elected |
| | (f)    RV: not elected |
| | (g)    WDR: not elected |
| Election of activities under Article 3, paragraph 4 | None |
| Election of application of provisions for natural disturbances | Yes, for AR and FM |
| 3.5% of total base-year GHG emissions, excluding LULUCF and including indirect $CO_2$ emissions | 7 811.943 kt $CO_2$ eq (62 495.551 kt $CO_2$ eq for the duration of the commitment period) |
| Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for: | |
| 1.    AR | NA |
| 2.    Deforestation | NA |
| 3.    FM | NA |
| 4.    CM | NA |
| 5.    GM | NA |
| 6.    RV | NA |
| 7.    WDR | NA |

## Annex II

## Information to be included in the compilation and accounting database

Tables 1–5 include the information to be included in the compilation and accounting database for the Netherlands. Data shown are from the original annual submission of the Party, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table 1
**Information to be included in the compilation and accounting database for 2017, including on the commitment period reserve, for the Netherlands**
(t $CO_2$ eq)

|  | Original submission | Revised estimate | Adjustment | Final |
|---|---|---|---|---|
| **CPR** | 832 300 112 | – | – | 832 300 112 |
| **Annex A emissions for 2017** | – | – | – | – |
| $CO_2$[a] | 164 931 493 | – | – | 164 931 493 |
| $CH_4$ | 18 030 550 | – | – | 18 030 550 |
| $N_2O$ | 8 721 134 | – | – | 8 721 134 |
| HFCs | 1 826 382 | – | – | 1 826 382 |
| PFCs | 77 029 | – | – | 77 029 |
| Unspecified mix of HFCs and PFCs | NO | – | – | NO |
| $SF_6$ | 126 380 | – | – | 126 380 |
| $NF_3$ | NO, IE | – | – | NO, IE |
| **Total Annex A sources** | **193 712 968** | – | – | **193 712 968** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2017** | – | – | – | – |
| AR | –602 071 | – | – | –602 071 |
| Deforestation | 1 302 622 | – | – | 1 302 622 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2017** | – | – | – | – |
| FM | –990 038 | – | – | –990 038 |

[a] $CO_2$ emissions include indirect $CO_2$ emissions reported in CRF table 6.

Table 2
**Information to be included in the compilation and accounting database for 2016 for the Netherlands**
(t $CO_2$ eq)

|  | Original submission | Revised estimate | Adjustment | Final |
|---|---|---|---|---|
| **Annex A emissions for 2016** | – | – | – | – |
| $CO_2$[a] | 166 837 731 | – | – | 166 837 731 |
| $CH_4$ | 18 347 514 | – | – | 18 347 514 |
| $N_2O$ | 8 487 425 | – | – | 8 487 425 |
| HFCs | 1 876 408 | – | – | 1 876 408 |
| PFCs | 151 812 | – | – | 151 812 |
| Unspecified mix of HFCs and PFCs | NO | – | – | NO |
| $SF_6$ | 134 155 | – | – | 134 155 |
| $NF_3$ | NO, IE | – | – | NO, IE |
| **Total Annex A sources** | **195 835 044** | – | – | **195 835 044** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2016** | – | – | – | – |

| | Original submission | Revised estimate | Adjustment | Final |
|---|---|---|---|---|
| AR | −600 606 | – | – | −600 606 |
| Deforestation | 1 233 631 | – | – | 1 233 631 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2016** | – | – | – | – |
| FM | −1 054 167 | – | – | −1 054 167 |

[a] CO₂ emissions include indirect $CO_2$ emissions reported in CRF table 6.

Table 3

**Information to be included in the compilation and accounting database for 2015 for the Netherlands**
(t $CO_2$ eq)

| | Original submission | Revised estimate | Adjustment | Final |
|---|---|---|---|---|
| **Annex A emissions for 2015** | – | – | – | – |
| $CO_2$[a] | 166 902 547 | – | – | 166 902 547 |
| $CH_4$ | 18 216 780 | – | – | 18 216 780 |
| $N_2O$ | 8 815 546 | – | – | 8 815 546 |
| HFCs | 1 833 549 | – | – | 1 833 549 |
| PFCs | 104 220 | – | – | 104 220 |
| Unspecified mix of HFCs and PFCs | NO | – | – | NO |
| $SF_6$ | 139 490 | – | – | 139 490 |
| $NF_3$ | NO, IE | – | – | NO, IE |
| **Total Annex A sources** | **196 012 134** | – | – | **196 012 134** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015** | – | – | – | – |
| AR | −601 048 | – | – | −601 048 |
| Deforestation | 1 192 132 | – | – | 1 192 132 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015** | – | – | – | – |
| FM | −1 039 855 | – | – | −1 039 855 |

[a] CO₂ emissions include indirect $CO_2$ emissions reported in CRF table 6.

