



United Nations

FCCC/ARR/2022/EU



Framework Convention on  
Climate Change

Distr.: General  
12 May 2023

English only

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## Report on the individual review of the annual submission of the European Union 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 European Union, 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 5 to 10 December 2022 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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## Abbreviations and acronyms

2006 IPCC Guidelines	2006 IPCC Guidelines for National Greenhouse Gas Inventories
AAU	assigned amount unit
AD	activity data
Annex A source	source category included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
Article 8 review guidelines	“Guidelines for review under Article 8 of the Kyoto Protocol”
CER	certified emission reduction
CH <sub>4</sub>	methane
CM	cropland management
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> 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
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU	European Union
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
GHG	greenhouse gas
GM	grazing land management
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
IE	included elsewhere
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
LULUCF	land use, land-use change and forestry
N <sub>2</sub> O	nitrous oxide
NA	not applicable
NE	not estimated
NF <sub>3</sub>	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 <sub>6</sub>	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 EU, 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 5 to 10 December 2022 in Bonn and was coordinated by Vítor Góis Ferreira (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for the EU.

Table 1

**Composition of the expert review team that conducted the review for the European Union**

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Marta Alfaro	Chile
	Kiyoto Tanabe	Japan
Energy, IPPU, waste	Ole-Kenneth Nielsen	Denmark
Agriculture	Marta Alfaro	Chile
LULUCF and KP-LULUCF	Thelma Krug	Brazil
Lead reviewers	Marta Alfaro	
	Kiyoto Tanabe	

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 EU resolve identified findings, including issues<sup>1</sup> designated as problems.<sup>2</sup> Other findings, and, if applicable, the encouragements of the ERT to the EU to resolve related issues, are also included in this report.

4. A draft version of this report was communicated to the EU, 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 EU, including totals excluding and including LULUCF, indirect CO<sub>2</sub> emissions, and emissions by gas and by 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.

<sup>1</sup> Issues are defined in decision 13/CP.20, annex, para. 81.

<sup>2</sup> Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

Table 2  
**Summary of review results and general assessment of the 2022 annual submission of the European Union**

<i>Assessment</i>	<i>Issue/problem ID#(s) in table 3 or 5<sup>a</sup></i>	
Dates of submission	Original submission: NIR, 14 April 2022; CRF tables (version 1), 14 April 2022; SEF tables, 11 April 2022 (SEF-CP2-2021 and SEF-CP1-2021 tables)  Revised submissions: NIR, 27 May 2022 and 2 December 2022; CRF tables (version 2), 26 May 2022 and CRF tables (version 4), 2 December 2022  Unless otherwise specified, values from the most recent submission are included in this report	
Review format	Centralized	
Application of the requirements of the UNFCCC	Have any issues been identified in the following areas:	
Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable)	(a) Identification of key categories? (b) Selection and use of methodologies and assumptions? (c) Development and selection of EFs? (d) Collection and selection of AD? (e) Reporting of recalculations? (f) Reporting of a consistent time series? (g) Reporting of uncertainties, including methodologies? (h) QA/QC?  (i) Missing categories, or completeness? <sup>b</sup> (j) Application of corrections to the inventory?	Yes G.1, G.2, G.3, G.4, G.8 Yes A.7, L.4 No No No No Yes G.9, G.10 QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below) Yes A.5, KL.4 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?	NA
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? (b) Performance of the national system functions?  Have any issues been identified related to the national registry: (a) Overall functioning of the national registry? (b) Performance of the functions of the national registry and the adherence to technical standards for data exchange?  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 No  No No  No

<i>Assessment</i>	<i>Issue/problem ID#(s) in table 3 or 5<sup>a</sup></i>
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?	Yes KL.4
(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	No
(c) Reporting requirements of decision 6/CMP.9?	No
(d) Country-specific information to support provisions for natural disturbances in accordance with decision 2/CMP.7, annex, paragraphs 33–34?	Yes KL.6
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 The EU does not have a previously applied adjustment
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for assessing conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties? Yes
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

<sup>a</sup> Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.

<sup>b</sup> 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 18 February 2022,<sup>3</sup> and had not been resolved by the time of publication of the report on the review of the Party's 2020 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 European Union

<i>ID#</i>	<i>Issue/problem classification<sup>a, b</sup></i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	Key category analysis (G.2, 2020) (G.6, 2018) Transparency	Include in the NIR transparent information on the use of confidential data, including from which key category analysis such data have been excluded.	<p>Addressing. The Party provided in its NIR (section 1.7.3, pp.59–60) information on reporting of confidential data by its member States, Iceland and the United Kingdom. This information is basically similar to that provided in its 2020 NIR, with an update on the number of subcategories reported as confidential by Sweden. However, the ERT noted that, in the 2022 submission, the Party included a new table in the same section (table 1.18, p.60) titled “Confidential data reported by MS in key categories for the EU-27, Iceland and the United Kingdom” in order to address the recommendation from the previous review reports. Table 1.18 of the NIR explains that Sweden reported “C” (confidential) for seven subcategories in the energy sector that were identified as key by the Party’s key category analysis, but it does not clarify whether or not those confidential data from Sweden were included in the key category analysis conducted by the EU. Therefore, the ERT noted that the recommendation has not yet been fully addressed because the Party has not clarified the categories from which confidential data have been excluded in its key category analysis.</p> <p>During the review, the EU clarified that the confidential data of Sweden had not been included when the key category analysis was conducted owing to timing constraints. The ERT suggests that this clarification should be included in future NIRs of the EU with a list of (sub-)categories for which confidential data reported by member States, Iceland or the United Kingdom were excluded when conducting the key category analysis. Also, during the review, the EU acknowledged that the final sentence of section 1.7.3 of the NIR regarding the use of “C”, which reads “In 2020 no ‘C’s were shown for emissions in the comments of the relevant cells in the CRF tables”, is not correct and stated that it will remove this sentence from the NIR in its next annual submission.</p>

<sup>3</sup> FCCC/ARR/2020/EU. The ERT notes that the report on the review of the 2021 annual submission of the EU has not been published yet owing to insufficient funding for the review process. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2020 annual submission.



<i>ID#</i>	<i>Issue/problem classification<sup>a, b</sup></i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
G.2	Key category analysis (G.6, 2020) Convention reporting adherence	Improve QA/QC in order to avoid errors in the information on the number of key categories in the NIR and the emissions in the agriculture sector used in the key category analysis.	<p>Addressing. The Party reported in its NIR (table 1.12, p.48), in CRF table 7 and in the revised annex I to the NIR (Key category analysis, Excel spreadsheet: EU-KP_KCA_EUCDec2022.xlsx) the results of the key category analysis for the 2022 submission. In all cases, the key category analysis included the correct emissions from the agriculture sector.</p> <p>During the review the Party stated that, in the updated annex submitted on 2 December 2022 (EU-KP_KCA_EUCDec2022.xlsx), it reported a total of 86 key categories covering 96.1 per cent of total emissions for the EU (excluding the LULUCF sector). However, when reviewing the above-mentioned annex, the ERT noted that 22 out of the 86 categories were marked as “0”, not as “L” (level), indicating that 22 categories were not identified as key by level assessment for 2020, which meant that the level assessment for 2020 had been applied to only 64 categories (i.e. those marked as “L”) and these added up to 94.7 per cent of total GHG emissions excluding LULUCF.</p> <p>During the review, the Party confirmed that this is an error and agreed that CO<sub>2</sub> emissions from use of residual fuel oil in category 1.A.3.d Domestic navigation should have been included in the key category analysis and, with those emissions included, the total would reach 95.1 per cent (see ID# G.3 below).</p> <p>The ERT considers that the recommendation has not yet been fully addressed because the Party did not account for 95 per cent of the total emissions (excluding LULUCF) in the key category analysis of its most recent submission.</p>
G.3	Key category analysis (G.7, 2020) Convention reporting adherence	Identify as a key category the last category, which surpasses the 95 per cent limit, in the level assessment both with and without LULUCF, and report the results of the key category analysis in the NIR accordingly.	<p>Not resolved. The Party included a new column in the revised annex I to the NIR (Key category analysis, Excel spreadsheet: EU-KP_KCA_EUCDec2022.xlsx) showing the share of each key category in the national totals, with a view to demonstrating that the sum of the individual shares of all the identified key categories surpasses the 95 per cent limit. However, the ERT found that the key category analysis had not been conducted in accordance with the 2006 IPCC Guidelines and added up to 94.7 per cent of total GHG emissions excluding LULUCF. During the review, the Party performed a detailed check of its key category analysis and agreed with the ERT that there was an error and CO<sub>2</sub> emissions from use of residual fuel oil in category 1.A.3.d Domestic navigation should have been included in the key category analysis (see ID# G.2 above). The ERT also notes that the presentation of the results of the key category analyses in annex I to the NIR was not sufficiently transparent for the ERT to determine whether the analysis was conducted in accordance with the 2006 IPCC Guidelines (see also ID# G.8 in table 5).</p> <p>The ERT considers that the recommendation has not yet been addressed because the Party has not accounted for at least 95 per cent of total emissions (excluding LULUCF) in the key category analysis of its most recent submission.</p>

