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Climate Change

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Report on the individual review of the annual submission of the Netherlands submitted in 2022*

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 review of the 2022 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 17 to 22 October in Bonn.

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* In the symbol for this document, 2022 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
AER	annual environment report
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)
ERT	expert review team
ERU	emission reduction unit
EU ETS	European Union Emissions Trading System
Eurostat	statistical office of the European Union
FM	forest management
FMRL	forest management reference level
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
Kyoto Protocol Supplement	*2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
MMS	manure management system(s)

N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NF_3	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulfur hexafluoride
SIAR	standard independent assessment report
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"
WDR	wetland drainage and rewetting
Wetlands Supplement	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*

I. Introduction

1.   This report covers the review of the 2022 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" (annex to decision 13/CP.20). The review took place from 17 to 22 October 2022 in Bonn and was coordinated by Gopal Joshi, Javier Hanna Figueroa and Simon Wear (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for the Netherlands.

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

Area of expertise	Name	Party
Generalist	Mauro Santos	Brazil
	Sina Wartmann	Germany
Energy	Luis Alberto de la Torre	Peru
	Nicholas Giles	Australia
	Lungile Manzini	South Africa
	Gherghita Nicodim	Romania
IPPU	Niculina Mihaela Balanescu	Romania
	David Kuntze	Germany
Agriculture	Abdulkadir Bektas	Türkiye
	Christopher John Dore	United Kingdom
LULUCF and KP-LULUCF	Rosie Brook	United Kingdom
	Esther Mertens	Belgium
	Eray Özdemir	Türkiye
Waste	Juliana Bempah	Ghana
	Gustavo Mozzer	Brazil
Lead reviewers	David Kuntze	
	Mauro Santos	

2.   The basis of the findings in this report is the assessment by the ERT of the Party's 2022 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines.

3.   The ERT has made recommendations that the Netherlands resolve identified findings, including issues[1] designated as problems.[2] Other findings, and, if applicable, the encouragements of the ERT to the Netherlands to resolve related issues, are also included in this report.

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 presents the annual GHG emissions of the Netherlands, including totals excluding and including LULUCF, indirect CO_2 emissions, and emissions by gas and by

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[1] Issues are defined in decision 13/CP.20, annex, para. 81.
[2] Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

sector, and contains background data on emissions and removals from KP-LULUCF, if elected by the Party, 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 Party's 2022 annual submission

7.   Table 2 provides the assessment by the ERT of the Party's 2022 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 2022 annual submission of the Netherlands

Assessment			Issue/problem ID#(s) in table 3 or 5[a]
Date of submission	Original submission: NIR, 14 April 2022; CRF tables (version 1), 14 April 2022; SEF tables, 14 April 2022		
Review format	Centralized		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	No	
	(b) Selection and use of methodologies and assumptions?	Yes	I.8, I.14, I.24, L.8, L.9, L.14
	(c) Development and selection of EFs?	Yes	I.6, A.16
	(d) Collection and selection of AD?	Yes	I.9, A.3, L.7
	(e) Reporting of recalculations?	Yes	E.3, E.5, E.6
	(f) Reporting of a consistent time series?	Yes	I.1, I.4, I.23
	(g) Reporting of uncertainties, including methodologies?	No	
	(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, or completeness?[b]	Yes	I.11, I.16, I.17, I.29
	(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?	No	I.29
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 adherence to technical standards for data exchange?	No	

Assessment			Issue/problem ID#(s) in table 3 or 5[a]
	Have any issues been identified related to the reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies 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 the 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:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	No	
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	Yes	KL.2, KL.4
	(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 33–34?	No	
CPR	Was the CPR reported in accordance with decision 18/CP.7, annex; decision 11/CMP.1, annex; and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied any adjustments under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Has the Party submitted a revised estimate to replace a previously applied adjustment?	NA	
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 assessing conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Partly	
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] Further information on the issues identified, as well as additional findings, may be found in tables 3 and 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 recommendations included in the previous review report

8. Table 3 compiles the recommendations from previous review reports that were included in the most recent previous review report, published on 27 April 2022,[3] and had not been resolved by the time of publication of the report on the review of the Party's 2021 annual submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue or problem by the time of publication of this review report and has provided the rationale for its determination, which takes into consideration the publication date of the most recent previous review report and national circumstances.

Table 3
Status of implementation of recommendations included in the previous review report for the Netherlands

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
General			
G.1	QA/QC and verification (G.4, 2021) Convention reporting adherence	Review the QC procedures used to verify the input inventory data collected under directive EC/2009/29 and report the results of this verification in future annual submissions.	Resolved. The Party reported in its NIR (section 1.2.3, pp.30–34, and section 10.4.1.1, p 283) about enhanced QA/QC processes related to information reported under the EU ETS, which helped the sectoral experts detect and correct erroneous inputs in the CRF tables (including links between inventory sources and CRF categories, missing notation keys and fluctuations in IEFs) in an early stage of the compilation process.
G.2	Uncertainty analysis (G.5, 2021) Convention reporting adherence	Report the correct information in NIR table A2.3 for AD and EF uncertainties for category 1.B.2.b in future annual submissions.	Resolved. The Party reported in its NIR (annex 2, table A2.3, pp.366–371) the correct information on AD and EF uncertainties for category 1.B.2.b.
Energy			
E.1	1.A.1.c Manufacture of solid fuels and other energy industries – liquid fuels – CO_2, CH_4 and N_2O (E.3, 2021) (E.9, 2019) (E.16, 2017) Completeness	Include in the NIR the reason why emissions from liquid fuels are reported for 1990 only.	Resolved. The previous ERT concluded that the issue will be deemed resolved if the Party includes the missing CH_4 and N_2O emissions from liquid fuels for 1991–2013 and provides transparent information on the matter. The Party reported the missing CH_4 and N_2O emissions from liquid fuels for 1991–2013 in CRF table 1.A(a)s1 of the current submission, providing information on this activity in the NIR (section 3.2.4.5, p.89). Starting with 2014 the liquid fuels are reported using "NO" for category 1.A.1.c in CRF table1.A(a)s1.
E.2	1.A.2.c Chemicals – all fuels – CO_2 (E.6, 2021) (E.27, 2019) Comparability	Allocate the non-energy use emissions to the IPPU category where they occur, if applicable, and provide in the NIR information on emissions resulting from the use of fossil fuels	Not resolved. The Party reported in CRF table 1.A(a)s2 the emissions resulting from the use of fossil fuels as feedstocks for the production of silicon carbide, carbon black, ethylene and methanol. As explained in the NIR (sections 3.2.5.2, p.98, and 4.3, p.138), the AD provided by the energy balance cannot be separated into combustion- and process-related data.

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[3] FCCC/ARR/2021/NLD.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
		as feedstocks for the production of silicon carbide, carbon black, ethylene and methanol.	During the review, the Party confirmed that it will continue reporting the GHG emissions from the production of silicon carbide, carbon black, ethylene and methanol in the energy sector under category 1.A.2.c (chemicals), although these emissions are process-related.
			The ERT noted that this approach is not in accordance with the 2006 IPCC Guidelines (vol. 3, chap. 3.9.4.2, p.3.88, and vol. 3, chap. 1, box 1.1, p.1.8, and vol. 2, chap. 1.2, p.1.5), particularly in terms of the allocation of fuels between energy and non-energy uses, and it therefore considers that the recommendation has not yet been implemented.
E.3	1.A.2.c Chemicals – all fuels – CO_2 (E.13, 2021) Transparency	Transparently present the different reasons affecting the recalculations for each subcategory, as well as the impact of the recalculations separately along with the aggregated category-level information in future annual submissions.	Resolved. The Party included in its NIR (section 3.2.5.5, p.100) information related to the impact of recalculations on the CO_2 emissions under subcategories of category 1.A.2, including under category 1.A.2.c (chemicals), as a result of the AD changes in the energy balance for 2015–2019. For example, the impact of recalculations in category 1.A.2.c is a decrease in CO_2 emissions amounting to 104.61 kt CO_2 for 2019.
E.4	1.A.3.e.i Pipeline transport – gaseous fuels – CH_4 (E.7, 2021) (E.15, 2019) (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 Party reported in its NIR (sections 3.2.6.1, p.107, and 3.3.2.1, p.125) that energy consumption for pipeline transport is not recorded separately in the national energy statistics, but that CO_2 and N_2O combustion emissions for gas transport are included in category 1.A.3.e (other transportation). The CH_4 emissions for gas transport are reported under subcategory 1.B.2.b.4 (natural gas transmission and storage) instead of under category 1.A.3.e.
			During the review, the Party clarified that it has no plan to investigate moving the allocation of CH_4 combustion emissions from the natural gas transport network to category 1.A.3.e.
			The ERT noted that the approach used by the Party is not in accordance with the 2006 IPCC Guidelines (vol. 2, table 3.1.1).
E.5	1.A.4.a Commercial/institutional – biomass – CO_2 and CH_4 (E.14, 2021) Transparency	Include the AD for landfill gas in the CRF tables and present transparently the different reasons affecting the recalculations for each subcategory, as well as the impact of the recalculations separately along with the aggregated category-level information.	Not resolved. The Party did not provide transparent information on the AD for landfill gas or transparent information related to the biomass recalculations.
			Regarding the GHG emissions from landfill gas flaring, during the review the Party provided the following information: (1) CH_4 emissions have been reallocated from subcategory 1.A.4.a.i (commercial/institutional – stationary combustion) to category 5.A.1.a (managed waste disposal sites – anaerobic) and amount to 9.7 t CH_4 for 2018 and 9.1 t CH_4 for 2019; (2) CO_2 emissions have been removed from subcategory 1.A.4.a.i but are not reported elsewhere, since these emissions are generated by a biofuel and amount to 48.7 kt CO_2 for 1998, 104.4 kt CO_2 for 2003, 47.5 kt CO_2 for 2018 and 44.7 kt CO_2 for 2019; and (3) N_2O emissions were not calculated because they are very small. At the same time, the Party mentioned that it is not required to report N_2O and CH_4 emissions from landfill gas flaring.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			Regarding biomass, the Party reported recalculations in CRF table 1.A(a)s4 for the entire time series for CO_2 and CH_4 emissions, as well as for 2015–2019 for biomass consumption and N_2O emissions, but it did not provide any related information in its NIR.
			During the review, the Party specified that the small changes to the N_2O emissions in subcategory 1.A.4.a.i are the result of corrections to the energy statistics on biofuels, but it did not specify what type of biofuel and in what way they were corrected by the energy balance. It also explained that an unnumbered table in the NIR (section 3.2.7.5, p.122) contains the recalculations for both fossil fuel and biogenic emissions. By error, the text in the NIR explains only that the recalculation was for CO_2 emissions, but it should have mentioned that it contained both the fossil and biogenic fuels. The ERT noted that, compared with the values reported in the previous submissions, in subcategory 1.A.4.a.i biomass consumption decreased by 13.59 TJ for 2019, and smaller differences occur for 2015–2018. As a consequence, the overall impact of the corresponding recalculations for CO_2, CH_4 and N_2O emissions for 2019 amounts to a decrease of 0.26 per cent (0.26 kt CO_2 eq) compared with the previous submissions, excluding CO_2 emissions.
			The ERT considers that the Party did not present the different reasons affecting the recalculations transparently and did not present the impact of the recalculations separately along with the aggregated category-level information.
E.6	1.A.4.b Residential – biomass – CO_2, CH_4 and N_2O (E.15, 2021) Transparency	Transparently present the different reasons affecting the recalculations for each subcategory, as well as the impact of the recalculations separately along with the aggregated category-level information in future annual submissions.	Not resolved. The Party explained in its NIR (section 3.2.7.5, p.121) that it took into consideration the recalculations provided by the energy balance for natural gas for 2015–2019, but it did not provide any information related to the biomass recalculations that are reported in CRF table 1.A(a)s4 for biomass consumption and the corresponding CO_2, CH_4 and N_2O emissions reported under subcategory 1.A.4.b.i (residential – stationary combustion). The ERT noted that, according to the CRF tables, there were recalculations for biomass, particularly for 2019.
			During the review, the Party explained that an unnumbered table in the NIR (section 3.2.7.5, p.122) contains the recalculations for both fossil fuel and biogenic emissions. By error, the text in the NIR explains only that the recalculation was for CO_2 emissions, but it should have mentioned that it contained both the fossil and biogenic fuels. The ERT noted that subcategory 1.A.4.b.i (biomass consumption) increased by 21.28 TJ for 2019, and smaller differences occur for 2015–2018 compared with the values reported in the previous submission. As a consequence, the overall impact of the corresponding recalculations for the CO_2, CH_4 and N_2O emissions for 2019 amounts to an increase of 0.02 kt CO_2 eq compared with the previous submission, excluding CO_2 emissions.
E.7	1.B.2.b Natural gas – gaseous fuels – CO_2 and CH_4	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 Party reported "NA" for the AD and "NO" for CH_4 and CO_2 emissions in CRF table 1.B.2 for the entire time series for subcategory 1.B.2.b.6