Table 4

**Information to be included in the compilation and accounting database for 2014 for the Netherlands**
(t $CO_2$ eq)

| | Original submission | Revised estimate | Adjustment | Final |
|---|---|---|---|---|
| **Annex A emissions for 2014** | – | – | – | – |
| $CO_2$[a] | 159 256 440 | – | – | 159 256 440 |
| $CH_4$ | 18 018 486 | – | – | 18 018 486 |
| $N_2O$ | 8 560 145 | – | – | 8 560 145 |
| HFCs | 1 649 095 | – | – | 1 649 095 |
| PFCs | 93 210 | – | – | 93 210 |
| Unspecified mix of HFCs and PFCs | NO | – | – | NO |
| $SF_6$ | 133 859 | – | – | 133 859 |
| $NF_3$ | NO, IE | – | – | NO, IE |
| **Total Annex A sources** | **187 711 236** | – | – | **187 711 236** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014** | – | – | – | – |
| AR | −601 006 | – | – | −601 006 |
| Deforestation | 1 150 574 | – | – | 1 150 574 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014** | – | – | – | – |

| | Original submission | Revised estimate | Adjustment | Final |
|---|---|---|---|---|
| FM | −1 070 070 | – | – | −1 070 070 |

[a] $CO_2$ emissions include indirect $CO_2$ emissions reported in CRF table 6.

Table 5
**Information to be included in the compilation and accounting database for 2013 for the Netherlands**
(t $CO_2$ eq)

| | Original submission | Revised estimate | Adjustment | Final |
|---|---|---|---|---|
| **Annex A emissions for 2013** | – | – | – | – |
| $CO_2$[a] | 166 213 757 | – | – | 166 213 757 |
| $CH_4$ | 18 432 056 | – | – | 18 432 056 |
| $N_2O$ | 8 432 232 | – | – | 8 432 232 |
| HFCs | 2 061 640 | – | – | 2 061 640 |
| PFCs | 143 757 | – | – | 143 757 |
| Unspecified mix of HFCs and PFCs | NO | – | – | NO |
| $SF_6$ | 119 860 | – | – | 119 860 |
| $NF_3$ | NO, IE | – | – | NO, IE |
| **Total Annex A sources** | **195 403 302** | – | – | **195 403 302** |
| **Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013** | – | – | – | – |
| AR | −600 272 | – | – | −600 272 |
| Deforestation | 1 110 505 | – | – | 1 110 505 |
| **FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013** | – | – | – | – |
| FM | −1 069 972 | – | – | −1 069 972 |

[a] $CO_2$ emissions include indirect $CO_2$ emissions reported in CRF table 6.

# Annex III

## Additional information to support findings in table 2 in this report

### Missing categories that may affect completeness

The categories for which methods are included in the 2006 IPCC Guidelines that were reported as "NE" or for which the ERT otherwise determined that there may be an issue with the completeness of reporting in the Party's inventory are the following:

(a)     Agriculture – emissions from mules and asses ($CH_4$ and $N_2O$) (see ID# A.1 in table 3 in this report);

(b)     Agriculture – emissions from alpacas and llamas ($CH_4$ and $N_2O$) (see ID# A.17 in table 5 in this report);

(c)     4.D.1.1 Peat extraction remaining peat extraction ($CO_2$ and $N_2O$) (see ID# L.23 in table 5 in this report);

(d)     4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – drainage of organic soils in forest land ($N_2O$) (see ID# L.16 in table 3 in this report);

(e)     $CH_4$ and $N_2O$ emissions from drained and rewetted organic soils – drainage of organic soils in AR and FM lands ($N_2O$) (see ID# KL.11 in table 3 in this report);

(f)     Deforestation ($CO_2$) (see ID# KL.14 in table 5 in this report).