<i>ID#</i>	<i>Issue/problem classification<sup>a, b</sup></i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
G.4	Methods (G.4, 2020) (G.8, 2018) Transparency	Ensure that annex III to the NIR, which includes summaries of the descriptions of the methodologies used by member States for the estimation of EU key categories, reflects the latest submissions of member States and is coherent with the information in the NIR and CRF tables.	<p>Addressing. The Party explained in annex V to its NIR (Improvements made in response to UNFCCC review process) that an additional QA/QC check has been included in its yearly procedure in order to address the inconsistencies between the member States' CRF tables and annex III to the NIR, which is updated by member States, Iceland and the United Kingdom on a regular basis.</p> <p>During the review, the EU provided further clarifications on the additional QA/QC checks, explaining that this involved introducing a checklist so that member States, Iceland and the United Kingdom could document for each sector whether the description in annex III is still relevant or had been updated. The Party also stated that from 2023 onward it will be mandatory for member States to provide the relevant information as part of the reporting requirements under the new EU governance regulation.</p> <p>The ERT commends the Party for this additional effort. However, the ERT considers that the recommendation has not yet been fully addressed because the lack of transparency on methods still remains, at least in the energy sector (see also ID# E.1 below).</p> <p>The ERT also considers that the additional QA/QC check mentioned above should be explicitly explained in its NIR in the section on QA/QC of the EU inventory (see also ID# G.7 in table 5).</p>
G.5	Uncertainty analysis (G.5, 2020) (G.7, 2018) Convention reporting adherence	Attribute the uncertainty values and category groupings derived from the analyses of data reported by member States to the same level of emissions reported at the category level in the CRF tables.	Resolved. The Party reported in its NIR (section 1.6, pp.53–54) which values had been updated in an addendum to the NIR (file UncertaintyTables_NIR2022_EUdec2022.xlsx), as well as providing in table 1.15 of the NIR (p.54) updated information on the uncertainty values for the sectors and respective key categories, reflecting the improvement of the methodology used for estimating uncertainty values, including adequate aggregation levels (see also ID# G.10 in table 5).
Energy			
E.1	1. General (energy sector) (E.1, 2020) (E.1, 2018) (E.2, 2016) (E.2, 2015) (40, 2014) Transparency	Present methodological summaries that are consistent among member States and categories, at least for the key categories.	<p>Addressing. This issue was considered addressing in previous review reports. The ERT checked some of the examples previously highlighted and noted that, for example, for CO<sub>2</sub> emissions reported under subcategory 1.A.2.g Solid fuels use (other manufacturing industries and construction) no information was provided on the methodology or EF used for Germany (NIR table 3-51, p.218), although Germany is by far the dominant member State, accounting for almost 80 per cent of the reported CO<sub>2</sub> emissions in 2020.</p> <p>During the review, the EU explained that it attempted to collect this information from the member States, Iceland and the United Kingdom, but not all member States responded to this request. Furthermore, the EU stated that from 2023 onward it will be mandatory for member States to provide this information and therefore the</p>

ID#	Issue/problem classification <sup>a, b</sup>	Recommendation from previous review report	ERT assessment and rationale
E.2	1. General (energy sector) – gaseous fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.3, 2020) (E.3, 2018) (E.10, 2016) (E.10, 2015) Transparency	Provide information in the NIR on the fuel combustion categories under which the emissions from the combustion of CH <sub>4</sub> recovered are included.	methodological summaries in the NIR of the EU will be completed in future submissions (see also ID# G.4 above).  Addressing. The EU has included a sentence in its NIR (p.367) explaining that Germany is the only country that reports the recovery of CH <sub>4</sub> emissions relating to subcategory 1.B.2.c Venting and flaring, but that Germany reported them in its NIR under category 1.A.1.b.  During the review, the ERT asked if the EU could report CH <sub>4</sub> recovery in CRF table 1.B.2. In response, the EU said that its understanding is that Germany recovers CH <sub>4</sub> emissions from venting and flaring and returns them to the refining process or to refinery combustion systems (see Germany’s 2022 NIR, section 3.3.2.3.1.1), and explained that reporting on this in the 2022 NIR of the EU might be misleading.  The ERT considers that the issue would be resolved by including this minor clarification in the NIR.
E.3	1.A.1.c Manufacture of solid fuels and other energy industries – biomass – CO <sub>2</sub> (E.9, 2020) (E.18, 2018) Transparency	Include in the NIR information on the types of biomass consumed and any particular impact they have on the overall trend.	Resolved. The EU included information in the NIR (p.127) on the nature of the biomass (i.e. that it is mainly biogas) and explained the impact of biogas used in gasification plants on the overall trend.
E.4	1.A.2.f Non-metallic minerals – other fossil fuels – CO <sub>2</sub> (E.13, 2020) (E.23, 2018) Transparency	Include in the NIR information on the main components incinerated in cement kilns by member States to support the low CO <sub>2</sub> IEFs reported for other fossil fuels.	Resolved. The EU included information in the NIR (pp.207–209) on the types of waste (mainly industrial) used in cement production explaining the lower CO <sub>2</sub> IEF.
E.5	1.A.2.g Other (manufacturing industries and construction) – liquid fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.20, 2020) Transparency	Include in its NIR, to the extent possible, a table similar to table 3.49 in the 2018 NIR indicating the types of emissions included under category 1.A.2.g for each member State or indicate where those data are available. (The table would not need to include emissions associated with the categories and could only include the categories reported by each member State, thereby avoiding blank cells.)	Resolved. The EU included table 3-48 in its NIR (pp.211–212), showing the total emissions reported under subcategory 1.A.2.g, as well as reporting the emissions relating to off-road vehicles and other machinery per member State, Iceland and the United Kingdom. The EU also indicated the specific emission allocations for the category for some of the member States.
E.6	1.A.3.b Road transportation – liquid fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.15, 2020) (E.12, 2018)	Provide summary information on how each member State has reported the emissions from use of lubricants under the transport (1.A.3) and/or lubricant use (2.D.1) categories and work with the member States	Resolved. The EU presented information transparently in the NIR (table 74, p.271) on how member States, Iceland and the United Kingdom have reported emissions from the use of lubricants in two-stroke engines. The ERT noted that some member States did not report lubricant use in road transport owing to national circumstances, which are

<i>ID#</i>	<i>Issue/problem classification<sup>a, b</sup></i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
	(E.15, 2016) (E.15, 2015) Comparability	to report emissions from lubricants combusted in two-stroke engines under the transport category in accordance with the 2006 IPCC Guidelines.	explained in the table in the NIR. As the information is presented transparently and no further improvements can be made by the EU, the issue is considered resolved.
E.7	1.A.4.b Residential – biomass – CH <sub>4</sub> (E.16, 2020) (E.25, 2018) Transparency	Include in the NIR information on the characteristics of modern biomass boilers and stoves which would explain the decrease in the CH <sub>4</sub> IEF for biomass in this subcategory for 1990–2016.	Resolved. The EU included the explanation for the trend in IEF in the NIR (p.320).
IPPU			
I.1	2. General (IPPU) (I.1, 2020) (I.2, 2018) (I.26, 2016) (I.26, 2015) Transparency	Provide consistent information on the methodologies used to estimate GHG emissions from the IPPU sector within the NIR, while also ensuring consistency with the NIRs of member States.	Resolved. No inconsistencies were identified in the NIR.
I.2	2. General (IPPU) (I.2, 2020) (I.3, 2018) (I.27, 2016) (I.27, 2015) Transparency	Identify which tier method was used to estimate emissions under each key category of the IPPU sector, in accordance with the 2006 IPCC Guidelines, and provide the corresponding tier method when a country-specific method is used.	Resolved. The EU added notes to the relevant table (e.g. NIR, table 4.4, p.467) explaining the corresponding tiers for member States, Iceland and the United Kingdom using country-specific methodologies.
I.3	2.A Mineral industry – CO <sub>2</sub> (I.21,2020) Convention reporting adherence	Ensure consistency between the information on the magnitude of recalculations for mineral industry in the NIR tables and CRF table 8.	Resolved. No inconsistencies were identified between the information on recalculations provided in the NIR (table 4.3) and CRF table 8.
I.4	2.A.1 Cement production – CH <sub>4</sub> (I.4,2020) (I.6, 2018) (I.29, 2016) (I.29, 2015) Transparency	Provide information in the NIR on the corresponding level of complexity (IPCC tier) of the country-specific methods used by Cyprus, Greece, Hungary, the Netherlands and Sweden to estimate emissions from cement production.	Resolved. The ERT that reviewed the 2020 submission found that the EU had addressed the issue for Greece, Hungary and Sweden, but not for Cyprus and the Netherlands (FCCC/ARR/2020/EU, p.14). In the 2022 submission, the EU has added explanations for Cyprus and the Netherlands in notes to table 4.4 of the NIR (p.467).
I.5	2.A.2 Lime production – CO <sub>2</sub> (I.5, 2020) (I.8, 2018) (I.30, 2016) (I.30, 2015) Transparency	Provide information in the NIR on the methods and EFs used by Austria, France and Malta and the level of complexity (IPCC tier) of the country-specific methods used by Greece, Hungary and Sweden to estimate CO <sub>2</sub> emissions from lime production.	Resolved. The EU included the information for Malta and Latvia in a note to table 4.7 of the NIR (p.471). For all other member States, Iceland and the United Kingdom this had already been resolved in the 2020 submission.