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
	(E.12, 2021) (E.21, 2019) (E.27, 2017) Comparability		(natural gas – other). In previous submissions the Party had reported "IE" for AD and "NO" for CH_4 and CO_2 emissions.
			During the review, the Party explained that it had reported "NA" for AD because there are no emissions in this category.
			The ERT noted that, according to the 2006 IPCC Guidelines (vol. 1, chap. 8, p.8.7), "NA" is to be used for activities under a given category that occur within the Party but do not result in emissions or removals of a specific gas. Where "NA" is reported for AD and there is a method and an EF in the 2006 IPCC Guidelines (according to the 2006 IPCC Guidelines, vol. 1, chap. 8) for the particular category–gas combination, then "NE" should be used (in this case, for CH_4 and CO_2 emissions). The same chapter of the 2006 IPCC Guidelines notes that activities under subcategory 1.B.2.b.6 (natural gas – other) could be represented by the fugitive emissions from natural gas systems (excluding venting and flaring) if not otherwise accounted for in the other categories (exploration, production, processing, transmission and storage, distribution) and may include emissions from well blowouts and pipeline ruptures or dig-ins.
			Considering the above information, the Party informed the ERT during the review that the situations referenced above do not appear to be the case within the Party and consequently the appropriate notation key for the AD for subcategory 1.B.2.b.6 (natural gas – other) would be "NO".
			The ERT considers that the issue will be resolved if the Party uses the appropriate notation keys for subcategory 1.B.2.b.6 (natural gas – other).
E.8	1.B.2.b Natural gas – gaseous fuels – CH_4 (E.17, 2021) Comparability	(a) Include in the next NIR further information on the methods and EFs used to estimate fugitive emissions of CH_4 from natural gas (category 1.B.2.b), as well as the verification processes used by the Party;	Not resolved.
			(a) The Party did not report in the NIR further information on the methods and EFs used or on the verification processes for estimating CH_4 emissions from natural gas (category 1.B.2.b).
		(b) Report in the CRF tables disaggregated estimates to the extent possible while maintaining confidentiality (e.g. for the following subcategories: 1.B.2.b.1 natural gas: exploration; 1.B.2.b.2 natural gas: production; and 1.B.2.b.3 natural gas: processing) in order to increase the transparency and comparability of its reporting under this category.	During the review the Party described the explanation provided in the methodology report (Honig et al., 2022), according to which CH_4 emissions are reported aggregated consistently with the information received from the companies.
			The ERT noted that the transparency of the report will be increased by implementing the recommendation made by the previous ERT that the Party include in the NIR information on the methods and EFs used to estimate fugitive emissions of CO_2 and CH_4 from natural gas (category 1.B.2.b), as well as on the verification processes used by the Party.
			(b) The Party continued to report in CRF table 1.B.2 aggregated estimates based on plant-specific data provided by relevant companies for the subcategories 1.B.2.b.1 (natural gas exploration), 1.B.2.b.2 (natural gas production) and 1.B.2.b.3 (natural gas processing) by using "IE" for the corresponding CO_2 and CH_4 emissions.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			During the review, the Party explained that in their reports the companies did not consistently provide the AD and GHG emissions disaggregated by activity for this category and the companies are not planning to disaggregate their data in the future. According to the explanations provided in CRF table 9, the combustion and fugitive emissions cannot be separated between oil and gas exploration and production, and the fugitive emissions from processing cannot be separated from the total fugitive emissions from natural gas activities. For this reason, emissions from oil exploration and production and from natural gas exploration and production are included in subcategory 1.A.1.c.ii (oil and gas extraction); fugitive emissions from natural gas processing are reported under subcategories 1.B.2.c.1.iii (venting, combined) and 1.B.2.c.2.iii (flaring, combined); venting emissions from gas and oil are included under subcategory 1.B.2.c.1.iii (venting, combined); and flaring emissions from gas and oil are included under subcategory 1.B.2.c.2.iii (flaring, combined).
			The ERT noted that it is good practice under the 2006 IPCC Guidelines (vol. 2, p.4.36, and table 4.2.2, p.4.42) to estimate the fugitive emissions at a disaggregated level and transparently report them in the CRF tables. In this regard, the Party could explore a way to use the disaggregated information from the detailed reports communicated to the ERT during the review that were provided by three companies from a total of 11, then extend the separation of the GHG emissions by CRF categories of the total emissions reported from natural gas activities.
IPPU			
I.1	2.A.1 Cement production – CO_2 (I.17, 2021) Consistency	Provide more information in the NIR on time-series consistency, including an explanation for why the IEF is constant for 2002–2004, considering that the same detailed methodology is applied for the monthly testing of every batch.	Not resolved. The Party did not implement changes in the IEF used and did not provide additional information on the time-series consistency in the NIR. In the NIR (p.452) and during the review, the Party clarified that the issue is not prioritized among the pending issues/recommendations.
I.2	2.A.1 Cement production – CO_2 (I.17, 2021) Transparency	Provide information on the changes in the raw materials used or the process followed that led to the increase in the variability of the IEF for 2005 onward.	Not resolved. The Party did not provide additional information in the NIR. In the NIR (p.452) and during the review, the Party clarified that the issue is not a priority for the inventory team.
I.3	2.A.2 Lime production – CO_2 (I.18, 2021) Transparency	Provide information on the source of the AD in the NIR, including a discussion on time-series consistency.	Not resolved. The Party reported in the NIR (section 4.2.2, p.134) a description of two sugar industry plants in which limestone was used to produce lime for sugar juice purification. The Party also reported the data source for EFs; however, the data source for the AD is missing. The AD are only available for 1990 and from 2003 onward. The Party did not provide an explanation of why the AD between 1990 and 2003 were not reported. The last ERT asked for an explanation of the significant decrease in the AD between 1990 and 2004, followed by a fluctuating but increasing trend. This was not explained in the NIR.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			In the NIR (p.453) and during the review the Party explained that it interpolated for 1991–2002.

The ERT considers that the Party has not implemented the previous recommendation. |
I.4	2.A.3 Glass production – CO_2 (I.19, 2021) Consistency	Provide more information in the NIR on time-series consistency for glass production, including on the decision to interpolate emissions rather than EFs and the rationale for not applying available plant-specific data.	Not resolved. The Party did not report more information in the NIR as requested in the previous review report. In the NIR (p.454) and during the review, the Party clarified that this is not a priority for the inventory team owing to the considerable effort required to resolve the issue; instead, the Party will concentrate resources on improving the most recent and future emission data, including for key sources.
I.5	2.A.4 Other process uses of carbonates – CO_2 (I.20, 2021) Comparability	Include the process emissions associated with mineral wool production in the IPPU sector as per the 2006 IPCC Guidelines (vol. 3, chap. 2, p.2.27).	Not resolved. The Party continues to report all emissions linked to mineral wool production under the energy sector. During the review and in the NIR (p.455), the Party clarified that it plans to implement this recommendation in its next annual submission.
I.6	2.A.4 Other process uses of carbonates – CO_2 (I.21, 2021) Accuracy	Investigate the reporting for 2017 and explain the slightly higher IEF for ceramics in that year compared with all other years of the time series.	Not resolved. The Party did not report the information in the NIR as requested in the previous review report. In the NIR (p.456) and during the review, the Party clarified that this is not a priority for the inventory team owing to the considerable effort required to resolve the issue; instead, the Party will concentrate resources on improving the most recent and future emission data, including for key sources.
I.7	2.A.4 Other process uses of carbonates – CO_2 (I.21, 2021) Transparency	Provide a comparison in the NIR between the process emissions reported for ceramics producers under the EU ETS and the current inventory estimates.	Not resolved. The Party did not report the information in the NIR as requested in the previous review report. In the NIR (p.456) and during the review, the Party clarified that this is not a priority for the inventory team owing to the considerable effort required to resolve the issue; instead, the Party will concentrate resources on improving the most recent and future emission data, including for key sources.
I.8	2.A.4 Other process uses of carbonates – (2.A.4.b other soda ash) – CO_2 (I.1, 2021) (I.6, 2019) (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 Party reported in its NIR (section 4.2.2, p.135) that the domestic consumption of soda ash for 2001 and 2002 was estimated based on the quantity produced and its imports and exports. For 1990–2000 and 2003 onward, these figures were estimated by extrapolating from the 2001 and 2002 values. The previous ERT suggested investigating the use of EU ETS data to resolve this issue.

During the review the Party clarified that it tried to develop a new methodology, but that it did not succeed in its implementation. The Party mentioned that this is also described in the NIR (section 4.2.2, p.135) and in the methodology report (Honig et al., 2022, section 2.2.3.1). However, the NIR did not include this explanation and the referenced section in the methodology report was incorrect. During the review, the Party further clarified that the description is provided in the methodology report (Honig et al., 2022, section 2.2.3.2, p.52). Since soda ash is also used in glass production, in order to prevent double counting the CO_2 emissions from soda ash used for glass production should be subtracted from the emissions from total soda ash use, because these are integrally reported. However, this procedure has not been |

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			used for the figures produced so far, owing to a lack of data and because the small quantity of CO_2 emissions estimated as being associated with soda ash use contain a considerable margin of uncertainty.
			Taking this explanation into account, the Party identified a number of emissions that are double counted. However, the methodology has still not been improved. There are no data for 1990–2000 and 2003 onward and the Party has not delivered an explanation of why EU ETS data were not used.
			The ERT considers that the Party has not implemented the previous recommendation.
I.9	2.B Chemical industry – CO_2, CH_4 and N_2O (I.22, 2021) Transparency	Implement the planned update and consider the possibility of reporting in CRF table 2(I).A-Hs1 more detailed AD and emissions (e.g. for ethylene production, for which AD are available from Eurostat).	Not resolved. The AD for the category continues to be reported using notation keys "C" (including for ethylene production) and "IE". In its NIR (section 4.3.1), the Party provided general information on AD for the Dutch chemical industry. For ethylene production, the Party reported that emissions are estimated on the basis of capacity data by using a default capacity utilization rate of 86 per cent (based on Neelis et al., 2005) and applying the default EF of 0.86 t/t ethylene oxide. For 2020, EU petrochemistry data were used as a new source. The Party further clarified that it cannot supply AD as it is not possible to find current AD for ethylene production in the Eurostat Prodcom database.
			During the review, the Party provided further information on the AD, EFs and emissions for the chemical industry, which contained confidential plant-specific data.
			The ERT considers that since information is still missing from the CRF table, the Party has not implemented the previous recommendation.
I.10	2.B Chemical industry – CO_2, CH_4 and N_2O (I.22, 2021) Transparency	Include more information in the NIR on the chemical industry, such as the number of plants in operation and the overall production capacity for each chemical industry subsector (caprolactam, silicon carbide, titanium dioxide production, methanol, ethylene, ethylene oxide, acrylonitrile, carbon black, industrial gas, carbon electrodes, activated carbon, ethylene dichloride and vinyl chloride monomer).	Addressing. The Party reported in its NIR (section 4.3.1, p.137) the number of plants for the different subsectors. Furthermore, the Party reported "C" in CRF table 2(I).A-Hs1 for AD in the chemical industries in which emissions occur.
			During the review, the Party provided further information on the AD, EFs and emissions for the chemical industry, which contained confidential plant-specific data.
			The ERT considers that information is still missing in the NIR, such as the number of plants in operation and the overall production capacity of each chemical industry subsector (caprolactam, silicon carbide, titanium dioxide production, methanol, ethylene, ethylene oxide, acrylonitrile, carbon black, industrial gas, carbon electrodes, activated carbon, ethylene dichloride and vinyl chloride monomer).
I.11	2.B.8 Petrochemical and carbon black production – CO_2 and CH_4 (I.23, 2021) Completeness	Report AD and emissions under category 2.B.8.c (ethylene dichloride and vinyl chloride monomer) or, if this is not possible for confidentiality reasons, change the reporting from "NO" to "IE".	Not resolved. The Party did not report AD and emissions under category 2.B.8.c for ethylene dichloride and vinyl chloride monomer and did not change its reporting from "NO" to "IE". In its NIR (p.458) the Party clarified that an update on general AD for the Dutch chemical industry is included in the NIR (section 4.3.1). However,