# Annex IV

## Reference documents

### A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl.

IPCC. 2014. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/kpsg.

IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva: IPCC. Available at http://www.ipcc-nggip.iges.or.jp/public/wetlands/.

IPCC. 2019. *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.* E Calvo, K Tanabe, A Kranjc, J Baasansuren, M Fukuda, S Ngarize, A Osako, Y Pyrozhenko, P Shermanau, S Federici (eds). Hayama, Japan: Institute for Global Environmental Strategies. Available at https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/.

### B. UNFCCC documents

**Annual review reports**

Reports on the individual reviews of the 2012, 2013, 2014, 2015, 2016 and 2017 annual submissions of the Netherlands, contained in documents FCCC/ARR/2012/NLD, FCCC/ARR/2013/NLD, FCCC/ARR/2014/NLD, FCCC/ARR/2015/NLD, FCCC/ARR/2016/NLD and FCCC/ARR/2017/NLD, respectively.

**Other**

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at https://unfccc.int/sites/default/files/resource/AGI%202019.pdf.

Annual status report for the Netherlands for 2019. Available at https://unfccc.int/sites/default/files/resource/nld.pdf.

### C. Other documents used during the review

Responses to questions during the review were received from Peter Zijlema (Netherlands Enterprise Agency), including additional material on the methodology and assumptions used. The following references are reproduced as received:

Bannink et al. 2011. *A model of enteric fermentation in dairy cows to estimate methane emission for the Dutch National Inventory Report using the IPCC Tier 3 approach.* Animal Feed Science and Technology ISSN 0377-8401 pp.603-618. Available at https://library.wur.nl/WebQuery/wurpubs/410155.

CBS. 2012. *Standardised calculation methods for animal manure and nutrients*. Statistics Netherlands. Available at https://www.cbs.nl/nl-nl/publicatie/2012/29/standardised-calculation-methods-for-animal-manure-and-nutrients.

CBS. 2018. *Dierlijke mest en mineralen 2017*. Den Haag/Heerlen: CBS. Available at https://www.cbs.nl/nl-nl/publicatie/2018/37/dierlijke-mest-en-mineralen-2017.

DHV, 2010 *Update of emission factors for N2O and CH4 for composting, anaerobic digestion and waste incineration.* Report MD-AF20100263/mk, July. DHV, Amersfoort.

Moraal et al. 2004. *Verschuivingen van insectenplagen bij bomen sinds 1946 in relatie met klimaatverandering. Met aandacht voor de effecten van stikstofdepositie, vochtstress, bossamenstelling en bosbeheer.* Wageningen, Alterra, Alterra-rapport 856. 66 p. Available at https://library.wur.nl/WebQuery/wurpubs/fulltext/28848.

Oonk et al. 1994: *Validation of landfill gas formation models.* TNO Institute of Environmental and Energy Technology, December, reference number 94-315.

Spakman et al. 2003: *Method for calculating GHG emissions*. Emission Registration Report VROM-HIMH, The Hague Available at: http://english.rvo.nl/nie.

Tauw. 2011. *Validatie van het nationale stortgas emissiemodel (Validation of the national landfill gas emission model)*. Deventer, the Netherlands (In Dutch).

van Bruggen et al. 2017, *Emissies naar lucht uit de landbouw in 2016 Berekeningen met het model NEMA* (Emissions into the atmosphere from agricultural activities in 2016. Calculations using the NEMA model). Wageningen University and Research. Available at https://edepot.wur.nl/452369.

van Bruggen et al. 2018, *Emissies naar lucht uit de landbouw in 2017 Berekeningen met het model NEMA* (Emissions into the atmosphere from agricultural activities in 2017. Calculations using the NEMA model). Wageningen University and Research.

Velthof et al. 1996, *Seasonal variations in nitrous oxide losses from managed grasslands in The Netherlands*. Plant and Soil, Volume 181, pp.263-274. Available at https://link.springer.com/article/10.1007/BF00012061.

Velthof and Mosquera. 2011, *Calculation of nitrous oxide emission from agriculture in the Netherlands. Update of emission factors and leaching fraction.* Alterra report 2151. Alterra, Wageningen.