<i>ID#</i>	<i>Issue/problem classification<sup>a, b</sup></i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
I.6	2.B.1 Ammonia production – CO <sub>2</sub> (I.7,2020) (I.16, 2018) (I.36, 2016) (I.35, 2015) Accuracy	Work with Czechia to move from a tier 1 to a higher-tier method to estimate CO <sub>2</sub> emissions from ammonia production, which is a key category, in accordance with the 2006 IPCC Guidelines.	Resolved. The ERT considers that the methodology applied by Czechia is consistent with the tier 2 method of the 2006 IPCC Guidelines (vol. 3, chap. 3) because the information is plant-specific and complemented by default data. During the review, the EU confirmed the assessment made by the ERT.
I.7	2.B.8 Petrochemical and carbon black production – CO <sub>2</sub> (I.10, 2020) (I.23, 2018) (I.42, 2016) (I.40, 2015) Comparability	Include in the NIR the reasons why CO <sub>2</sub> emissions from fuel consumption in ethylene production in France were allocated to the energy sector and work with the member State to allocate CO <sub>2</sub> emissions from fuel use in ethylene production to the IPPU sector, under petrochemical and carbon black production, in accordance with the 2006 IPCC Guidelines.	Addressing. According to the previous review report, France had reallocated all process and combustion CO <sub>2</sub> emissions from ethylene production to the IPPU sector, but to category 2.B.10 instead of category 2.B.8. In its NIR (annex V) and during the review the EU provided information, namely that France will reallocate emissions from ethylene production from category 2.B.10 Chemical industry, other to category 2.B.8 Petrochemical and carbon black emissions in its 2023 submission.
I.8	2.B.9 Fluorochemical production – PFCs (I.11, 2020) (I.24, 2018) (I.43, 2016) (I.41, 2015) Comparability	Explain in the NIR how tetrafluoromethane emissions from the production of HCFC-22 occur and work with Italy to allocate these emissions under the subcategory fluorochemical production – by-product emissions (other) (2.B.9.a.2) instead of the subcategory fluorochemical production – by-product emissions (production of HCFC-22) (2.B.9.a.1).	Resolved. The EU continues to report emissions under subcategory 2.B.9.a.1 by-product emissions (production of HCFC-22) and included information in its NIR (pp.489–490) on the situation at the industrial plant in Italy justifying this allocation.
I.9	2.B.9 Fluorochemical production – HFCs (I.22, 2020) Transparency	Include the information provided during the review in its next NIR if still relevant, namely that HFC-125 is not formed as a by-product during the production of HCFC-22 (category 2.B.9.a) but can be emitted during the handling of F-gas containers or in the form of fugitive emissions from the production of HFC-125 (category 2.B.9.b).	Resolved. The explanation on the recalculation is no longer relevant. The relevant explanation, namely that HFC-125 is not formed as a by-product of HCFC-22 production, is included in the NIR (pp.489–490).
I.10	2.B.10 Other (chemical industry) – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (I.25, 2020) Convention reporting adherence	Ensure consistency in the reporting of emissions from the chemical industry (other) across tables 4.27–4.31 of the 2020 NIR.	Resolved. No inconsistencies were identified in the NIR across tables 4.27–4.31.
I.11	2.F Product uses as substitutes for ozone-	Endeavour to provide in the NIR summary overviews of methodologies used to estimate	Resolved. The EU explained in its NIR (p.531) that there are two key categories which occur in all countries, namely 2.F.1 Refrigeration and air conditioning and 2.F.4

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	depleting substances – HFCs (I.15, 2020) (I.34, 2018) (I.20, 2016) (I.20, 2015) (74, 2014) Transparency	emissions from the consumption of halocarbons and SF <sub>6</sub> for key categories based on the relevant methodological descriptions reported in the NIRs of member States.	Aerosols/metered dose inhalers, and that the latter is a key category only for emissions including LULUCF. The EU included information on methods and EFs for all member States, Iceland and the United Kingdom in its NIR (table 4.49, p.539, for category 2.F.1 and table 4.52, p.546, for category 2.F.4).
I.12	2.F.1 Refrigeration and air conditioning – HFCs and PFCs (I.17, 2020) (I.40, 2018) Transparency	Further analyse the F-gases reported as “unspecified mix of HFCs and PFCs” for commercial and industrial refrigeration applications, focusing on the practices related to refilling, and reflect these refilling practices in the AD and not in the EFs (i.e. if equipment is filled more than once a year, it should be reflected in increased AD, such as the amount of HFCs and PFCs used in operating stock, and not in the product life EF).	Resolved. The EU included the relevant information regarding the reporting of Spain in a note to table 4.47 of the NIR (p.536). The methodology applied by Spain is explained in Spain’s NIR (p.337). Spain uses a mass balance approach to estimate emissions for the operating phase and hence the product life factor becomes 100 per cent.
I.13	2.F.1 Refrigeration and air conditioning – HFCs (I.23, 2020) Transparency	Include in its next NIR the information provided during the review if still relevant, namely that the change in the EU inventory between the 2018 and 2020 submissions was related to changes in the inventory of Cyprus. Since the 2019 submission Cyprus has reported emissions by F-gas according to a tier 2a approach, with no unspecified mix of HFCs reported. The EU also informed the ERT that the small emissions of an unspecified mix of HFCs included in the 2018 submission were reported by Denmark.	Resolved. In the 2022 submission, all member States, Iceland and the United Kingdom provided reporting disaggregated by substance. There are no further recalculations reported for Denmark. The impact and reasons for recalculations for the HFCs for 1990 and 2019 for each of the member States are summarized in table 4.46.
I.14	2.F.4 Aerosols – HFCs (I.19, 2020) (I.44, 2018) Comparability	Use the correct notation key to report HFC emissions from aerosols for the Netherlands in NIR table 4.44 and CRF table2(II)B-Hs2, that is, “IE” rather than “NO” and include information in the NIR as to where these emissions have been allocated.	Addressing. There is no change in the 2022 submission as emissions are still reported as “NO” for the Netherlands (e.g. NIR table 4.48). A note to NIR table 4.52 (p.546) explains where emissions have been allocated in the 2022 submission. During the review, the EU confirmed that the methodology of the Netherlands was not revised for the 2022 submission.
I.15	2.F.4 Aerosols – HFCs (I.24, 2020) Transparency	Include in its next NIR the information provided during the review if still relevant, namely that the change in its inventory relates to changes in the inventory of Finland. (Specifically, in the 2018 submission Finland	Resolved. The EU included the explanation in the NIR (p.547) on the change in the reporting of Finland as of its 2019 submission.

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		reported an unspecified mix of HFCs from other aerosols for 2001–2006, whereas from the 2019 submission onward the member State only reported these emissions for 2001–2002, with the reporting disaggregated by gas for the later years in the time series.)	
I.16	2.F.6 Other applications (product uses as substitutes for ozone-depleting substances) – HFCs, PFCs and SF <sub>6</sub> (I.20, 2020) (I.37, 2018) (I.25, 2016) (I.25, 2015) (77, 2014) Transparency	Include an explanation in the annual submission on the reporting of the emissions from the processes related to the use of HFCs and SF <sub>6</sub> in the Netherlands, and enhance the QC procedures to ensure that the information in the NIR of the EU accurately reflects the information in the NIRs of member States.	Resolved. The previous ERT noted that the reporting in the NIR of the Netherlands and the EU was consistent with the exception of the notation key used (see ID# I.14 above) and the lack of clarification on the reporting for aerosols and fire protection. In the current NIR, the EU included table notes clarifying fire protection (NIR table 4.51, p.545) and aerosols/metered dose inhalers (NIR table 4.52, p.546) as recommended.
Agriculture			
A.1	3. General (agriculture) – CO <sub>2</sub> (A.1, 2020) (A.1, 2018) (A.8, 2016) (A.8, 2015) Transparency	Indicate in the NIR where in the inventory of the Netherlands indirect CO <sub>2</sub> emissions from the agriculture sector are included.	Resolved. The EU explained in annex V to its NIR (Improvements made in response to UNFCCC review findings_May2022) that the Netherlands included in its NIR (section 9.1, p.273) information on indirect CO <sub>2</sub> emissions from agriculture (mainly from non-methane volatile organic compounds from pesticides). These emissions were accounted for in the IPPU sector under 2.G.4 Other product manufacture and use.
A.2	3.A.1 Cattle – CH <sub>4</sub> (A.5, 2020) (A.5, 2018) (A.11, 2016) (A.11, 2015) Transparency	Work with the Netherlands to include the Party’s milk yield for dairy cattle in the NIR of the EU, as is the case for all other member States.	Not resolved. The Party reported on category 3.A.1.1 in its NIR (p.584) that the Netherlands does not report milk yield for dairy cattle in its CRF tables but links to websites where such data are available.  In response to a question from the ERT, the EU clarified that the NIR (figure 5.15 and table 5.10, p.584) does not contain this information and that table 5.10 should include the comment “except for the Netherlands”.  The ERT considers that the recommendation has not yet been addressed and that the EU needs to continue working closely with the Netherlands to identify potential sources of data on milk yield, which are available for all other member States, Iceland and the United Kingdom.
A.3	3.A.1 Cattle – CH <sub>4</sub> (A.6, 2020) (A.15,2018) Transparency	Consider the share of each member State’s contribution to the total dairy cattle population of the EU and the CH <sub>4</sub> IEF of each member State to determine the factors driving the average CH <sub>4</sub> IEF for dairy cattle of the EU, and report on those factors in the NIR.	Resolved. The EU included table 5.13 in the NIR (p.587), which provides information on the change in dairy cattle population and dairy cattle IEFs from 1990 to 2020, for each member State, Iceland and the United Kingdom and their share in the average CH <sub>4</sub> IEF of the EU. The data in NIR table 5.13 are sorted in accordance with share of the EU dairy cattle population in 2020.