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			the ERT did not find an explanation for the reporting of ethylene dichloride and vinyl chloride monomer in the referred section of the NIR.
			During the review, the Party explained that the emissions were included under category 2.B.8.c, hence the ERT did not consider this as an underestimation of emissions. Furthermore, the Party noted that it will change the reporting from "NO" to "IE" in the next submission and progress was being made in terms of updating information on AD.
I.12	2.B.8 Petrochemical and carbon black production – CO_2 (I.4, 2021) (I.10, 2019) (I.10, 2017) (I.16, 2016) (I.16, 2015) Transparency	Document the QA/QC activities and outcomes for the chemical and petrochemical sources in the IPPU sector.	Addressing. The Party reported in its NIR (section 4.3.4, p.146) the information on the QA/QC activities and outcomes for the chemical and petrochemical sources. However, the NIR provided no information on the analysis of data reported under the EU ETS. During the review, the Party clarified that the information on QA/QC activities could not be reported in the 2022 NIR because the EU ETS reports for these companies were not available on time and it received them only during the review week. The ERT considers that the issue will be resolved if the Party includes information from EU ETS reports in the NIR.
I.13	2.B.9 Fluorochemical production – HFCs (I.6, 2021) (I.15, 2019) (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 energy, industry and waste management 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 Party did not report the information in its NIR as requested in the previous review report. In its NIR (p.445) and during the review, the Party clarified that the flow meter results were not available, so this issue cannot be resolved. The emission data are obtained from the AER of the only company in the Netherlands. The Party further clarified that the AER is checked annually by the competent authority; hence these data are considered to be of the highest quality. The ERT considers that the issue will be resolved if the Party reports information on AD.
I.14	2.C.1 Iron and steel production – CO_2 (I.8, 2021) (I.17, 2019) (I.23, 2017) Transparency	(1) 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; (2) 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, ID# I.24) and for reporting the allocation to the energy sector subcategories 1.B.1.b, 1.A.1.a,	Not resolved. (1) The Party did not provide in its NIR an assessment of the carbon flow and carbon balance for each process in the iron and steel industry. During the previous review, the Party clarified that the emissions relevant for iron and steel production were reported in CRF subcategories 1.A.1.c, 1.A.2.a, 1.B.1.b and 2.C.1 and partly in category 2.A.4.d and the sum of emissions reported for these categories was consistent with the total reported under the EU ETS. In its NIR (p.446) and during the review, the Party clarified that the explanation was incorporated in the NIR (section 4.4.2). However, the ERT noted that neither this explanation nor additional information were included in the NIR. (2) The Party reported in its NIR (section 4.4.4, p.150) that in addition to the general QA/QC procedure for category 2.C.1, the AD and emission data of the producers'

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
		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).	AERs were compared with the EU ETS monitoring reports and no differences were found.
			The Party also did not report in its NIR information on conduct of the QA/QC activities for the AD. During the review, the Party clarified that the requested information is included in the NIR (section 4.4.2). The ERT noted that the NIR (section 4.4.2) did not contain any additional information compared with the previous NIR.
I.15	2.C.1 Iron and steel production – CO_2 and CH_4 (I.9, 2021) (I.18, 2019) (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.	Addressing. The Party reported "IE" for CO_2 emissions from pig iron, sinter and pellet production and "IE" for CH_4 emissions from pellet production in CRF table 2(I)A- Hs2. According to CRF table 9 all emissions from the subcategories were reported under subcategory 2.C.1.f. According to the NIR (p.447) all process emissions are reported in the IPPU sector, in CRF category 2.C.1 and partly in subcategory 2.A.4.d, and combustion emissions are reported in subcategories 1.A.1.c (flaring), 1.A.2.a and 1.B.1.b. During the review, the ERT requested (1) a clear presentation of the iron and steel production processes used in 2020; (2) the calculation data sheets for the total GHG emissions associated with iron and steel production (included for categories 2.C.1, 2.A.4.d, 1.A.1.c (flaring), 1.A.2.a and 1.B.1.b) for 2020; and (3) a comparison with the EU ETS data (2020). The Party provided the ERT with a confidential document, "Specification of the Dutch emission figures in the iron and steel category 2015.xls", which includes a schematic presentation of the flows in the iron and steel sector, as well as the CO_2 emissions and allocations to CRF categories for 2015. The Party explained that this schematic presentation was a result of an in-depth discussion with the ERT during the in-country review in 2017. The ERT noted from the presentation that the iron and steel production processes are basic oxygen furnace steel, electric arc furnace steel and direct reduction.
			The Party also provided the ERT with a confidential data calculation spreadsheet ("Confidential review data calculation 2A4d 2C1.xls") for the processes in one of the iron and steel plants for 2021 (including calculations for categories 2.A.4.d and 2.C.1). The ERT commends the Party for providing the information, but the ERT was not able to verify the 2020 CO_2 emissions from the data provided because the data were from 2015 and 2021.
			Regarding the comparison with the EU ETS data, the Party informed the ERT that the Dutch Emission Authority is the independent national authority appointed to implement and monitor the EU ETS, and the necessary confidential data would have to be requested from it. The Party also stated that previous ERTs (for its 2021 and 2019 submissions) had noted that the sum of the emissions related to iron and steel production as reported under CRF categories 1.A.1.c, 1.A.2.a, 1.B.1.b, 2.C.1 and 2.A.4.d is consistent with the total reported under the EU ETS.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			The current ERT was not able to verify the consistency of the reporting with the EU ETS data. The ERT could not check whether all emissions are reported under the iron and steel production subcategories in the IPPU sector because the data provided were for 2015 and 2021, instead of for 2020, and as such could not compare the data with the EU ETS. However, the ERT carried out a verification based on public data from the EU ETS portal and on production data provided by the International Steel Association and discovered that the data were consistent. The ERT therefore continues to consider the issue as an issue of comparability rather than an issue of accuracy.
I.16	2.C.1 Iron and steel production – CH_4 (I.24, 2021) Completeness	Justify why CH_4 emissions from sinter production do not occur or estimate and report these emissions or change the reporting to "NE" and provide information in the NIR to justify the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Addressing. The Party reported "NO" for CH_4 emissions from sinter production in CRF table 2(I)A-Hs2 and in its NIR (section 4.4.6, p.150) and explained that estimates for CH_4 process emissions from sinter production will be reported in its next annual submission. In the NIR (p.150) and during review, the Party clarified that the preliminary assessment of CH_4 process emissions from sinter production is 0.02 kt CH_4 (0.5 kt CO_2 eq). This value is below the threshold of significance for the application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11, and therefore this issue was not included in the list of potential problems and further questions raised by the ERT.
			The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided the methodology, AD and EF used for estimating CH_4 emissions for the entire time series and has not changed the notation key to "NE".
I.17	2.C.1 Iron and steel production – CO_2 (I.24, 2021) Completeness	Explain the reporting of "NO" for CO_2 emissions for subcategory 2.C.1.f, given that sinter and pellet production are reported as "IE"; and check and correct the use of notation keys for all subcategories of category 2.C.1.	Not resolved. The Party continued to report "IE" for CO_2 emissions from sinter and pellet production and "NO" for subcategory 2.C.1.f in CRF table 2(I)A-Hs2 without an explanation of the reporting in the NIR.
I.18	2.C.3 Aluminium production – CO_2 (I.25, 2021) Convention reporting adherence	Include a check of the IEFs as part of its QC procedures prior to reporting.	Addressing. The Party did not describe in the NIR a check of the IEFs as part of its QC procedures.
			During the review, the Party clarified that the figures for CO_2 and PFC emissions are taken directly from AERs and EU ETS reports, which are themselves subject to stringent QA/QC procedures. (A description of the verification process for EU ETS reports is available at https://www.emissionsauthority.nl/topics/year-end-closing-ets/emissions-report-verification.)
			The ERT agrees with the Party that these processes have already been through a QA/QC system and considers that the issue will be resolved when the Party includes information in the NIR on any follow-up checks of the IEF before submitting the inventory.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
I.19	2.C.3 Aluminium production – CO_2 (I.26, 2021) Transparency	Correct the information provided in the NIR to reflect the current methodology used (i.e. the estimation of CO_2 emissions on the basis of data reported under the EU ETS) and also provide information on the methodology used for the years before EU ETS data became available.	Resolved. The Party reported in its NIR (section 4.4.2, p.149) a description of the methodology used for estimating CO_2 emissions on the basis of data reported under the EU ETS. The Party also explained that a tier 1 method was used for the years before EU ETS data became available.
I.20	2.C.6 Zinc production – CO_2 (I.10, 2021) (I.25, 2019) Convention reporting adherence	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.	Resolved. The Party changed the reporting in its CRF table 2(I).A-Hs2 from "NA" to "NO" for zinc production.
I.21	2.D.1 Lubricant use – CO_2 (I.27, 2021) Transparency	Report the AD in CRF table 2(I).A-Hs2 in the annual submission.	Addressing. The Party reported "C" for AD in CRF table 2(I).A-Hs2. However, the Party did not explain in its NIR (section 4.5.2, p.151) why the AD are confidential. During the review, the Party clarified that the AD are no longer confidential and provided a table containing the data and confirmed that it plans to include the AD in its next annual submission.
I.22	2.D.2 Paraffin wax use – CO_2 (I.28, 2021) Transparency	Include in its NIR the AD for the use of paraffin wax and a description of the methodology and data used to derive them.	Resolved. The Party reported in its NIR (section 4.5.2, p.151) a short overview on the methodology and data sources for the AD and EFs used for estimating emissions, and added the AD for category 2.D.2 to CRF table 2(I).A-Hs2.
I.23	2.F.1 Refrigeration and air conditioning – HFCs (I.14, 2021) (I.27, 2019) Consistency	(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; (2) Revise the description in the NIR of the data-collection methods such that clear information on the method currently being used is provided.	Addressing. (1) Not resolved. The data reported in the NIR for 1990–2012 are still aggregated for subcategories 2.F.1.a, 2.F.1.d and 2.F.1.f. During the review, the Party clarified that it was not possible to disaggregate data for the years before 2013 owing to the unavailability of data. (2) Resolved. The Party provided in its NIR (section 4.7.2, p.155) and the methodology report (Honig et al., 2022, chap. 2.2.3.9, p.65) a description of the current data-collection methods.
I.24	2.F.1 Refrigeration and air conditioning – HFCs (I.15, 2021) (I.28, 2019) Comparability	Report emissions from operating stock and disposal separately in CRF table 2(II).B-Hs2, or 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.	Addressing. The last ERT recommended reporting emissions from stocks and disposal separately and that if these are confidential then the Party should use notation keys. The Party reported "NO" for 1990–2012 and "IE" for 2013–2020 in CRF table 2(II).B-Hs2 for manufacturing and disposal emissions from refrigeration and air conditioning for HFC-23, HFC-32, HFC-125, HFC-134a and HFC-143a. The Party explained in its NIR (p.450) that the stocks are the pivotal data for the emission calculation, but did not explain that these emissions are confidential. During the review, the Party clarified that it had reported "IE" because the data on manufacturing and disposal are already reported in the emissions from the stocks.

During the review, the Party further clarified that emissions from leakages, filling of installations (new and as a result of leakage during operation) and dismantling are calculated by using data directly from the refrigerant registration system, as follows:

(a) The volume of refrigerant used in new installations;

(b) The volume of refrigerant to fill operating installations (as a result of leakage);

(c) The volume of refrigerant gained back from retrofitting or maintenance;

(d) The volume of dismantled installations.

The Party also explained that it used the default EFs from the 2006 IPCC Guidelines for calculating emissions from refrigerant management of containers. Disposed refrigerants are also registered, but the Party has assumed that disposal is carried out in a responsible way without further losses apart from those occurring during dismantling.

The ERT was unable to understand why there are no emissions of fluorinated gases during the disposal of the refrigeration and air-conditioning systems and noted that the Party collects data on the volume of refrigerant used in new installations and the volume of refrigerant to fill operating installations. As such, all necessary data are available to calculate and report emissions from filling and disposal separated by usage. However, during the review the Party clarified that all types of emission are taken into account (i.e. refilling, dismantling, re-use, leakage), but as these cannot be separately distinguished in the columns of CRF table 2(II)B-Hs2, it has reported "IE" as follows:

(a) 'Manufacturing' is indicated as "IE" because data on new filling and refilling cannot be disaggregated (and there is no HFC production in the Netherlands);

(b) 'From disposal' should be "IE", because data cannot be disaggregated. The Party does not calculate emissions from the incineration of disposed HFCs;

(c) 'Recovery' should remain "IE" because the Party calculates emissions from leakage from working systems using the amount that is filled yearly (i.e. this is a combination of new and recovered refrigerants and the Party does not make a distinction).

The column 'From stock' contains the total emissions.

Furthermore, the Party clarified that is has implemented a new method in which it is using data collected from the refrigerants registration system for the Netherlands' Pollutant Release and Transfer Register, with the threshold for registration of systems being HFC content $\geq$5,000 kg CO_2 eq. The new method applied using this data source resulted in lower emission estimates than those calculated using the old stock-model method. The ERT assumes that the lower emissions are because of the threshold of HFC content $\geq$5,000 kg CO_2 eq.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			The ERT still recommends reporting the emissions differentiated from 'Manufacturing', 'From stock' and 'From disposal'. However, if these emissions are confidential the ERT recommends reporting the notation key "IE".
			The ERT assumes that the new model is omitting some emissions, because of the low threshold for registration, but assumes that these are below the threshold of significance.
I.25	2.F.1 Refrigeration and air conditioning – HFCs (I.29, 2021) Consistency	Provide explanations for the increases in emissions observed for 2013 and 2015 or revise the estimates.	Resolved. The Party provided in its NIR (section 4.7.3, p.155) the explanation that emissions fluctuate because of the use of different refrigerants with different global warming potentials.
I.26	2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.30, 2021) Transparency	Improve the transparency of the reporting of emissions for categories 2.F.2–2.F.5 as a matter of urgency by disaggregating the data for each gas and subcategory as far as possible.	Not resolved. The Party did not disaggregate the emissions for categories 2.F.2–2.F.5.
			During the review the Party clarified that it is not possible to report disaggregated data from 2015 onward owing to the lack of AD.
			The ERT noted that the new method (see ID# I.27 below) is not delivering the necessary data to report the emissions differentiated in accordance with the subsectors required in the CRF tables.
I.27	2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.30, 2021) Transparency	Include the following information in the NIR to allow a better understanding of the reporting: (a) The number of companies producing hard foam in the Netherlands; (b) Information on whether production of open-cell foam occurs or has previously occurred in the Netherlands; (c) Information about whether hard foam is currently or has previously been exported (e.g. by obtaining data from the Netherlands association of polyurethane hard foam manufacturers); (d) Information on the importation of hard foam that will lead to emissions during use and decommissioning; (e) Information on the number of fire extinguishing systems using HFCs in operation in the Netherlands and the rationale for reporting as confidential the corresponding AD and emissions;	Not resolved. The Party did not provide detailed information on items (a–i) listed in the previous review report about hard foam, open-cell foam, fire extinguishers, methylene diphenyl diisocyanates, aerosols and solvents.
			During the review, the Party clarified that it developed a new methodology, which is described in the methodology report (Honig et al., 2022), and new emission estimates are presented in the NIR (section 4.7.2) and methodology report (Honig et al., 2022, chap. 2.2.3.11). However, the ERT noted that the referenced documents do not contain the information addressing the recommendation made in the previous review report.
			The ERT considers that the issue will be resolved if the Party makes a detailed investigation to check the quality of the inventory and develop a method for reporting the emissions differentiated at the subsector level and delivers the necessary information for a transparent and comparable inventory.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
		(f) Information on the number of importers of methylene diphenyl diisocyanates in the Netherlands and a justification for reporting these data as confidential;	
		(g) Information on the number of companies using HFCs in aerosols;	
		(h) Information on how imports and exports are considered in estimating emissions from aerosols;	
		(i) Information on the number of companies using HFCs as solvents and the rationale for reporting these emissions as confidential.	
I.28	2.G.1 Electrical equipment – SF_6 (I.31, 2021) Comparability	Report emissions from electrical equipment separately under category 2.G.1 in future annual submissions and either use the same data source for 2007–2008 or explain in the NIR why a different methodology has been used for those years.	Resolved. The Party reported SF_6 emissions from electrical equipment under category 2.G.1 separately in CRF table 2(II)B-Hs1. Furthermore, the Party provided in its NIR (section 4.8.2, p.160) an explanation for its use of different methodologies for 2006–2008 and from 2009 onward. During the review, the Party clarified that further improvements will be implemented in the 2023 NIR.
I.29	2.G.2 SF_6 and PFCs from other product use – SF_6 (I.32, 2021) Completeness	Verify any potential uses of SF_6 in particle accelerators in universities, industry and medical facilities and in magnesium production, referred to in DHV (2000), across the time series and include any related emissions in future annual submissions.	Not resolved. The Party did not report on potential uses of SF_6 in particle accelerators in universities, industry and medical facilities and in magnesium production. During the review, the Party clarified that so far there are no new research results on further sources of SF_6 emissions, but it plans to check emissions from particle accelerators and magnesium production. The ERT made an estimation of SF_6 emissions from particle accelerators and magnesium production, on the basis of SF_6 emissions for these activities reported in Germany's 2022 submission, scaled to reflect population numbers. On this basis, the ERT considers that SF_6 emissions from these activities might be considered below the significance threshold for the application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11. Therefore, the ERT did not include this issue in the list of potential problems and further questions raised by the ERT. The ERT considers that the issue will be resolved if the Party verifies any potential uses of SF_6 in particle accelerators in universities, industry and medical facilities and in magnesium production and includes information on related emissions in the NIR.
I.30	2.G.2 SF_6 and PFCs from other product use – SF_6 (I.32, 2021) Accuracy	Correct the error in the lifetime in the calculation of emissions from soundproof windows.	Resolved. The Party corrected in its NIR (section 4.8.5, p.162) the error in the lifetime in the calculation of emissions from soundproof windows.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
I.31	2.G.3 N_2O from product uses – N_2O (I.16, 2021) (I.29, 2019) Comparability	Report the AD for category 2.G.3.b (other – N_2O from aerosol cans) in kt in the next annual submission.	Not resolved. The Party did not report the AD for category 2.G.3.b (other – N_2O from aerosol cans) in kt, rather than the number of cans. During the review, the Party clarified that it plans to include this information in the next annual submission.
I.32	2.H Other (IPPU) – CO_2 (I.33, 2021) Transparency	Provide further information in the NIR on the non-energy use of fuels in this sector and the processes leading to CO_2 emissions.	Addressing. The Party reported in its methodology report (Honig et al., 2022, section 2.2.3.1, p.47) that this category comprises CO_2 emissions related to food and drink production (category 2.H.2) in the Netherlands. CO_2 emissions in this source category are related to the non-energy use of fuels. Carbon is oxidized during these processes, resulting in CO_2 emissions. The ERT was unable to understand why carbon is oxidized in the process.
			During the review, the Party clarified that this information was inserted in the wrong section of the methodology report: it is about CO_2 emissions produced by using lime in sugar production, which are reported under category 2.A.2 (lime production). These emissions had been previously reported under category 2.H.2, but when those emissions were moved to category 2.A.2 it had forgotten to move the corresponding text. The Party plans to amend this in its next annual submission.

Agriculture

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
A.1	3. General (agriculture) – CH_4 and N_2O (A.1, 2021) (A.1, 2019) (A.8, 2017) Completeness	Collect livestock data and estimate emissions associated with mules and asses for 1990–2009, or use an extrapolation technique to ensure time-series consistency.	Resolved. The Party reported in its NIR (section 5.1.2, p.169) and CRF table 3.B(a)s1 that the estimated number of mules and asses for 1990–2009 was based on expert judgment. The number of mules and asses was set at 1,000 animals, thus replacing the notation key "NO" reported previously.
A.2	3. General (agriculture) – CH_4 and N_2O (A.6, 2021) (A.17, 2019) Transparency	Investigate whether alpacas and llamas exist 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.	Addressing. The Party did not report emissions from alpacas and llamas in the CRF tables and stated in its NIR (section 5.1.2, p.169) that emissions from alpacas in the Netherlands were not estimated owing to the lack of detailed information on the number of these animals and that they are mostly kept as pets or as a tourist attraction. Changes to the European Union regulation on animal health in 2022 could make the registration of alpacas mandatory, thereby making it possible to calculate corresponding emissions in the future.
			During the review, the Party clarified that emissions relating to alpacas are negligible.
			The ERT considers that the issue will be resolved if the Party provides specific evidence that there are no alpaca farms in the country or, if relevant, estimates emissions or justifies that the emissions are insignificant.
A.3	3. General (agriculture) – CH_4 and N_2O (A.7, 2021) (A.18, 2019) Comparability	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.	Addressing. The Party reported the values for average cattle weights in CRF tables 3.B(a)s1 and 3.B(b). The ERT noted that the Party reported "NA" for the weight of mature dairy cattle in CRF table 3.As2 even though the weights of growing and other mature cattle were reported in CRF table 3.B(b).

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			During the review, the Party clarified that the weights of cattle are not used for estimating GHG emissions so "NE" is not appropriate, which is why it reported "NA" in CRF table 3.As2.
			The ERT considers that the recommendation has not yet been fully addressed because the Party reported "NA" and did not provide the values for average weights of mature dairy cattle in CRF table 3.As2.
A.4	3. General (agriculture) – CH$_4$ and N$_2$O (A.8, 2021) (A.19, 2019) Convention reporting adherence	(1) Develop a QA/QC plan in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 6.5) for agriculture and include in the NIR details of all the QA/QC procedures; and, if there are no such procedures, develop a timeline, including:	Resolved. The Party reported in its NIR (section 1.2.3, p.30) on the QA/QC programme, QA/QC procedures, QA/QC activities, verification activities for the CRF tables and the NIR, archiving, and overall coordination. It also provided in the methodology report for agriculture (van der Zee et al., 2022, pp.38–40) an overview of the different steps taken every year for QA/QC purposes.
		(a) Procedures to ensure the accuracy of data transcription to the calculations used;	During the review and in the NIR (p.409) the Party clarified that the QA/QC section has been extended in the above-mentioned methodology report (section 2.5) and the Party plans to further improve the QA/QC section in future methodology reports.
		(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;	
		(2) As carrying out an extensive QA/QC process may be resource intensive and not feasible in the first year following this recommendation, document in the QA/QC plan when each procedure is expected to be implemented, and submit the QA/QC plan as a supplementary	

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		document to the NIR in future submissions and update it regularly.	
A.5	3.A.1 Cattle – CH₄ (A.9, 2021) (A.20, 2019) Transparency	(1) Provide in the methodology report submitted with the 2019 NIR the following details on the tier 3 method used for estimating emissions from mature dairy cattle:	Resolved. In its NIR (section 5.2.2, pp.172–173) the Party referred to the methodology document (van der Zee et al., 2022, chap. 3, pp.42–45) that contained detailed information on the calculation methods and EFs used for estimating emissions from mature dairy cattle, covering items (a–e) in the previous recommendation. An overview of the AD can be found in CBS data (2011–2021) and van der Zee et al. (2022).
		(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 CH₄ and N₂O emissions from manure management;	
		(2) Include in the NIR references to external sources where the information is presented, if the Party considers it is not practical to include all the information above in the NIR.	
A.6	3.B Manure management – CH₄ and N₂O (A.12, 2021) (A.4, 2019) (A.1, 2017) (A.2, 2016) (A.2, 2015) (41, 2014) (52, 2013) Transparency	Continue and enhance efforts to improve the consistency between the CH₄ and N₂O emission estimates and report correct values for the fractions of the different MMS in the NIR and the CRF tables.	Addressing. The Party reported in its NIR (section 5.3.2, pp.179–180) that a tier 2 approach was used for estimating CH₄ emissions from manure management for the key categories cattle, swine and poultry. The emissions were estimated using a tier 1 approach for all other animal categories. Detailed descriptions of the methods are given in the methodology report (van der Zee et al., 2022, p.53).
			During the review, the Party explained that a tier 1 method was used for estimating emissions from fur-bearing animals, rabbits, horses, goats, and mules and asses; therefore, no further information was required in the CRF tables. The ERT noted that CRF table 3.B(b) contains information on the MMS for fur-bearing animals (liquid

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			manure), rabbits (solid manure), horses (solid manure; pasture, range and paddock), goats (solid manure), and mules and asses (solid manure; pasture, range and paddock). However, the Party reported "NO" and "NA" in CRF table 3.B(a)s2 for the allocation of MMS, except for mules and asses (reported values).
			The ERT noted that the inconsistent reporting on MMS used for fur-bearing animals, rabbits, horses, goats, and mules and asses between the CH_4 and N_2O emission estimates has not been resolved.
A.7	3.B Manure management – CH_4 and N_2O (A.17, 2021) (A.27, 2019) Transparency	Include in the NIR a description of each of the MMS 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.	Not resolved. The Party did not report in its NIR the description of each of the MMS used in the country. During the review, the Party explained that the common manure treatments in the Netherlands are manure separation, nitrification/denitrification, creation of mineral concentrates, incineration of manure, drying of manure and/or digesting of manure. This information was supposed to be included in the NIR (section 5.3.2), but the paragraph was accidentally omitted during the final stages of drafting the NIR. The Party clarified that this information will be included in the NIR of its next annual submission.
A.8	3.B Manure management – CH_4 and N_2O (A.19, 2021) (A.29, 2019) Transparency	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.	Resolved. The Party reported in its NIR (section 5.3.2, p.179) an assumption that the manure storage time is short as it is beneficial for the farmer to treat the manure as soon as possible.
A.9	3.B Manure management – CH_4 and N_2O (A.20, 2021) (A.30, 2019) Transparency	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.	Resolved. The Party reported in its NIR (section 5.3.1, pp.176–177) a detailed explanation of the trends of CH_4 and N_2O emissions under manure management, including the changes in 2017.
A.10	3.B.1 Cattle – CH_4 and N_2O (A.22, 2021) (A.32, 2019) Convention reporting adherence	Review the 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.	Resolved. The Party reported in its methodology report (van der Zee et al., 2022) (pp.229–231) and technical report (Van Bruggen et al., 2022, pp.85 and 97) consistent and clear information on where manure was produced for cattle categories.