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A.4	3.A.2 Sheep –CH <sub>4</sub> (A.7, 2020) (A.17, 2018) Transparency	Report accurately in the NIR the method and CH <sub>4</sub> EF used by Denmark to estimate CH <sub>4</sub> emissions from sheep.	<p>The ERT notes that the 2021 NIR of the EU (figures 5.9–5.10) already identified the decrease in animal numbers as the main driver for the decrease of CH<sub>4</sub> emissions from category 3.A Enteric fermentation.</p> <p>Resolved. The EU reported in table 5.6 of its NIR (p.576) the contribution of emissions from each member State, Iceland and the United Kingdom to the total EU emissions reported under the Kyoto Protocol, as well as information on the method and EF used for estimating CH<sub>4</sub> emissions. The table indicates that Denmark follows a tier 2 method and uses a default EF for CH<sub>4</sub> emissions from sheep, and the ERT confirmed that this reporting is consistent with the reporting in Denmark’s NIR (table 5.2, p.399).</p>
A.5	3.B Manure management – N <sub>2</sub> O (A.11, 2020) (A.21,2018) Completeness	Work with the United Kingdom to clarify the use of “NE” to report direct N <sub>2</sub> O emissions from manure management for composting systems, or replace “NE” with “NO” if these emissions do not occur, always reporting in the NIR the rationale for using this notation key.	<p>Addressing. In its NIR (annex V), the EU states that the United Kingdom explained in its NIR (p.366) that it reported “NE” for direct N<sub>2</sub>O emissions from manure management for composting systems owing to the current lack of AD, material characterization and EFs. Emissions from composting and subsequent land application of livestock manures are currently not estimated in the United Kingdom owing to a lack of AD: it is not a widespread practice and, to date, the United Kingdom farm survey has not identified any AD for use in the inventory.</p> <p>In response to a question by the ERT on whether the EU or the United Kingdom have any information regarding the level of significance of the emissions from this source, the EU clarified that there is no information additional to that already reported but, considering that reviews of the United Kingdom’s submissions did not identify any issue of completeness related to this issue and no issues of incompleteness have been reported by the Party to the EU, it can be assumed that these emissions are below the significance threshold. The ERT agrees that any potential underestimation of emissions would be likely below the significance threshold for application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11 and therefore not included in the list of potential problems and further questions raised.</p> <p>The EU informed the ERT that the United Kingdom will not be part of the EU’s 2023 submission. Therefore, the current ERT notes for the sake of the next ERT that this issue will not be relevant for coming submissions.</p>
A.6	3.B Manure management – N <sub>2</sub> O (A.18, 2020) Convention reporting adherence	Correctly report in the NIR the methodology used by the Netherlands to estimate N <sub>2</sub> O emissions from manure management for cattle and swine.	Resolved. The EU reported in its NIR information on N <sub>2</sub> O emissions from category 3.B Manure management, in particular in NIR tables 5.30 (p.612) and 5.31 (p.614), which also provide information on the methods and EFs reported under this category by the Netherlands for cattle and swine, respectively. The methods and EFs used for both animal types are correctly reported as tier 1 and country-specific, respectively.
A.7	3.B.3 Swine – CH <sub>4</sub> (A.12, 2020) (A.11, 2018) (A.16, 2016) (A.16, 2015) Accuracy	Work with Cyprus, Czechia, Greece and Slovakia to move to a higher-tier method to estimate CH <sub>4</sub> emissions from manure management for swine.	Addressing. The EU reported in its NIR (table 5.18, p.596) that Cyprus, Czechia and Slovakia now use a tier 2 method to report CH <sub>4</sub> emissions from manure management from swine. However, the EU explained during the review that it is still working with Greece so that this member State can apply a tier 2 method for the next submission,



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A.8	3.D.a.2 Organic nitrogen fertilizers – N <sub>2</sub> O (A.14, 2020) (A.23, 2018) Transparency	Work with Croatia and Iceland to estimate and report direct N <sub>2</sub> O emissions from other organic fertilizers applied to soils under the agriculture sector (organic nitrogen fertilizers (3.(II).D.a.2)). If N <sub>2</sub> O emissions are determined to be insignificant, work with the countries so that they can explain the use of “NE” to report these emissions in their NIRs, in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	noting that Greece is already providing an estimate of these emissions using a tier 1 method (2022 NIR of Greece, p.315).  Resolved. The EU reported in annex V to its NIR that Iceland has been reporting emissions from other organic fertilizers applied to soils since 2021, as reported by Iceland in its 2021 NIR (p.171).  Regarding Croatia, the EU explained to the ERT that this member State reported “NE” in CRF table 3.D and that Croatia stated in its 2022 NIR (p.197) that AD for other organic fertilizer applied to soils are not yet available.  However, the ERT noted that Croatia’s 2022 NIR (p.198) provided an example for 2019 (as requested by the ERT for Croatia’s 2021 NIR) showing that emissions from this subcategory are below the threshold of significance (0.0053 kt N <sub>2</sub> O).
A.9	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N <sub>2</sub> O (A.16, 2020) (A.12, 2018) (A.7, 2016) (A.7, 2015) (92, 2014) Transparency	Work with member States to ensure more consistent reporting of the area of organic soils between the agriculture and LULUCF sectors.	Resolved. The EU provided in its NIR (pp.754–755) an overview of the checks that were implemented on the data submitted by its member States, Iceland and the United Kingdom, including checks to verify the consistency of their reporting on LULUCF, KP-LULUCF and agriculture, specifically of land areas under histosols. The EU explained that the only reason for larger areas of organic soils reported in the LULUCF sector for cropland and grassland (categories 4.B and 4.C) compared with the agriculture sector (CRF table 3.D) is that organic soil areas reported under category 4.C include non-cultivated areas (irrespective of whether these areas are considered managed or unmanaged) and are not included in the calculation of N <sub>2</sub> O emissions for the agriculture sector. In addition, in its NIR (section 6.4.2, p. 755) the EU uses new language to refer to QA/QC for organic soils, namely “organic soils for non-cultivated grassland” instead of “organic soils for unmanaged grassland”, following an observation made by previous ERTs. The ERT noted that the new definition enables the EU to check the consistency of reporting on areas of organic soils across sectors, and identify the reason for larger organic soil areas being reported under the LULUCF sector (categories 4.B and 4.C) compared with the agriculture sector (CRF table 3.D). See also ID# A.12 in table 5.
A.10	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N <sub>2</sub> O (A.19, 2020) Transparency	Include information on the assumptions and criteria used by Germany, Iceland, Ireland and the Netherlands to estimate emissions for category 3.D.a.6 (cultivation of organic soils) in the next NIR and clearly explain how the IEF was derived for the EU.	Resolved. In the NIR (table 5.50, p.641) the EU listed the N <sub>2</sub> O IEFs for category 3.D.a.6 Cultivation of organic soils for all member States and explained those which are lower than the range of the IPCC default values for Germany, Iceland, Ireland and the Netherlands. Emissions reported by these four countries account for 27 per cent of total emissions under this source category for the whole EU. Germany used an average country-specific N <sub>2</sub> O EF (6.16 kg N <sub>2</sub> O-N/ha), derived by aggregating regional estimates of EFs. Ireland, which used an EF of 4.30 kg N <sub>2</sub> O-N/ha, estimated emissions from drainage/management of organic soils using the area of drained/managed organic soils, and also estimated emissions and removals for category 4.C Grasslands using an EF for nutrient-poor grasslands derived from table 2.5 of the Wetlands Supplement.

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LULUCF			Iceland used a country-specific EF of 0.55 kg N <sub>2</sub> O-N/ha derived from direct measurements from organic and volcanic soils in the country. The Netherlands, using an EF of 4.45 kg N <sub>2</sub> O-N/ha, adopted a tier 1 approach, together with the IPCC default EFs for temperate and boreal organic nutrient-rich (0.6 kg N <sub>2</sub> O-N/ha) and nutrient-poor forest soils (0.1 kg N <sub>2</sub> O-N/ha) from the 2006 IPCC Guidelines (vol. 4, chap. 11, table 11.1). The NIR of the EU (table 5.50) provides the IEF for the EU as a whole for cultivation of organic soils (6.79 kg N <sub>2</sub> O-N/ha for 1990 and 6.65 kg N <sub>2</sub> O-N/ha for 2020). The IEFs for the EU were calculated by dividing the N <sub>2</sub> O emissions of member States, Iceland and the United Kingdom, expressed as kg N <sub>2</sub> O-N, by the area of organic soils reported. (For 2020, the N <sub>2</sub> O emissions reported were 32,448,218 kg N <sub>2</sub> O-N and the area of organic soils reported was 4,604,704 ha/year.)
L.1	4. General (LULUCF) (L.4, 2020) (L.4, 2018) (L.16, 2016) (L.15, 2015) Convention reporting adherence	Correct the inconsistencies in the reported areas in CRF tables 4.1 and 4.A–4.F.	Addressing. The Party reported in its NIR (p.754, regarding QA/QC, and pp.757–758, regarding improvements and plans) that the areas reported in CRF tables 4.1 and 4.A–4.F are now rather similar, although small inconsistencies remain. In its NIR (p.757) the EU mentioned that it has been working with its member States over recent years in order to address inconsistencies in CRF tables and that, as a result of this, in the current submission the area differences reported in those tables for any of the land-use categories are less than 10 kha and, in most cases, less than 1 kha. In addition, the EU included information in its NIR (p.757 and p.754-755) indicating that Estonia received a different recommendation from its ERT on how to report areas across CRF tables 4.1 and 4.A–4.F. This led to an inconsistent reporting in the tables that was directly translated into the EU GHG inventory, therefore preventing the full implementation of the recommendation made by the ERT. The ERT notes that the size of these differences has an insignificant impact in the EU inventory for reporting under the Kyoto Protocol in terms of emissions and removals. In its NIR (section 6.4.4.2, p.758), under planned improvements, the EU stated that it will continue to follow up these matters with individual member States to further reduce the small remaining differences in areas reported in CRF tables 4.1 and 4.A–4.F in future submissions. The ERT notes that, to resolve this issue at the EU level, the ERTs of member States' inventory submissions should have the same approach and provide recommendations in a consistent manner during the individual reviews. At the same time, the ERT notes that the EU should continue working with member States, with the objective of reducing the small differences that remain.
L.2	4. General (LULUCF) – CO <sub>2</sub> (L.5, 2020) (L.5, 2018) (L.12, 2016) (L.12, 2015) Comparability	Use the notation key “NA” to report carbon stock changes from carbon pools where carbon stock changes are neutral (i.e. where net emissions are equal to net removals).	Resolved. The ERT noted that the EU has followed the recommendation of the previous ERT to request member States, Iceland and the United Kingdom to report “NA” for carbon pools that are considered in balance or equilibrium (NIR, p.757). The ERT also noted that member States have agreed to use this notation key except those that had received a different recommendation from the ERT for the review of the specific countries' NIR and had thus changed their submissions accordingly.