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A.11	3.B.3 Swine – CH$_4$ (A.23, 2021) (A.6, 2019) (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.	Resolved. The Party reported in its NIR (section 5.3.2, p.180) an explanation for the different trends between CH$_4$ emissions and changes in the swine population.
A.12	3.D Direct and indirect N$_2$O emissions from agricultural soils – N$_2$O (A.24, 2021) (A.8, 2019) (A.5, 2017) (A.8, 2016) (A.8, 2015) Transparency	Include in the NIR numerical data on annual removal of agricultural crop residues.	Not resolved. The Party did not report in its NIR numerical data on annual removal of agricultural crop residues. During the review, the Party explained that the methodology for estimating emissions from crop residues is based on the methodology in Ruijter et al. (2019) and it provided a summary of the methodology. However, the ERT noted that a description of this method and the underlying numerical data are not included in the NIR or the methodology report (van der Zee et al., 2022). The ERT considers that this issue would be resolved if the Party includes a summary of the methodology for estimating emissions from crop residues and associated key data sets in the NIR or the relevant methodology report.
A.13	3.D Direct and indirect N$_2$O emissions from agricultural soils – N$_2$O (A.26, 2021) (A.34, 2019) Transparency	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.	Resolved. The Party included in its NIR (section 5.4.1, pp.184–185) an explanation for the trends in grassland renewal and relevant policies influencing the trends.
A.14	3.D Direct and indirect N$_2$O emissions from agricultural soils – N$_2$O (A.27, 2021) (A.35, 2019) Transparency	(1) Include in the NIR a reference for the country-specific EF for compost applied to soils; (2) If the EF is based on expert judgment, ensure that it is documented in accordance with the 2006 IPCC Guidelines (vol. 1, annex 2A.1).	Resolved. The Party reported in its NIR (section 5.4.2, table 5.9, p.186) a reference for the country-specific EFs for direct N$_2$O emissions arising from compost applied to agricultural soils. The EF is assumed to be the same as the country-specific EF for animal manure spreading, the latter being accompanied by references to country-specific studies. The ERT considers this to be an appropriate approach.
A.15	3.D Direct and indirect N$_2$O emissions from agricultural soils – N$_2$O (A.31, 2021) Transparency	Transparently present the different reasons affecting the recalculations for each subcategory, as well as the impact of the recalculations separately along with the aggregated category-level information.	Resolved. The Party reported in its NIR (section 5.4.5, p.188) category-specific recalculations for category 3.D. The ERT noted that category-specific recalculations are given in the NIR with sufficient detail.
A.16	3.D.a.3 Urine and dung deposited by grazing animals – N$_2$O (A.29, 2021) (A.36, 2019) Accuracy	Noting that the Party has drained much of its soils over the years, resulting in a potentially very low groundwater level, review the research on the 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	Not resolved. There were no recalculations to the emissions since the 2021 submission. The Party reported in its NIR (section 5.4.2, table 5.9, p.186) country-specific EFs for subcategory 3.D.a.3 by soil type. During the review, the Party clarified that groundwater levels had already been reduced in the 1990s and referred to the methodology report (van der Zee et al., 2022) based on Velthof et al. (1996). The ERT considers that the Party did not

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
		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 EF₃.	improve transparency by explaining in the NIR how research results were used to calculate the current EF_3.
			The ERT noted that this issue could be addressed by the Party adding an overview of the methodology in Velthof et al. (1996) to the NIR with supporting data and justifying why the EF_3 values used are still applicable.

LULUCF

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
L.1	4. General (LULUCF) – CO_2 (L.3, 2021) (L.18, 2019) Comparability	Report "NA" for cases where a tier 1 assumption of carbon stocks in equilibrium is applied.	Resolved. The Party updated its NIR (section 6.1.2, table 6.2, p.199) by reporting "NA" for all cases where carbon stocks are assumed to be in equilibrium, including for mineral soils under remaining lands (see also ID# L.3 below). In addition, the "NA" notation key is applied consistently in CRF tables 4.A–4.F.
L.2	4.A Forest land – CO_2 (L.15, 2021) Transparency	Include information in the NIR on forest age structure that justifies the trend in removals.	Not resolved. The Party did not provide information in its NIR on forest age structure. However, the NIR (section 6.4.2.1, p.218) includes a reference to Schelhaas et al. (2022a). This report provides information on age class distribution (chap. 7), harvesting (chap. 15) and growing stock (chap. 16). A summary of the forest age structure is not available in English. Therefore, the ERT considers that the recommendation has not been addressed.
L.3	4.A.1 Forest land remaining forest land – CO_2 (L.5, 2021) (L.19, 2019) Comparability	Report "NA" for cases where a tier 1 assumption of carbon stocks in equilibrium is applied, in particular for CSC in mineral soils in CRF table 4.A for forest land remaining forest land instead of "NO".	Resolved. In accordance with paragraph 27(e) of the conclusions and recommendations from the 16th meeting of GHG inventory lead reviewers, the Party changed its reporting in CRF table 4.A from "NO" to "NA" for the carbon pools in which no CSC occurs on the basis of a tier 1 assumption from the 2006 IPCC Guidelines (e.g. figure 2.3 in vol. 4, chap. 2, p.2.22).
L.4	4.A.1 Forest land remaining forest land – CO_2 (L.6, 2021) (L.20, 2019) Transparency	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.	Resolved. The Party reported in its NIR (section 6.1.3, p.206) that the seventh national forestry inventory is now available. It provides observational data for growing stock and biomass and has replaced the data from the EFISCEN model previously used. This issue is therefore no longer relevant and is considered resolved.
L.5	4.B Cropland – CO_2 (L.7, 2021) (L.10, 2019) (L.8, 2017) (L.9, 2016) (L.9, 2015) Accuracy	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.	Resolved. The Party reported in its NIR (section 6.6.2, p.232, table 6.13) that the differences in land-use areas between CRF table 3.D and CRF tables 4.B and 4.C are explained by the fact that the total area of grassland organic soil (including unmanaged areas) is reported under category 4.C, but the CSCs and associated emissions in CRF table 3.D only refer to cultivated areas. The ERT accepts this explanation and does not consider this an accuracy issue.
L.6	4.C Grassland – CO_2 (L.16, 2021) Transparency	Report information in the NIR on the exact methodology applied in the estimation of CSCs in orchards.	Not resolved. The Party did not update the methodological description for orchards in its NIR.
			During the review, the Party clarified that additional information should have been included in the NIR regarding the change in statistical survey classification, which resulted in a small increase in orchard area between 2014 and 2015 (about 1 kha). CBS confirmed that an average of 700 ha high-quality fruit trees was included in the

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			most recent time series. The Party expects this to have a small impact on net removals (approximately 4 kt CO_2) and therefore decided not to make a correction in this inventory cycle.
			The ERT considers that the issue will be resolved if the Party includes information in the NIR of its next annual submission on the exact methodology applied in the estimation of CSCs in orchards.
L.7	4.C.1 Grassland remaining grassland – CO_2 (L.8, 2021) (L.13, 2019) (L.10, 2017) (L.10, 2016) (L.10, 2015) Accuracy	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 Party reported in its NIR (sections 6.6, p.235, and 6.6.1, p.230) that the correction of the misallocation of land converted to grassland, which changes within the 20-year transition period from one grassland category (non-trees outside forest) to another, has not yet been implemented and the Party plans to update the LULUCF model for the 2023 NIR. The ERT agrees with the Party's conclusion that this is a low-priority improvement as it will only impact the allocation of areas between land remaining and land converted categories and will not impact emission/removal calculations.
			The ERT considers that the issue will be resolved if the Party includes this information in the NIR of its next annual submission and addresses the issue in the LULUCF bookkeeping model.
L.8	4.D Wetlands – CO_2 (L.17, 2021) Accuracy	Report in the NIR and CRF table 4.D the correct estimation results for mineral soils under wetlands remaining wetlands.	Not resolved. The Party reported in its NIR (section 6.7.6, p.237) that the misallocation of land converted to wetlands that change within the 20-year transition period from one wetlands subcategory to another will be corrected in a further update of the LULUCF model.
			The ERT considers that the recommendation has not yet been addressed because the Party has not corrected the allocation of CSCs in mineral soils in the wetlands remaining wetlands category.
L.9	4.G HWP – CO_2 (L.19, 2021) Accuracy	Include carbon inflows for the years before 1990 in its estimation of CSCs for HWP.	Not resolved. The Party reported in its NIR (annex 10, p.488) that, for its 2022 submission, it had continued to report CSCs from HWP under the Convention using the same methods as those used for reporting under the Kyoto Protocol, on the basis of the Kyoto Protocol Supplement, to maintain consistency. The Party also confirmed that starting from the 2023 NIR, the methodologies will be updated to include carbon inflows for the years before 1990 in its estimation of CSCs for HWP.
L.10	4.G.2 Paper and paperboard – CO_2 (L.11, 2021) (L.25, 2019) Convention reporting adherence	Apply QC procedures to the 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.	Not resolved. The Party did not provide in its NIR information on the QC procedures applied to HWP source data.
			During the review, the Party clarified that Probos data are used for comparing national statistics from CBS and data from Vereniging Nederlandse Papier- en Kartonfabrieken (Association of Dutch Paper and Cardboard Factories). Further QC procedures on the Probos data were not performed because the Party considers those to be the most reliable data for the Netherlands.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			The ERT considers that the recommendation has not yet been addressed because the Party has not provided in its NIR a summary of a comparison of HWP source data and the justification for using Probos data.
L.11	4.G.2 Paper and paperboard – CO_2 (L.11, 2021) (L.25, 2019) Transparency	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.	Not resolved. The Party reported in its NIR (table 6.16, p.243) information on the balance of produced, imported and exported wood pulp, but the NIR does not contain information on the justification for the paper pool being reduced to zero for 1994 onward.
			During the review, the Party clarified that section 3.1.5 of Oldenburger et al. (2022) indicates that paper and cardboard produced in the Netherlands are produced from imported cellulose (wood pulp) and recycled paper, and that, as the Party applies a production approach for HWP, no gains in paper and paperboard are expected.
			The ERT considers that the recommendation has not yet been addressed because the Party has not provided in its NIR information on industrial and trade practices that justify accumulation of carbon stocks in the paper pool being reduced to zero for 1994 onward.
L.12	4(II) Emissions/removals from drainage and rewetting and other management of organic/mineral soils – CO_2 and CH_4 (L.14, 2021) (L.27, 2019) Transparency	Update the NIR to include a correct description of rewetting activities in the country.	Not resolved. The Party reported in its NIR (section 6.7.6, p.237) that improved and higher-tier approaches for assessing emissions and removals from draining and rewetting activities will be included in future years.
			During the review, the Party clarified that a methodological change will be implemented in the 2023 NIR.
			The ERT considers that the recommendation has not yet been addressed because an updated description of rewetting activities was not included in the NIR.
Waste			
W.1	5.A Solid waste disposal on land – CH_4 (W.1, 2021) (W.1, 2019) (W.1, 2017) (W.2, 2016) (W.2, 2015) (52, 2014) Transparency	Include important AD, such as the amount and composition of disposed waste, in the NIR.	Resolved. The Party reported in its NIR (section 7.2.2, table 7.3, p.251) data on the amount of waste landfilled for various waste-stream groups, and the methodology report (Honing et al., 2022, chap. 2.3.2.2.2, pp.115–118) contains data on the composition of all waste by fraction and by share. Table 7.3 of the NIR is adjusted for the most recent year and a further explanation can be found in the methodology report (Honig et al., 2022, chap. 2.3.2.2.2, table 33). Chapter 2.3.2.2.3, table c, of the methodology report provides details on the composition and amount of commercial waste and its use of the list of European waste codes.
W.2	5.A Solid waste disposal on land – CH_4 (W.10, 2021) Convention reporting adherence	Correct the DOC_f values in CRF table 5.A.	Resolved. The Party corrected the DOC_f values in CRF table 5.A. The Party reported in CRF table 5.A the DOC_f value of 0.5 (default value from the 2006 IPCC Guidelines) for 2004–2020 and 0.58 (country-specific value from Oonk et al., 1994) for 1945–2004 (see also ID# W.4 below).

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W.3	5.A Solid waste disposal on land – CH_4 (W.11, 2021) Transparency	Apply the time series of household waste composition to update the estimated DOC values in the next annual submission.	Resolved. The Party reported in its NIR (section 7.2.2, table 7.2, p.249, and table 7.3, p.251) the DOC values for waste landfilled and household waste landfilled for the entire time series. During the review, the Party clarified that the values reported in table 7.3 of the NIR were adjusted for the most recent year and that a further explanation can be found in the methodology report (Honig et al., 2022, chap. 2.3.2.2.2, table 33). The Party further explained that household waste is now only a minor stream of waste that is being sent to landfill and referred to table A of the above-mentioned methodology report (p.115), which provides a summary on the composition of household waste.
W.4	5.A.1 Managed waste disposal sites – CH_4 (W.5, 2021) (W.11, 2019) (W.17, 2017) Consistency	(1) Derive country-specific DOC_f values for 2001 onward in order to ensure time-series consistency; (2) Until the studies for obtaining these country-specific DOC_f values are concluded, apply the country-specific value for DOC_f (0.58) for 1990–2004 and the IPCC default value for DOC_f (0.5) for 2005 onward; (3) Explain in the NIR the use of the DOC_f values throughout the time series.	Resolved. (1) The Party resorted to using a default value from the 2006 IPCC Guidelines from 2005 onward when its efforts to revise the country-specific value failed; (2) The Party used the DOC_f value of 0.58 (country-specific value from Oonk et al., 1994) for 1945–2004 and 0.5 (default value from the 2006 IPCC Guidelines) for 2004–2020; (3) The Party provided in its NIR (section 7.2.2, p.251) and the methodology report (Honig et al., 2022, p.114) an explanation of the use of the DOC_f values throughout the time series.
W.5	5.B.1 Composting – CH_4 (W.8, 2021) (W.14, 2019) (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.	Resolved. The Party reported in its NIR (section 7.3.2, p.256) that detailed information on AD and EFs can be found in the methodology report (Honig et al., 2022, chap. 2.3.2.3.2, p.123). The methodology report explains that the Netherlands used an EF of 750 g/t CH_4 for the whole time series for the composting of organic waste from households.
W.6	5.B.1 Composting – CH_4 and N_2O (W.12, 2021) Transparency	Specify in the next annual submission that the EF is based on wet weight to improve transparency and consistency between the NIR and the methodology report.	Resolved. The Party reported in its NIR (section 7.3.2, p.256) that detailed information on AD and EFs can be found in the methodology report (Honig et al., 2022, chap. 2.3.2.3.2, p.123). The methodology report explains that the EF is based on wet weight for the entire time series.
W.7	5.C.1 Waste incineration – CH_4 and N_2O (W.13, 2021) Transparency	Include the information provided to the ERT during the review regarding hazardous and medical waste.	Resolved. The Party reported in its NIR (section 7.4.2, p.258) that detailed information on AD and EFs (waste incineration in waste incineration plants) can be found in the methodology report (Honig et al., 2022, chap. 2.3.2.1, p.92). The methodology report contains information on hazardous and medical waste and explains that a small portion of hazardous waste (e.g. certain organic liquids from the chemical industry, cleaning cloths contaminated with oil and/or solvents and oil filters) is processed in waste incineration plants while other hazardous waste is incinerated abroad in rotary kilns. Hospital waste is incinerated in special facilities.

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KP-LULUCF			
KL.1	General (KP-LULUCF) – CO_2 (KL.1, 2021) (KL.12, 2019) Comparability	Report "NE" for cases where emissions are not reported on the basis of the justification that they are not a net source.	Resolved. The Party updated CRF table 4(KP-1)B.1 by reporting litter under FM as "NE" based on the justification that it is not a net source.
KL.2	General (KP-LULUCF) – CO_2, CH_4 and N_2O (KL.11, 2021) Transparency	Include information in the NIR on the main factors generating the accounted quantity that can be explained as deviations in actual policies compared with those historical policies included in the FMRL, rather than the methodological difference between the FMRL and the actual FM estimate.	Not resolved. The requested information was not included in the NIR. During the review, the Party provided the ERT with Schelhaas et al. (2022b), which on p.16 provides information on the policies that have resulted in higher removals in FM during the commitment period compared with the FMRL. The ERT concluded that the transparency issue does not impact the Party's ability to fulfil its commitments for the second commitment period of the Kyoto Protocol and therefore it was not included in the list of potential problems and further questions raised.
KL.3	Deforestation – CO_2 (KL.4, 2021) (KL.14, 2019) Completeness	Estimate and report the CO_2 emissions associated with the loss of DOM from deforested lands previously classified under AR where the forest is less than 20 years old, 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.	Resolved. The Party reported in its NIR (section 11.3.1.2, p.301) that it does not estimate accumulation of DOM for the first 20 years of conversion to forest land. This has an impact on the estimates of both emissions and removals for deforested and AR areas younger than 20 years. In table 11.5 of the NIR (p.301) the potential emissions from the loss of DOM on deforested areas are much lower than the potential removals from the accumulation of DOM on AR land. The exclusion of these emission is therefore justified because it does not result in an underestimation of emissions or overestimation of removals. The ERT accepts this explanation.
KL.4	FM – CO_2, CH_4 and N_2O (KL.10, 2021) Transparency	Provide in the NIR the summary information and the disaggregated number of technical corrections to the FMRL based on the elements listed in table 2.7.1 of the Kyoto Protocol Supplement (p.2.101).	Not resolved. The requested information was not included in the NIR. During the review, the Party provided the ERT with Schelhaas et al. (2022b), which on p.7 provides a summary of the corrections to the FMRL in line with table 2.7.1 of the Kyoto Protocol Supplement (p.2.101). The ERT concluded that the transparency issue does not impact the Party's ability to fulfil its commitments for the second commitment period of the Kyoto Protocol and therefore it was not included in the list of potential problems and further questions raised.

[a] References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) in which the issue 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 2020 annual submission of the Netherlands was not available at the time of this review. For the same reason, 2020 and 2018 are excluded from the list of review years in which issues could have been identified.

IV. Issues and problems identified in three or more 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 and/or problems included in table 4 have been identified in three or more successive reviews, including the review of the 2022 annual submission of the Netherlands, and had not been addressed by the Party at the time of publication of this review report.

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

ID#	Previous recommendation for issue	Number of successive reviews issue not addressed[a]
General	No issues identified.	
Energy		
E.2	Allocate the non-energy use emissions to the IPPU category where they occur, if applicable, and 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.	3 (2019–2022)
E.4	Allocate combustion emissions of CH_4 from the natural gas transport network to subcategory 1.A.3.e.i (pipeline transport).	4 (2017–2022)
E.7	Report the appropriate notation keys in CRF table 1.B.2 for AD and CO_2 and CH_4 emissions, ensuring time-series consistency.	4 (2017–2022)
IPPU		
I.8	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.	5 (2015/16–2022)
I.12	Document the QA/QC activities and outcomes for the chemical and petrochemical sources in the IPPU sector.	5 (2015/16–2022)
I.13	Report the HFC-23 load in the untreated flow based on flow meter results and stream composition in the NIR or in the energy, industry and waste management 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.	4 (2017–2022)
I.14	(1) 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; (2) 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, 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).	4 (2017–2022)

ID#	Previous recommendation for issue	Number of successive reviews issue not addressed[a]
I.15	Ensure that all emissions are reported under iron and steel production subcategories in the IPPU sector, in accordance with the 2006 IPCC Guidelines.	4 (2017–2022)
I.23	(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;	3 (2019–2022)
	(2) Revise the description in the NIR of the data-collection methods such that clear information on the method currently being used is provided.	
I.24	Report emissions from operating stock and disposal separately in CRF table 2(II).B-Hs2, or 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.	3 (2019–2022)
I.31	Report the AD for category 2.G.3.b (other – N_2O from aerosol cans) in kt in the next annual submission.	3 (2019–2022)
Agriculture		
A.2	Investigate whether alpacas and llamas exist 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.	3 (2019–2022)
A.3	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.	3 (2019–2022)
A.6	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 MMS in the NIR and the CRF tables.	7 (2013–2022)
A.7	Include in the NIR a description of each of the MMS 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.	3 (2019–2022)
A.12	Include in the NIR numerical data on annual removal of agricultural crop residues.	5 (2015/2016–2022)
A.16	Noting that the Party has drained much of its soils over the years, resulting in a potentially very low groundwater level, review the research on the 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.	3 (2019–2022)
LULUCF		
L.7	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.	5 (2015/2016–2022)
L.10	Apply QC procedures to the 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.	3 (2019–2022)

ID#	Previous recommendation for issue	Number of successive reviews issue not addressed[a]
L.11	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.	3 (2019–2022)
L.12	Update the NIR to include a correct description of rewetting activities in the country.	3 (2019–2022)
Waste	No issues identified.	
KP-LULUCF	No issues identified.	

 [a] The reports on the reviews of the 2018 and 2020 annual submissions of the Netherlands have not yet been published. Therefore, 2018 and 2020 were not included when counting the number of successive years for this table. In addition, as the reviews of the Party's 2015 and 2016 annual submissions were conducted together, they are not considered successive reviews and 2015/2016 is counted as one year.

V.   Additional findings made during the individual review of the Party's 2022 annual submission

10.   Table 5 presents findings made by the ERT during the individual review of the 2022 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 2022 annual submission of the Netherlands

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
General			
G.3	Other	The Party reported in its NIR (annex 6, pp.396–397) on categories for which emissions are reported as "NE". According to paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, Parties may decide to report "NE" when the emissions of a category are insignificant, but shall provide a justification in the NIR or CRF tables. The Party provided qualitative justifications but not emission estimates for the following categories that are reported as "NE", for which methodologies exist in the 2006 IPCC Guidelines:	Yes. Transparency
		(a) 4.A.2 Land converted to forest land – accumulation of deadwood and litter in newly established forest plots – CO_2;	
		(b) 4.A Forest land – drainage and rewetting of organic soils – CO_2;	
		(c) 5.D.2 Industrial sludge treatment – CH_4.	
		During the review, the Party provided estimates for emissions from those categories reported as "NE" for which methodologies exist in the 2006 IPCC Guidelines. On the basis of these estimates, the ERT noted that these categories can indeed be considered as insignificant in line with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
		The ERT recommends that the Party either include estimates for those categories considered as insignificant and reported as "NE" for which methodologies exist in the 2006 IPCC Guidelines or further justify their exclusion (e.g. providing the likely level of emissions), in line with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	