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			The ERT notes that the reviewers of submissions from member States should consider this recommendation in a consistent manner in their reviews and that the secretariat should provide this information to those lead reviewers and ERTs conducting those reviews for future submissions.
L.3	4.A.2.2 Grassland converted to forest land – CO <sub>2</sub> (L.11, 2020) Consistency	Improve transparency by explaining any significant issues related to time-series consistency for this category in the NIR.	Resolved. The EU has improved the transparency of the inventory with the addition of further information on trends of the categories in the relevant sections of the LULUCF chapter of the NIR. The EU reported in its NIR (section 6.4.4.1, p.758) that Romania has recalculated its inventory ensuring the consistency of the time series and enhancing the information on AD by including spatially explicit data. Further details are also provided in section 6.5 of the NIR of the EU. With this improvement the inconsistency identified by the previous ERT has been corrected and the accuracy of the inventory has been enhanced.
L.4	4.B.2 Land converted to cropland – CO <sub>2</sub> (L.8, 2020) (L.10, 2018) (L.7, 2016) (L.7, 2015) (100, 2014) (81, 2013) (92, 2012) Accuracy	Work with the member States to improve the completeness of their reporting and use higher-tier methods in order to enhance accuracy.	Addressing. The Party reported in its NIR (p.712) that in order to follow this recommendation, which specifically mentioned Luxembourg and Italy, it has followed the reporting of this category by those member States. Estimates of carbon stock changes for living biomass and soil organic carbon that result from the conversion of land into cropland were made using country-specific information for the most important parameters. For instance, Luxembourg uses information on soil organic carbon from projects “Mapping Topsoil Organic Carbon Content in the Grand-Duchy of Luxembourg” and “Mapping Topsoil Organic Carbon Stocks in the Grand-Duchy of Luxembourg”, and Italy uses information from the LIFE project, MEDINET (Mediterranean Network for Reporting Emissions and Removals in Cropland and Grassland), which was carried out in Italy and other countries in the Mediterranean basin.  The ERT noted, however, that in Italy’s 2022 NIR (table 6.2, p.253), land converted to cropland is a key category according to the trend assessment under approach 2.  The ERT considers that the recommendation made by the 2014 ERT has not yet been fully addressed because Italy still estimates emissions and removals for this subcategory using a tier 1 approach for above-ground biomass and soil organic matter. The ERT is of the view that a tier 2 approach should have been used.  In its comments to the draft review report, the EU stated that it will continue working with its member States to improve the accuracy of the methods used to estimate emissions and removals in the LULUCF sector.
	Waste		
W.1	5.B Biological treatment of solid waste – CH <sub>4</sub> (W.1, 2020) (W.2, 2018) Transparency	Improve the transparency of the NIR by including more detailed information in NIR table 7.13 on the drivers of significant recalculations.	Resolved. The EU included explanations for all significant recalculations for this category in table 7.10 of its NIR (pp.802–805).

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KP-LULUCF			
KL.1	General (KP-LULUCF) (KL.1, 2020) (KL.2, 2018) (KL.1, 2016) (KL.1, 2015) (121, 2014) Comparability	Work with and support member States to improve consistency in the use of notation keys and further improve the transparency of future submissions.	Addressing. The NIR (p.859) provides transparent information on how the EU is seeking to improve consistency in the use of notation keys among countries but recognizes that some differences still remain across submissions. One of the reasons for these differences, as also noted during the review, is that a different recommendation might have been made by an ERT for a specific member State on the notation key to be used by that country. See also ID# L.2 above.
KL.2	General (KP-LULUCF) (KL. 2, 2020) (KL.4, 2018) (KL.1, 2016) (KL.7, 2015) Convention reporting adherence	Correct the error found in the aggregation process of member States' inventories to ensure the consistency of information of the EU and its member States.	Addressing. In its NIR (p.873) the EU indicated that it has been working with its member States, Iceland and the United Kingdom in recent years to ensure consistency of information between the submission of the EU and individual submissions. The Party explained that any inconsistency detected as part of the QA/QC process is tracked with the member States and explanations requested. This led to significant improvements as reported in section 11.3.6 of the NIR. As a result, the differences in areas have been reduced in the 2022 submission: most of them are now under 1 kha. Therefore, the EU claimed that any divergences have an insignificant impact in the EU inventory for reporting under the Kyoto Protocol in terms of emissions and removals. However, the ERT found that some inconsistencies remain. For instance, the data reported in CRF table NIR-2 for CM and grassland management are not consistent with those reported in CRF table 4(KP.I)B.2 (i.e. 53,252.60 kha in CRF table NIR-2 and 53,185.77 kha in CRF table 4(KP.I)B.2) and CRF table 4(KP.I)B.3 (i.e. 31,378.24 kha in CRF table NIR-2 and 31,306.96 kha in CRF table 4(KP.I)B.3), for the same categories. Also, the area reported under CRF table NIR-2 for AR (10,220.94 kha) is not consistent with the figure provided in CRF table 4(KP.I)A.1 (10,221.14 kha).
KL.3	General (KP-LULUCF) (KL.3, 2020) (KL.5, 2018) (KL.7, 2016) (KL.7, 2015) Transparency	Ensure that issues identified during the aggregation process, which affect the accuracy and completeness of the submission, are resolved.	Addressing. See ID# KL.2 above.
KL.4	Article 3.4 activities – CO <sub>2</sub> (KL.4, 2020) (KL.10, 2018) (KL.11, 2016) (KL.11, 2015) Completeness	Work with the United Kingdom to estimate the net carbon stock changes in the litter and deadwood pools under CM and GM and CO <sub>2</sub> emissions/removals from WDR.	Addressing. Although the EU included in table 11.17 of the NIR (p.873) the information provided by the United Kingdom in its inventory to demonstrate that deadwood and litter are not a net source of emissions, and hence that the country does not need to estimate the net carbon stock changes for these pools under CM and GM, the ERT noted that the United Kingdom is using the tier 1 assumption that the pools are in equilibrium and hence not a net source. However, CM and GM are key categories for the United Kingdom and hence using a tier 1 assumption is not appropriate and the explanation provided in the NIR of the EU does not represent transparent and verifiable information that the pools are not sources.  The ERT therefore considers that the previous recommendation has not yet been resolved. However, the ERT acknowledges that changes in estimates of emissions and

ID#	Issue/problem classification <sup>a, b</sup>	Recommendation from previous review report	ERT assessment and rationale
KL.5	FM – CO <sub>2</sub> (KL.6, 2020) (KL.14, 2018) (KL.15, 2016) (KL.15, 2015) Transparency	Provide in the NIR and in CRF table 4(KP-1)B.1.1, as appropriate, accurate information on the value of the FMRL inscribed in the appendix to the annex to decision 2/CMP.7 and the value of the technical correction for the EU as a whole and for each of the member States plus Iceland, in accordance with the requirements of decision 2/CMP.8, annex II, paragraph 5(f), and taking into consideration the changes made in the coverage of the FMRL.	<p>removals are likely to be minor given the level of the threshold for insignificance for the EU and therefore not included the issue in the list of potential problems and further questions raised.</p> <p>Regarding WDR, the United Kingdom provided sufficient information, which the EU included in the relevant sections of its annual submission.</p> <p>Resolved. The EU provided in table 11.22 of the NIR (p.886) a summary of information related to the construction of the FMRL values as reported by member States, Iceland and the United Kingdom. The value for the EU as a whole is also provided (-306,736 kt CO<sub>2</sub> eq/year), which is consistent with the value of the FMRL inscribed in the appendix to the annex to decision 2/CMP.7 (first order decay function for harvested wood products). The EU also reported information on accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Table 11.22 of the NIR also provides the individual technical corrections applied by member States, Iceland and the United Kingdom.</p> <p>The ERT noted that in table 11.22 the technical correction for Cyprus is indicated as “NA” because the country had not included information on its technical correction to the FMRL in its 2022 NIR. However, Cyprus resubmitted its 2022 NIR on 9 September 2022, including a technical correction, and that value is reported in the resubmission made by the EU (table 4 in the annex to the NIR: “Accompanying_Note_2022_EU_GHGI_KP-LULUCF”) submitted on 2 December 2022.</p>
KL.6	FM – CO <sub>2</sub> (KL.7, 2020) (KL.15, 2018) (KL.16, 2016) (KL.16, 2015) Transparency	Provide transparent information on the background level of emissions associated with natural disturbances included in the FMRL of the EU and work with member States, in particular those that apply the Joint Research Centre’s approach, in order to improve consistency between the FMRL and the reporting of FM in relation to the treatment of natural disturbances, and to calculate a technical correction where required.	<p>Addressing. The ERT noted the efforts made by the EU in addressing this issue, as reported in its NIR; in particular the work carried out in collaboration with member States, Iceland and the United Kingdom to improve the consistency between the FMRL and the reporting and accounting on the activity FM. The ERT also noted that in table 11.24 of the NIR (p.893), the EU reported information on background levels of emissions and the margin associated with natural disturbances for 17 member States and also for Iceland and the United Kingdom. However, the ERT considers that the previous recommendation has not been fully addressed because the EU did not provide the background level of emissions associated with natural disturbances for its FMRL in the NIR. The ERT considers that the lack of transparency on this mandatory requirement does not impact the Party’s ability to fulfil its commitments for the second commitment period and the issue was therefore not included in the list of potential problems and further questions raised.</p>

<sup>a</sup> 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.

<sup>b</sup> The report on the review of the 2021 annual submission of the EU was not available at the time of this review. Therefore, the recommendations reflected in this table are taken from the 2020 annual review report. For the same reason, 2021, 2019 and 2017 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 EU, and had not been addressed by the Party by 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 European Union

<i>ID#</i>	<i>Previous recommendation for issue</i>	<i>Number of successive reviews issue not addressed<sup>a</sup></i>
<b>General</b>		
G.1	Include in the NIR transparent information on the use of confidential data, including from which key category analysis such data have been excluded.	3 (2018–2022)
G4	Ensure that annex III to the NIR, which includes summaries of the descriptions of the methodologies used by member States for the estimation of EU key categories, reflects the latest submissions of member States and is coherent with the information in the NIR and CRF tables.	3 (2018–2022)
<b>Energy</b>		
E.1	Present methodological summaries that are consistent among member States and categories, at least for the key categories.	5 (2014–2022)
E.2	Provide information in the NIR on the fuel combustion categories under which the emissions from the combustion of CH <sub>4</sub> recovered are included.	4 (2015/2016–2022)
<b>IPPU</b>		
I.7	Include in the NIR the reasons why CO <sub>2</sub> emissions from fuel consumption in ethylene production in France were allocated to the energy sector and work with the member State to allocate CO <sub>2</sub> emissions from fuel use in ethylene production to the IPPU sector, under petrochemical and carbon black production, in accordance with the 2006 IPCC Guidelines.	4 (2015/2016–2022)
I.14	Use the correct notation key to report HFC emissions from aerosols for the Netherlands in NIR table 4.44 and CRF table 2(II)B-Hs2, that is, “IE” rather than “NO” and include information in the NIR as to where these emissions have been allocated.	3 (2018–2022)
<b>Agriculture</b>		
A.2	Work with the Netherlands to include the Party’s milk yield for dairy cattle in the NIR of the EU, as is the case for all other member States.	4 (2015/2016–2022)
A.5	Work with the United Kingdom to clarify the use of “NE” to report direct N <sub>2</sub> O emissions from manure management for composting systems, or replace “NE” with “NO” if these emissions do not occur, always reporting in the NIR the rationale for using this notation key.	3 (2018–2022)

<i>ID#</i>	<i>Previous recommendation for issue</i>	<i>Number of successive reviews issue not addressed<sup>a</sup></i>
A.7	Work with Cyprus, Czechia, Greece and Slovakia to move to a higher-tier method to estimate CH <sub>4</sub> emissions from manure management for swine.	4 (2015/2016–2022)
LULUCF		
L.1	Correct the inconsistencies in the reported areas in CRF tables 4.1 and 4.A–4.F.	4 (2015/2016–2022)
L.4	Work with the member States to improve the completeness of their reporting and use higher-tier methods in order to enhance accuracy.	7 (2012–2022)
Waste	No issues identified.	
KP-LULUCF		
KL.1	Work with and support member States to improve consistency in the use of notation keys and further improve the transparency of future submissions.	5 (2014–2022)
KL.2	Correct the error found in the aggregation process of member States' inventories to ensure the consistency of information of the EU and its member States.	4 (2015/2016–2022)
KL.3	Ensure that issues identified during the aggregation process, which affect the accuracy and completeness of the submission, are resolved.	4 (2015/2016–2022)
KL.4	Work with the United Kingdom to estimate the net carbon stock changes in the litter and deadwood pools under CM and GM and CO <sub>2</sub> emissions/removals from WDR.	4 (2015/2016–2022)
KL.6	Provide transparent information on the background level of emissions associated with natural disturbances included in the FMRL of the EU and work with member States, in particular those that apply the Joint Research Centre's approach, in order to improve consistency between the FMRL and the reporting of FM in relation to the treatment of natural disturbances, and to calculate a technical correction where required.	4 (2015/2016–2022)

<sup>a</sup> Reports on the reviews of the 2017, 2019 and 2021 annual submissions of the EU have not been published. Therefore, 2017, 2019 and 2021 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 EU 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 European Union

<i>ID#</i>	<i>Finding classification</i>	<i>Description of finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?<sup>a</sup></i>
General			
G.6	Annual submission	The ERT noted that total emissions and removals reported by the EU in its revised submission (2 December 2022) match the sum of emissions and removals reported by individual member States, Iceland and the United Kingdom in their respective individual submissions. Additionally, the ERT noted that the CPR was correctly calculated.	Not an issue/problem
G.7	QA/QC and verification	<p>During the review, the Party explained that an additional QA/QC check had been introduced to address the previous recommendation (see ID# G.4 in table 3) to ensure that annex III to the NIR reflects the latest submissions of member States, Iceland and the United Kingdom and that it is coherent with the information in the NIR and CRF tables.</p> <p>The ERT encourages the Party to provide in its next NIR in the section on QA/QC of the EU inventory information on the newly introduced QA/QC checks regarding the data provided in annex III of the NIR based on the latest submissions of member States, Iceland and the United Kingdom.</p>	Not an issue/problem
G.8	Key category analysis	<p>The Party reported in its NIR (table 1.12, p.48), CRF table 7 and in the updated annex submitted on 2 December 2022 (EU-KP_KCA_EUCDec2022.xlsx) the results of the key category analyses for the 2022 submission. However, the ERT found that the key category analyses had not been conducted in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 4), and the Party agreed with this finding (see ID# G.3 in table 3). The ERT considers that the presentation of the results of the key category analyses in annex I to the NIR is not sufficiently transparent for it to assess whether the analyses have been conducted in accordance with the 2006 IPCC Guidelines.</p> <p>The ERT recommends that the Party report in annex I to its NIR the results of the key category analyses in three separate tables in addition to the summary table currently presented, namely (1) approach 1 level assessment for 1990, (2) approach 1 level assessment for the latest inventory year and (3) approach 1 trend assessment, following the example presented in the 2006 IPCC Guidelines (vol. 1, chap. 4, tables 4.5–4.6).</p>	Yes. Transparency
G.9	Uncertainty analysis	<p>The Party reported in its NIR (section 1.6, pp.50–54) that, in response to previous recommendations, it has implemented an updated method (tier 1) to adequately account for uncertainty values. This methodology included the assumption that for countries using a mix of default and country-specific EFs, errors are partially correlated (<math>r = 0.5</math>). However, the ERT noted that there is no explanation on why this correlation coefficient is fixed at 0.5 for the uncertainty analysis. The ERT noted that this is not in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 1, p.1.7) because this assumption affects the clarity of the analysis carried out to estimate the uncertainty of the GHG inventory.</p> <p>During the review, the Party clarified that the value of <math>r</math> is not applied as a limit or fixed value, but is used for comparing different uncertainty scenarios given that, previously, uncertainties were compiled assuming full (<math>r = 1</math>)</p>	Yes. Transparency



ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? <sup>a</sup>
		<p>or no (<math>r = 0</math>) correlation in errors depending on the EFs used by the member States, Iceland and the United Kingdom. The Party also explained that this approach represents an improvement of the uncertainty estimation that targeted consistency between emission values and assumptions made by member States, such as the use of country-specific EFs.</p> <p>The ERT commends the Party for this improvement and, in order to increase the transparency of reporting, recommends that the Party include in the NIR the assumptions used and scenarios evaluated for the uncertainty estimation using a hybrid approach that considers the effect of the country-specific EFs on overall emissions from member States, Iceland and the United Kingdom.</p>	
G.10	Uncertainty analysis	<p>The Party reported in its NIR (section 1.6, table 1.15, p.54) the uncertainty estimates by sector. Additionally, in the resubmission of 2 December 2022 it provided updated uncertainty estimations (annex UncertaintyTables_NIR2022_EUCDec2022.xlsx), which showed a significant increase in the uncertainty estimation for the LULUCF sector: from 23.7 per cent by level and 9.8 per cent by trend in the May submission to 53.2 per cent by level and 61.1 per cent by trend in the December resubmission, respectively. The ERT noted that this was not transparently explained in the resubmission, and this lack of explanation affects the transparency of the reporting.</p> <p>During the review, the Party clarified that it identified an error in the routine for estimating uncertainty after it had made its submission in May 2022. This error was found in the uncertainty estimates for removals in the LULUCF sector. This error was corrected and the updated results were provided to the ERT in the resubmission of 2 December 2022.</p> <p>The ERT recommends that the Party update the uncertainty estimates for removals in the LULUCF sector in the NIR and report the correct values if there are any resubmissions of the NIR.</p>	Yes. Convention reporting adherence
	Energy	No findings for the energy sector additional to those included in table 3 were made by the ERT during the review.	
	IPPU	No findings for the IPPU sector additional to those included in table 3 were made by the ERT during the review.	
	Agriculture		
A.11	3.B.2 Sheep – CH <sub>4</sub>	<p>The previous ERT (see FCCC/2020/ARR/EU, ID# A.7) noted that Denmark reported that it used a default EF for estimating CH<sub>4</sub> emissions from sheep for category 3.A.2. The EU continues to report “T2/D” for Denmark in table 5.6 (p. 576). However, when assessing the IEF reported by Denmark in CRF table 3.As1 of its 2022 submission, namely 6.71 kg CH<sub>4</sub>/head/year, the ERT noted that this value does not correspond with the default EF provided in the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.10), which is 8 kg CH<sub>4</sub>/head/year. This issue is also related to issue ID# A.4 raised during the 2018 review. The ERT recommends that the EU work closely with Denmark to correct the reference to the EF used for sheep (i.e. from ‘D’ to ‘CS’ in table 5.6 in the NIR of the EU).</p>	Yes. Transparency
A.12	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N <sub>2</sub> O	<p>The ERT noted that, in response to a recommendation made by the previous ERT regarding the consistency of the area of organic soil between sectors (see ID# A.9 in table 3), the EU used new language to refer to organic soils (“organic soils for non-cultivated grassland”) used under 4.C to distinguish them from values used under 3.D. With this change, the consistency checks carried out by the EU should ultimately enable it to identify the reason for larger organic soil areas reported under the LULUCF sector (categories 4.B and 4.C) compared with its reporting under the agriculture sector (CRF table 3.D). The ERT recommends that the EU further improve the information in</p>	Yes. Transparency