Energy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
E.9	1.A.2.c Chemicals – solid fuels, gaseous fuels – CO_2, CH_4 and N_2O	The Party reported in its NIR (section 3.2.5.1, p.96) the variation of the CO_2 IEF from combustion of the phosphorus gas that is a by-product of solid fuels, which contributed to the modification of the CO_2 IEF for natural gas combustion used for estimating emissions under category 1.A.2.c (chemicals). The plant that provided the specific data for this activity operated in 1998−2012 and it reported a CO_2 EF of 149.5 kg/GJ. The ERT noted a possible inconsistency in this information in the NIR; namely, the indication that the phosphorus gas is a by-product of solid fuels but that it contributes to the CO_2 IEF from combustion of gaseous fuels. According to the 2006 IPCC Guidelines (vol. 2, chap. 1.4.1.1, p.1.14, table 1.1 (Definitions of fuel types)), the derived gases (by-products of solid fuels) should be reported under the relevant fuel type. Consequently, phosphorus gas, being a by-product of solid fuels, should be allocated under solid fuels for category 1.A.2.c (chemicals).	Yes. Comparability
		During the review, the Party clarified that this by-product is currently included in gaseous fuels, but it will be reallocated to solid fuels in the next annual submission.	
		The ERT recommends that the Party allocate phosphorus gas consumption and the corresponding GHG emissions to solid fuels, in accordance with the 2006 IPCC Guidelines.	
E.10	1.A.3.b Road transportation – LPG – CO_2, CH_4 and N_2O	The ERT noted significant recalculations in CRF table 1.A(a)s3 for LPG consumption in several subcategories under road transport, for the entire time series. For example, for 2019 the consumption of LPG in subcategory 1.A.3.b.iii (heavy-duty trucks and buses) increased by 9,195.83 per cent, in subcategory 1.A.3.b.ii (light-duty trucks) it increased by 66.6 per cent and in subcategory 1.A.3.b.i (cars) it decreased by 30.78 per cent compared with the values presented in the previous submission. The ERT noted similar variations among subcategories for all years after 2011. However, the NIR does not mention this significant level of variation for LPG consumption among the above subcategories, nor the reallocation of it between subcategories performed for the entire time series, nor the impact of the recalculation on the corresponding emissions.	Yes. Transparency
		During the review, the Party explained that the AD used for estimating road transport emissions are collected from the energy balance for fuels sold within the country's territory (e.g. motor gasoline, gas diesel oil, LPG, natural gas and biofuels) and a new methodology has been used to allocate the fuels among the different types of transport in the 2022 submission. Within this process the allocation of LPG was the most affected, being reallocated among the subcategories for cars, light-duty trucks and heavy-duty trucks and buses.	
		The ERT recommends that the Party explain in its NIR the recalculations performed for each type of fuel and the corresponding categories affected, and indicate the impact of the recalculations on consumption and the corresponding GHG emissions.	

IPPU   No findings for the IPPU sector additional to those included in table 3 were made by the ERT during the review.

Agriculture

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
A.17	3.B Manure management – N$_2$O	The Party reported in the methodology report (van der Zee et al., 2022, section 10.3.2, p.108) that manure exported from the Netherlands is accounted for in the emission calculation methodology. However, the ERT noted that the NIR and the methodology report do not include sufficient information on the methodology used for accounting for manure exported from the Netherlands.	Yes. Transparency
		During the review, the Party explained that the amount of N in animal manure exported is approximately 6 per cent of the total N in MMS, and that the amount of manure exported is included in a report by CBS.	
		The ERT recommends that the Party include in the NIR a summary of the methodology used for calculating the amount of N in animal manure exported from the Netherlands.	
LULUCF			
L.13	4.D Wetlands – CO$_2$, CH$_4$ and N$_2$O	The ERT noted that the Party did not fully implement the methodologies set out in the Wetlands Supplement. During the review, the Party explained that it is assessing the methods and data available for improving the reporting of emissions from wetlands, including CH$_4$ emissions, that are covered by the Wetlands Supplement and that possible methodological improvements will be considered on the basis of this assessment.	Not an issue/problem
		The ERT acknowledges the Party's ongoing efforts and encourages it to use the Wetlands Supplement in preparing its annual inventory for future annual submissions.	
L.14	4.C.2.1 Forest land converted to grassland – CO$_2$	The Party reported in its NIR (section 6.4.2.3, p.223) that for conversions between forest land and grassland trees outside forest, it is assumed that no loss of biomass occurs. The ERT noted that this is not in line with the Party's CRF tables 4.A and 4.C, in which losses and an overall net gain is assumed for both forest land converted to trees outside forest and trees outside forest converted to forest land.	Yes. Transparency
		During the review, the Party clarified that the Dutch LULUCF bookkeeping model accounts for an equal loss and gain in living biomass for conversions between forest land and trees outside forest and that the additional annual carbon stock gains resulting from growth of biomass are included. The ERT noted that the justification for applying the same assumptions regarding biomass growth to trees outside forest and to forest land is not included in the NIR (p.228) or the referenced report (Schelhaas et al., 2022a).	
		The ERT recommends that the Party include information in its NIR on the assumed gains and losses for conversions between forest land and trees outside forest, and include information to justify the assumption that biomass growth rates are the same for trees outside forest as in forest land.	
L.15	4(II) Emissions/removals from drainage and rewetting and other management of organic/mineral soils – CH$_4$	The Party did not correct the description of rewetting activities in its NIR in line with the previous recommendation (see ID# L.12 in table 3).	Yes. Completeness
		During the review, the Party clarified that it will update the methodology in its 2023 NIR to include CH$_4$ emissions in CRF table 4(II). In the new approach, it will apply a tier 1 ditch fraction from the 2013 Wetlands Supplement in combination with a country-specific CH$_4$ EF. Emissions from organic soils under forest land, cropland and grassland under agricultural use (CRF tables 4.A, 4.B and 4.C) are expected to decrease, and CH$_4$ emissions will be reported in CRF table 4(II). The Party estimates that the net effect will be a decrease of emissions (81 kt CO$_2$ eq for 1990 and 31 kt CO$_2$ eq for 2020).	

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
		The ERT recommends that the Party include estimates of CH_4 emissions in CRF table 4(II) in future annual submissions.	
Waste		No findings for the waste sector additional to those included in table 3 were made by the ERT during the review.	
KP-LULUCF		No findings for KP-LULUCF additional to those included in table 3 were made by the ERT during the review.	

[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 for the 2022 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.   Table I.5 presents the accounting quantities for KP-LULUCF reported by the Netherlands and the final values agreed by the ERT. The final quantities of units to be issued and cancelled are presented in table I.6.

VIII. Questions of implementation

13.   No questions of implementation were identified by the ERT during the individual review of the Party's 2022 annual submission.

Annex I

Overview of greenhouse gas emissions and removals and data and information on activities under Article 3, paragraphs 3–4, of the Kyoto Protocol, as submitted by the Netherlands in its 2022 annual submission

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

Table I.1

Total greenhouse gas emissions and removals for the Netherlands, base year–2020

(kt CO_2 eq)

| | Total GHG emissions excluding indirect CO_2 emissions | | Total GHG emissions and removals including indirect CO_2 emissions[a] | | Land-use change (Article 3.7 bis as contained in the Doha Amendment)[b] | KP-LULUCF (Article 3.3 of the Kyoto Protocol)[c] | KP-LULUCF (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[d]	226 970.80	221 201.85	227 887.99	222 119.04	752.27		NA	
1990	225 365.49	219 596.54	226 282.68	220 513.73				
1995	235 236.78	229 625.24	235 888.72	230 277.18				
2000	222 677.66	217 505.21	223 209.22	218 036.77				
2010	216 509.20	211 583.23	216 967.41	212 041.44				
2011	202 190.46	197 244.08	202 647.13	197 700.75				
2012	197 901.75	193 009.40	198 354.78	193 462.43				
2013	197 971.85	193 342.44	198 421.21	193 791.80		260.15	NA	−1 393.73
2014	190 060.24	185 548.93	190 489.59	185 978.29		309.55	NA	−1 360.80
2015	197 167.38	192 648.93	197 619.10	193 100.65		360.69	NA	−1 287.57
2016	197 559.16	193 058.39	198 009.89	193 509.12		413.45	NA	−1 298.84
2017	194 294.41	190 568.24	194 747.46	191 021.28		−181.44	NA	−1 251.43
2018	189 262.87	185 596.91	189 703.27	186 037.31		−178.52	NA	−1 203.37
2019	183 420.78	179 837.65	183 851.91	180 268.78		−175.67	NA	−1 187.11
2020	167 446.45	163 915.18	167 865.77	164 334.50		−152.57	NA	−1 183.11

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

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

[b] The value reported in this column relates to GHG emissions from conversion of forests (deforestation) in 1990 as contained in the report on the review of the Party's report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol.

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

[d] "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.

Table I.2

Greenhouse gas emissions and removals by gas for the Netherlands, excluding land use, land-use change and forestry, 1990–2020

(kt CO_2 eq)

	$CO_2{}^a$	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3
1990	162 724.11	31 834.84	17 478.90	5,606.33	2 662.85	NO	206.70	NO, IE
1995	172 952.08	29 631.27	17 612.64	7 545.61	2 279.92	NO	255.66	NO, IE
2000	171 613.79	24 196.81	15 487.26	4 608.46	1 902.81	NO	227.64	NO, IE
2010	181 984.93	19 359.14	8 150.00	2 128.77	313.77	NO	104.83	NO, IE
2011	168 716.33	18 809.01	7 926.33	1 891.47	275.20	NO	82.42	NO, IE
2012	165 141.81	18 389.27	7 775.77	1 831.63	188.45	NO	135.50	NO, IE
2013	165 123.84	18 374.00	8 001.40	2 040.65	143.76	NO	108.14	NO, IE
2014	158 084.94	17 954.66	8 124.35	1 622.99	93.21	NO	98.13	NO, IE
2015	164 594.23	18 144.89	8 328.33	1 817.30	104.22	NO	111.67	NO, IE
2016	165 312.75	18 272.42	8 008.44	1 644.12	151.81	NO	119.56	NO, IE
2017	162 947.01	17 948.07	8 259.98	1 671.95	77.03	NO	117.24	NO, IE
2018	159 068.24	17 348.83	8 026.20	1 323.31	163.01	NO	107.71	NO, IE
2019	153 463.94	17 219.19	7 915.90	1 434.93	117.69	NO	117.15	NO, IE
2020	138 268.84	16 967.60	7 754.30	1 151.94	67.24	NO	124.58	NO, IE
Percentage change 1990–2020	**−15.0**	**−46.7**	**−55.6**	**−79.5**	**−97.5**	**NA**	**−39.7**	**NA**

Note: Emissions and removals reported for the sector other (sector 6) are not included in this table.

[a] Including indirect CO_2 emissions as reported in CRF table 6.

Table I.3

Greenhouse gas emissions and removals by sector for the Netherlands, 1990–2020

(kt CO_2 eq)

	Energy	IPPU	Agriculture	LULUCF	Waste	Other
1990	158 628.70	23 192.29	24 511.96	5 768.95	14 180.79	NO
1995	169 247.09	24 886.67	23 621.48	5 611.55	12 521.94	NO
2000	167 027.50	21 212.07	20 038.36	5 172.44	9 758.84	NO
2010	178 802.51	11 126.78	17 512.75	4 925.97	4 599.39	NO
2011	165 404.92	10 787.05	17 181.72	4 946.38	4 327.06	NO

	Energy	IPPU	Agriculture	LULUCF	Waste	Other
2012	162 028.76	10 339.25	16 996.46	4 892.34	4 097.96	NO
2013	161 694.31	10 720.24	17 483.24	4 629.41	3 894.01	NO
2014	154 529.10	10 148.60	17 643.99	4 511.31	3 656.60	NO
2015	161 224.76	10 211.37	18 219.27	4 518.45	3 445.25	NO
2016	162 067.38	9 715.09	18 439.55	4 500.78	3 287.09	NO
2017	159 141.12	10 303.38	18 493.53	3 726.17	3 083.25	NO
2018	155 037.37	10 081.21	17 931.58	3 665.96	2 987.15	NO
2019	149 686.44	9 985.28	17 719.06	3 583.13	2 878.00	NO
2020	134 775.78	9 171.54	17 654.20	3 531.27	2 732.98	NO
Percentage change 1990–2020	**−15.0**	**−60.5**	**−28.0**	**−38.8**	**−80.7**	**NA**

Notes: (1) The Netherlands did not report emissions or removals for the sector other (sector 6); the corresponding cells in the CRF tables were left blank; (2) totals include indirect CO_2 emissions reported in CRF table 6.