<i>ID#</i>	<i>Finding classification</i>	<i>Description of finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?<sup>a</sup></i>
		the NIR on the comparison between the organic soils reported in LULUCF and the agriculture sector and provide in its next NIR an evaluation of the impact of the new formulation on the reporting of its member States by providing the areas of histosols reported in the LULUCF and agriculture sectors (e.g. in tabular format) and explaining potential inconsistencies in the data reported.	
LULUCF		No findings for the LULUCF sector additional to those included in table 3 were made by the ERT during the review.	
	Waste		
W.2	5.B Biological treatment of solid waste – CH <sub>4</sub>	During the review, the EU clarified that the definition used for insignificant recalculations is “below 0.05 per cent of the national total for the member States, Iceland and the United Kingdom”. In cases where the recalculation is insignificant, it does not question the relevant member State on this matter during the internal QA process for the annual submission of the EU.  The ERT encourages the Party to provide this definition in the NIR for all sectors.	Not an issue/problem
KP-LULUCF		No findings for KP-LULUCF additional to those included in table 3 were made by the ERT during the review.	

<sup>a</sup> 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

- The ERT did not identify the need to apply any adjustments for the 2022 annual submission of the EU.

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

- Table I.5 presents the accounting quantities for KP-LULUCF reported by the EU and the final values agreed by the ERT.

## VIII. Questions of implementation

- 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 European Union 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 EU.

Table I.1  
Total greenhouse gas emissions and removals for the European Union, base year–2020  
(kt CO<sub>2</sub> eq)

	<i>Total GHG emissions excluding indirect CO<sub>2</sub> emissions</i>		<i>Total GHG emissions and removals including indirect CO<sub>2</sub> emissions<sup>a</sup></i>		<i>Land-use change (Article 3.7 bis as contained in the Doha Amendment)<sup>b</sup></i>	<i>KP-LULUCF (Article 3.3 of the Kyoto Protocol)<sup>c</sup></i>	<i>KP-LULUCF (Article 3.4 of the Kyoto Protocol)</i>	
	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>			<i>CM, GM, RV, WDR</i>	<i>FM</i>
FMRL								–306 736.00
Base year <sup>d</sup>	5 686 627.67	5 851 276.86	5 690 944.59	5 855 593.78	5 560.49		81 604.21	
1990	5 460 847.05	5 643 377.93	5 465 163.97	5 647 694.85				
1995	5 020 441.27	5 296 163.62	5 024 048.95	5 299 771.30				
2000	4 883 774.89	5 159 580.58	4 886 732.58	5 162 538.27				
2010	4 484 660.05	4 787 559.05	4 486 940.60	4 789 839.60				
2011	4 336 192.08	4 633 438.93	4 338 356.66	4 635 603.50				
2012	4 271 532.53	4 574 986.08	4 273 603.81	4 577 057.35				
2013	4 171 523.64	4 475 905.79	4 173 447.73	4 477 829.88		–16 022.42	68 089.73	–422 916.23
2014	4 007 588.89	4 297 379.20	4 009 460.74	4 299 251.05		–18 498.50	65 146.35	–399 528.62
2015	4 046 301.90	4 327 764.25	4 048 164.72	4 329 627.07		–14 501.40	60 423.03	–385 622.52
2016	4 032 019.57	4 307 169.38	4 033 818.66	4 308 968.47		–12 823.20	58 319.58	–374 873.05
2017	4 104 426.81	4 321 494.92	4 106 213.10	4 323 281.22		–15 294.16	60 063.80	–320 911.25
2018	3 996 367.02	4 227 272.65	3 998 043.32	4 228 948.94		–12 045.03	56 504.20	–326 454.84
2019	3 837 472.66	4 052 995.12	3 839 101.20	4 054 623.66		–14 823.89	55 092.98	–311 605.40
2020	3 497 643.67	3 707 034.97	3 499 113.45	3 708 504.75		–18 601.44	55 802.45	–299 589.40

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

<sup>a</sup> The Party reported indirect CO<sub>2</sub> emissions in CRF table 6.

<sup>b</sup> 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.

<sup>c</sup> Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.

<sup>d</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O for Iceland, the United Kingdom and all member States except Bulgaria (1988), Hungary (1985–1987), Poland (1988), Romania (1989) and Slovenia (1986); 1995 for HFCs, PFCs and SF<sub>6</sub> for the United Kingdom and all member States except Austria, Croatia, France, Italy, Malta and Slovakia (1990) and Romania (1989), and 1990 for Iceland; and 1995 for NF<sub>3</sub> for Iceland, the United Kingdom and all member States except Austria, Croatia, Greece, Poland, Portugal, Romania and Slovakia (2000). CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions included for the base year do not include the emissions from deforestation that were included in the EU’s initial report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol for the base year and subsequently used for the calculation of the assigned amount. The EU has not elected any activities under Article 3, para. 4, of the Kyoto Protocol because these activities are elected by each member State, Iceland and the United Kingdom. The values reported refer to the sum of the values reported by the member States, Iceland and the United Kingdom for the activities and are for information purposes only. The base year for CM, GM, RV and WDR under Article 3, para. 4, of the Kyoto Protocol is 1990 for Iceland, the United Kingdom and member States which elected these activities except Romania, for which the base year is 1989. 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 European Union, excluding land use, land-use change and forestry, base year–2020**(kt CO<sub>2</sub> eq)

	CO <sub>2</sub> <sup>a</sup>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF <sub>6</sub>	NF <sub>3</sub>
Base year	4 634 182.19	733 375.91	394 850.88	45 183.93	23 838.33	5 919.11	13 828.76	103.28
1990	4 478 971.72	712 756.46	383 680.08	29 136.36	26 361.97	5 850.00	10 914.77	23.48
1995	4 215 606.77	655 692.48	346 687.81	43 353.29	17 338.71	5 944.08	15 048.95	99.21
2000	4 185 305.67	596 385.87	303 087.94	52 755.42	12 301.74	2 248.56	10 350.74	102.33
2010	3 960 663.21	481 029.39	238 186.51	99 003.56	4 033.85	523.23	6 280.17	119.68
2011	3 818 513.06	470 933.28	232 453.69	102 911.52	4 232.70	418.09	6 013.29	127.87
2012	3 763 300.48	466 857.26	230 286.34	105 985.95	3 598.67	807.14	6 129.26	92.25
2013	3 670 076.05	456 821.57	230 706.90	109 433.14	3 708.68	983.81	6 033.65	66.08
2014	3 494 207.32	449 154.89	234 003.49	111 955.03	3 378.94	772.15	5 709.18	70.06
2015	3 530 632.92	448 830.12	233 491.60	106 319.41	3 473.58	765.24	6 049.64	64.57
2016	3 514 743.22	442 195.76	232 982.61	108 014.85	3 869.95	779.90	6 320.70	61.49
2017	3 526 129.73	441 025.44	237 297.95	107 641.94	3 452.46	1 117.53	6 555.92	60.24
2018	3 444 350.44	434 808.81	233 861.03	103 675.50	3 614.36	1 832.92	6 737.76	68.11
2019	3 286 683.35	425 928.31	230 410.27	100 332.29	2 829.74	1 669.99	6 712.22	57.49
2020	2 962 216.18	420 081.15	227 480.07	89 351.00	2 188.17	1 604.46	5 523.55	60.17
<b>Percentage change base year–2020</b>	<b>–36.1</b>	<b>–42.7</b>	<b>–42.4</b>	<b>97.7</b>	<b>–90.8</b>	<b>–72.9</b>	<b>–60.1</b>	<b>–41.7</b>

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

<sup>a</sup> Including indirect CO<sub>2</sub> emissions as reported in CRF table 6.