Table I.4

Greenhouse gas emissions and removals from activities under Article 3, paragraphs 3–4, of the Kyoto Protocol by activity, base year–2020, for the Netherlands
(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[a]	Activities under Article 3.3 of the Kyoto Protocol		FM and elected activities under Article 3.4 of the Kyoto Protocol				
	Land-use change	AR	Deforestation	FM	CM	GM	RV	WDR
FMRL				−1 425.00				
Technical correction				337.42				
Base year	752.27				NA	NA	NA	NA
2013		−841.45	1 101.59	−1 393.73	NA	NA	NA	NA
2014		−834.08	1 143.63	−1 360.80	NA	NA	NA	NA
2015		−826.28	1 186.97	−1 287.57	NA	NA	NA	NA
2016		−818.09	1 231.54	−1 298.84	NA	NA	NA	NA
2017		−832.72	651.28	−1 251.43	NA	NA	NA	NA
2018		−842.53	664.01	−1 203.37	NA	NA	NA	NA
2019		−852.43	676.76	−1 187.10	NA	NA	NA	NA
2020		−842.40	689.83	−1 183.11	NA	NA	NA	NA
Percentage change base year–2020					**NA**	**NA**	**NA**	**NA**

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

[a] The value reported in this column relates to 1990.

2. Table I.5 provides information on the Party's accounting quantities for reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.5
Accounting quantities for activities under Article 3, paragraph 3, and forest management and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol for the Netherlands
(kt CO$_2$ eq)

GHG source/ sink activity	Base year[a]	2013	2014	2015	2016	2017	2018	2019	2020	Total[b]	Accounting parameters	Accounting quantities[c]
					Net emissions/removals							
A.1. AR		−841.446	−834.082	−826.282	−818.086	−832.723	−842.532	−852.425	−842.403	−6 689.978		−6 689.978
Excluded emissions from natural disturbances[d]		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
Excluded subsequent removals from land subject to natural disturbances		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
A.2. Deforestation		1 101.593	1 143.631	1 186.973	1 231.536	651.284	664.010	676.758	689.834	7 345.618		7 345.618
B.1. FM										−10 165.955		−1 465.314
Net emissions/ removals		−1 393.730	−1 360.801	−1 287.574	−1 298.835	−1 251.430	−1 203.370	−1 187.105	−1 183.110	−10 165.955		
Excluded emissions from natural disturbances[d]		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
Excluded subsequent removals from land subject to natural disturbances		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
Any debits from newly established forest		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
FMRL[e]											−1 425.000	

GHG source/ sink activity	Net emissions/removals										Accounting parameters	Accounting quantities[c]
	Base year[a]	2013	2014	2015	2016	2017	2018	2019	2020	Total[b]		
Technical corrections to FMRL											337.420	
FM cap											62 495.551	−1 465.314
B.2. CM (if elected)		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.3. GM (if elected)		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.4. RV (if elected)		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.5. WDR (if elected)		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA

[a] Net emissions and removals from CM, GM, RV and/or WDR, if elected, in the Party's base year as established in decision 9/CP.2.

[b] Cumulative net emissions and removals for all years of the commitment period reported in the annual submission under review.

[c] The accounting quantity is the total quantity of units to be issued or cancelled for a particular activity.

[d]   The Party indicated in its report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol its intent to apply the provisions from natural disturbances to its accounting of AR and FM at the end of the commitment period. The Party decided not to exclude emissions and subsequent removals from natural disturbances in its accounting for the 2022 annual submission.

[e] As inscribed in the appendix to the annex to decision 2/CMP.7 in kt CO_2 eq per year.

3.   Table I.6 provides an overview of key data from the Netherlands' reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.6
Key data for the Netherlands under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2022 annual submission

Parameter	*Data*
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
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	None
Election of application of provisions for natural disturbances	Yes, for AR and FM[a]
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	Issue 6 689 978 RMUs
2. Deforestation	Cancel 7 345 618 units
3. FM	Issue 1 465 314 RMUs

Note: Values in this table reflect the accounting quantities for activities under Article 3, para. 3, and FM and any elected activities under Article 3, para. 4, of the Kyoto Protocol as reported in table I.5.

[a] The Party decided not to exclude emissions and subsequent removals from natural disturbances in its accounting for the 2022 annual submission.

Annex II

Information to be included in the compilation and accounting database

Tables II.1–II.8 include the information to be included in the compilation and accounting database for the Netherlands. Data shown are from the Party's annual submission, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table II.1
Information to be included in the compilation and accounting database for 2020, including on the commitment period reserve, for the Netherlands
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
CPR	**832 300 112**	–	–	**832 300 112**
Annex A emissions				
CO_2	138 268 837	–	–	138 268 837
CH_4	16 967 602	–	–	16 967 602
N_2O	7 754 297	–	–	7 754 297
HFCs	1 151 944	–	–	1 151 944
PFCs	67 241	–	–	67 241
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	124 579	–	–	124 579
NF_3	NO, IE	–	–	NO, IE
Total Annex A sources[a]	**164 334 501**	–	–	**164 334 501**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–842 403	–	–	–842 403
Deforestation	689 834	–	–	689 834
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 183 110	–	–	–1 183 110

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.2
Information to be included in the compilation and accounting database for 2019 for the Netherlands
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	153 463 936	–	–	153 463 936
CH_4	17 219 191	–	–	17 219 191
N_2O	7 915 895	–	–	7 915 895
HFCs	1 434 926	–	–	1 434 926
PFCs	117 688	–	–	117 688
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	117 146	–	–	117 146
NF_3	NO, IE	–	–	NO, IE
Total Annex A sources[a]	**180 268 782**	–	–	**180 268 782**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–852 425	–	–	–852 425
Deforestation	676 758	–	–	676 758
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				

	Original submission	Revised submission	Adjustment	Final value
FM	−1 187 105	–	–	−1 187 105

[a] The sum of the values for the individual gases and groups of gases may not match the total for "Total Annex A sources" owing to rounding.

Table II.3
Information to be included in the compilation and accounting database for 2018 for the Netherlands
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	159 068 243	–	–	159 068 243
CH_4	17 348 834	–	–	17 348 834
N_2O	8 026 203	–	–	8 026 203
HFCs	1 323 312	–	–	1 323 312
PFCs	163 009	–	–	163 009
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	107 707	–	–	107 707
NF_3	NO, IE	–	–	NO, IE
Total Annex A sources[a]	**186 037 308**	–	–	**186 037 308**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	−842 532	–	–	−842 532
Deforestation	664 010	–	–	664 010
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	−1 203 370	–	–	−1 203 370

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.4
Information to be included in the compilation and accounting database for 2017 for the Netherlands
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	162 947 011	–	–	162 947 011
CH_4	17 948 071	–	–	17 948 071
N_2O	8 259 983	–	–	8 259 983
HFCs	1 671 952	–	–	1 671 952
PFCs	77 029	–	–	77 029
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	117 238	–	–	117 238
NF_3	NO, IE	–	–	NO, IE
Total Annex A sources[a]	**191 021 284**	–	–	**191 021 284**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	−832 723	–	–	−832 723
Deforestation	651 284	–	–	651 284
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	−1 251 430	–	–	−1 251 430

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.5
Information to be included in the compilation and accounting database for 2016 for the Netherlands
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				

	Original submission	Revised submission	Adjustment	Final value
CO_2	165 312 751	–	–	165 312 751
CH_4	18 272 422	–	–	18 272 422
N_2O	8 008 444	–	–	8 008 444
HFCs	1 644 125	–	–	1 644 125
PFCs	151 812	–	–	151 812
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	119 563	–	–	119 563
NF_3	NO, IE	–	–	NO, IE
Total Annex A sources[a]	**193 509 117**	–	–	**193 509 117**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–818 086	–	–	–818 086
Deforestation	1 231 536	–	–	1 231 536
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 298 835	–	–	–1 298 835

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.6
Information to be included in the compilation and accounting database for 2015 for the Netherlands
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	164 594 232	–	–	164 594 232
CH_4	18 144 894	–	–	18 144 894
N_2O	8 328 329	–	–	8 328 329
HFCs	1 817 302	–	–	1 817 302
PFCs	104 220	–	–	104 220
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	111 674	–	–	111 674
NF_3	NO, IE	–	–	NO, IE
Total Annex A sources[a]	**193 100 652**	–	–	**193 100 652**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–826 282	–	–	–826 282
Deforestation	1 186 973	–	–	1 186 973
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 287 574	–	–	–1 287 574

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.7
Information to be included in the compilation and accounting database for 2014 for the Netherlands
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	158 084 940	–	–	158 084 940
CH_4	17 954 660	–	–	17 954 660
N_2O	8 124 354	–	–	8 124 354
HFCs	1 622 994	–	–	1 622 994
PFCs	93 210	–	–	93 210
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	98 131	–	–	98 131
NF_3	NO, IE	–	–	NO, IE

	Original submission	Revised submission	Adjustment	Final value
Total Annex A sources[a]	**185 978 289**	–	–	**185 978 289**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–834 082	–	–	–834 082
Deforestation	1 143 631	–	–	1 143 631
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 360 801	–	–	–1 360 801

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.8
Information to be included in the compilation and accounting database for 2013 for the Netherlands
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	165 123 842	–	–	165 123 842
CH_4	18 374 004	–	–	18 374 004
N_2O	8 001 400	–	–	8 001 400
HFCs	2 040 653	–	–	2 040 653
PFCs	143 757	–	–	143 757
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF6	108 140	–	–	108 140
NF₃	NO, IE	–	–	NO, IE
Total Annex A sources[a]	**193 791 797**	–	–	**193 791 797**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–841 446	–	–	–841 446
Deforestation	1 101 593	–	–	1 101 593
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 393 730	–	–	–1 393 730

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Annex III

Additional information to support findings in table 2

Missing categories that may affect completeness

The categories for which estimation 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 the reporting in the Party's inventory are the following:

(a) 2.B.8 Petrochemical and carbon black production (CO_2 and CH_4) (see ID# I.11 in table 3);

(b) 2.C.1 Iron and steel production (CH_4) (see ID# I.16 in table 3);

(c) 2.C.1 Iron and steel production (CO_2) (see ID# I.17 in table 3);

(d) 2.G.2 SF_6 and PFCs from other product use – SF_6 use in particle accelerators in universities, industry and medical facilities and in magnesium production (SF_6) (see ID# I.29 in table 3);

(e) 4(II) Emissions/removals from drainage and rewetting and other management of organic/mineral soils (CH_4) (see ID# L.15 in table 5).

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 https://www.ipcc.ch/publication/2013-revised-supplementary-methods-and-good-practice-guidance-arising-from-the-kyoto-protocol/.

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 https://www.ipcc.ch/publication/2013-supplement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories-wetlands/.

B.   UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2013, 2014, 2015, 2016, 2017, 2019 and 2021 annual submissions of the Netherlands, contained in documents FCCC/ARR/2013/NLD, FCCC/ARR/2014/NLD, FCCC/ARR/2015/NLD, FCCC/ARR/2016/NLD, FCCC/ARR/2017/NLD, FCCC/ARR/2019/NLD and FCCC/ARR/2021/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/documents/510888.

Annual status report for the Netherlands for 2022. Available at https://unfccc.int/sites/default/files/resource/asr2022_NLD.pdf.

C.   Other documents used during the review

Responses to questions during the review were received from Jorieke Reinstra (Netherlands Enterprise Agency), including additional material on the methodology and assumptions used. The following references may not conform to UNFCCC editorial style as some have been reproduced as received:

DHV, 2000. Identificatie van onbekende bronnen van overige broeikasgassen (Identification of unknown sources of other greenhouse gases).

Honig et al. (2022): Methodology for the calculation of emissions to air from the sectors energy, industry and waste.

Neelis et at. (2005): Analysis of energy use and carbon losses in the chemical and refinery industries. Report ECN-I-05-008. Energy Research Centre of the Netherlands, Unit Energy Efficiency in Industry, Petten, August.

Oldenburger et al. (2022): Houtproductie en -gebruik in Nederland in 2020. Productie, import, export en consumptie vanhoutproducten in 2020. Probos, Wageningen, The Netherlands.

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

Ruijter et al. (2019): A methodology for estimating the ammonia emission from crop residues at a national scale, Atmospheric Environment: X: 100028.

Schelhaas et al. (2022a): Seventh National Forest Inventory of the Netherlands. Wageningen, The Statutory Research Tasks Unit for Nature and the Environment (WOT Natuur & Milieu), WOt-rapport 142. 127 p.; 15 Figs; 57 Tabs; 17 Refs; 9 Annexes.

Schelhaas et al. (2022b): Technical Correction to the Forest Management Reference Level under the Kyoto Protocol for the Netherlands. Wageningen.

van der Zee et al. (2022): Methodology for estimating emissions from agriculture in the Netherlands.

Velthof et al. (1996): Seasonal variations in nitrous oxide losses from managed grasslands in The Netherlands, Plant and Soil, 181: 263-274.