Table I.3  
**Greenhouse gas emissions and removals by sector for the European Union, base year–2020**  
(kt CO<sub>2</sub> eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
Base year	4 479 180.44	592 088.90	541 820.25	–164 649.18	238 187.28	NO, NA
1990	4 326 082.87	550 033.41	533 219.68	–182 530.88	238 358.89	NO, NA
1995	4 063 919.90	524 612.73	466 917.85	–275 722.35	244 320.82	NO, NA
2000	3 996 920.40	480 806.01	457 293.71	–275 805.69	227 518.14	NO, NA
2010	3 796 287.10	407 770.31	419 824.36	–302 899.00	165 957.83	NO, NA
2011	3 652 016.52	404 665.55	418 614.04	–297 246.84	160 307.39	NO, NA
2012	3 609 948.26	393 401.73	417 796.22	–303 453.54	155 911.14	NO, NA
2013	3 510 791.51	396 415.60	420 807.45	–304 382.15	149 815.32	NO, NA
2014	3 324 192.57	403 066.64	428 227.88	–289 790.31	143 763.97	NO, NA
2015	3 365 432.16	394 178.24	429 219.22	–281 462.35	140 797.44	NO, NA
2016	3 349 230.79	391 896.97	430 334.89	–275 149.81	137 505.82	NO, NA
2017	3 352 381.21	401 044.39	433 567.91	–217 068.12	136 287.71	NO, NA
2018	3 271 248.01	393 158.14	429 709.11	–230 905.63	134 833.68	NO, NA
2019	3 113 863.15	382 378.98	425 370.00	–215 522.46	133 011.54	NO, NA
2020	2 802 045.07	351 276.45	424 622.84	–209 391.30	130 560.39	NO, NA
<b>Percentage change base year–2020</b>	<b>–37.4</b>	<b>–40.7</b>	<b>–21.6</b>	<b>27.2</b>	<b>–45.2</b>	<b>NA</b>

Note: Totals include indirect CO<sub>2</sub> 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 European Union**  
(kt CO<sub>2</sub> eq)

	<i>Article 3.7 bis as contained in the Doha Amendment<sup>a</sup></i>	<i>Activities under Article 3.3 of the Kyoto Protocol</i>		<i>FM and elected activities under Article 3.4 of the Kyoto Protocol</i>				
	<i>Land-use change</i>	<i>AR</i>	<i>Deforestation</i>	<i>FM</i>	<i>CM</i>	<i>GM</i>	<i>RV</i>	<i>WDR</i>
FMRL				–306 736.00				
Technical correction				18 789.95				
Base year <sup>b</sup>	5 560.49				38 733.56	44 554.31	–1 970.10	286.44
2013		–48 892.62	32 870.20	–422 916.23	34 526.67	34 560.60	–1 223.13	225.58
2014		–50 702.40	32 203.89	–399 528.62	33 552.84	32 598.34	–1 230.21	225.38
2015		–50 161.08	35 659.67	–385 622.52	29 392.08	32 043.22	–1 236.97	224.69

	Article 3.7 bis as contained in the Doha Amendment <sup>a</sup>	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
2016		-51 090.14	38 266.94	-374 873.05	26 204.13	33 133.02	-1 240.95	223.38
2017		-48 312.19	33 018.03	-320 911.25	26 668.60	34 427.57	-1 255.40	223.03
2018		-47 201.36	35 156.33	-326 454.84	25 899.51	31 663.38	-1 269.41	210.71
2019		-49 836.97	35 013.08	-311 605.40	25 082.60	31 075.89	-1 275.86	210.36
2020		-52 080.49	33 479.05	-299 589.40	26 032.55	30 849.11	-1 283.80	204.59
<b>Percentage change base year–2019</b>					<b>-32.8</b>	<b>-30.8</b>	<b>-34.8</b>	<b>-28.6</b>

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

<sup>a</sup> The value reported in this column relates to 1990.

<sup>b</sup> The EU has not elected any activities under Article 3, para. 4, of the Kyoto Protocol because these activities are elected by each member State, Iceland and the United Kingdom. The values reported refer to the sum of the values reported by member States, Iceland and the United Kingdom for these activities and are for information purposes only. The base year for CM, GM, RV and WDR under Article 3, para. 4, of the Kyoto Protocol is 1990 for Iceland, the United Kingdom and member States which elected these activities except Romania, for which the base year is 1989. 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.

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 European Union**

(kt CO<sub>2</sub> eq)

GHG source/ sink activity	Base year <sup>b</sup>	Net emissions/removals									Accounting parameters	Accounting quantities <sup>a</sup>
		2013	2014	2015	2016	2017	2018	2019	2020	Total <sup>c</sup>		
A.1. AR		-48 892.621	-50 702.396	-50 161.075	-51 090.140	-48 312.191	-47 201.356	-49 836.970	-52 080.494	-398 277.244		-398 277.244
Excluded emissions from natural disturbances <sup>d</sup>		NA, NO	NA, NO	NA, NO	NA, NO	NA, NE, NO	NA, NO	NA, NO	NA, NO	NO, NE, NA		NO, NE, NA
Excluded subsequent removals from land subject to natural disturbances		IE, NA, NO	IE, NA, NO	IE, NA, NO	IE, NA, NO	IE, NA, NE, NO	IE, NA, NO	IE, NA, NO	IE, NA, NO	NO, NE, IE, NA		NO, NE, IE, NA
A.2. Deforestation		32 870.197	32 203.894	35 659.673	38 266.942	33 018.031	35 156.331	35 013.085	33 479.050	275 667.203		275 667.203
B.1. FM										-2 841 501.315		-537 932.930

GHG source/ sink activity	Net emissions/removals										Accounting parameters	Accounting quantities <sup>a</sup>
	Base year <sup>b</sup>	2013	2014	2015	2016	2017	2018	2019	2020	Total <sup>c</sup>		
Net emissions/removals		-422 916.232	-399 528.624	-385 622.515	-374 873.047	-320 911.252	-326 454.842	-311 605.403	-299 589.399	-2 841 501.315		
Excluded emissions from natural disturbances		NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NO, NE, NA		NO, NE, NA
Excluded subsequent removals from land subject to natural disturbances		NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NO, NA		NO, NA
Any debits from newly established forest		IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	IE, NA, NE, NO	NA, NE, NO	NO, NE, IE, NA		NO, NE, IE, NA
FMRL <sup>e</sup>											-306 736.000	
Technical corrections to FMRL											18 789.952	
FM cap											1 643 636.750	-537 932.930
B.2. CM (if elected)	38 733.560	34 526.674	33 552.837	29 392.082	26 204.135	26 668.600	25 899.508	25 082.599	26 032.552	227 358.988		-82 509.494
B.3. GM (if elected)	44 554.306	34 560.597	32 598.337	32 043.225	33 133.016	34 427.572	31 663.385	31 075.888	30 849.108	260 351.128		-96 083.319
B.4. RV (if elected)	-1 970.097	-1 223.125	-1 230.210	-1 236.967	-1 240.953	-1 255.398	-1 269.410	-1 275.863	-1 283.801	-10 015.727		5 745.049
B.5. WDR (if elected)	286.436	225.579	225.383	224.687	223.377	223.026	210.714	210.357	204.591	1 747.715		-543.776

<sup>a</sup> The accounting quantity is the total quantity of units to be issued or cancelled for a particular activity

<sup>b</sup> 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. The EU has not elected any activities under Article 3, para. 4, of the Kyoto Protocol because these activities are elected by each member State, Iceland and the United Kingdom. The values reported refer to the sum of the values reported by member States, Iceland and the United Kingdom for these activities and are for information purposes only.

<sup>c</sup> Cumulative net emissions and removals for all years of the commitment period reported in the annual submission under review. The EU will neither issue nor cancel units based on the reported emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The EU indicated in the NIR (chap. 12) that the values reported in the CRF accounting table, representing the sum cumulative accounting quantities of member States, Iceland and the United Kingdom (excluding FM) for these activities, were for information purposes only. Additionally, it explains that member States, Iceland and the United Kingdom account individually for emissions by sources and removals by sinks from Kyoto LULUCF activities and

individually decide on accounting modalities and elections where foreseen under the Kyoto Protocol. Any issuance of RMUs or cancellation of units resulting from the accounting under Articles 3(3) and (4) would be made to the Kyoto Protocol register of member States, Iceland and the United Kingdom.

<sup>d</sup> The Party indicated that it is excluding emissions from natural disturbances at the end of the commitment period.

<sup>e</sup> As inscribed in the appendix to the annex to decision 2/CMP.7 in kt CO<sub>2</sub> eq per year.



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

Table I.6

**Key relevant data for the European Union under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2022 annual submission**

<i>Parameter</i>	<i>Data values</i>
Periodicity of accounting	(a) AR: commitment period accounting for all member States except Denmark and Hungary (b) Deforestation: commitment period accounting for all member States except Denmark and Hungary (c) FM: commitment period accounting for all member States except Denmark and Hungary (d) CM: elected by Denmark, Germany, Ireland, Italy, Portugal, Spain and the United Kingdom, with commitment period accounting for all indicated member States except Denmark (e) GM: elected by Denmark, Germany, Ireland, Italy, Portugal and the United Kingdom, with commitment period accounting for all indicated member States except Denmark (f) RV: elected by Romania and Iceland, with commitment period accounting for both member States (g) WDR: elected by the United Kingdom, with commitment period accounting
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	The EU has not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol because these activities are elected by each member State, Iceland and the United Kingdom as follows: (a) CM: elected by Denmark, Germany, Ireland, Italy, Portugal, Spain and the United Kingdom; (b) GM: elected by Denmark, Germany, Ireland, Italy, Portugal and the United Kingdom; (c) RV: elected by Romania and Iceland; (d) WDR: elected by the United Kingdom
Election of application of provisions for natural disturbances	Yes, elections made by member States, Iceland and the United Kingdom are as follows: (a) AR: elected by Bulgaria, Croatia, France, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Romania, Spain, Sweden and the United Kingdom; (b) FM: elected by Austria, Belgium, Bulgaria, Croatia, Cyprus, Estonia, Finland, France, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Romania, Spain, Sweden and the United Kingdom
3.5% of total base-year GHG emissions, excluding LULUCF and including indirect CO <sub>2</sub> emissions	205 454.627 kt CO <sub>2</sub> eq (1 643 637.017 kt CO <sub>2</sub> eq for the duration of the commitment period)
Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for:	
1. AR	NA
2. Deforestation	NA
3. FM	NA
4. CM	NA
5. GM	NA
6. RV	NA

<i>Parameter</i>	<i>Data values</i>
7. WDR	NA

*Note:* The EU will neither issue nor cancel units based on the reported emissions and removals from activities under Article 3, paras. 3–4, of the Kyoto Protocol. The EU explains that member States, Iceland and the United Kingdom account individually for emissions by sources and removals by sinks from activities under the Kyoto Protocol and individually decide on accounting modalities and elections where foreseen under the Kyoto Protocol. Any issuance of RMUs or cancellation of units resulting from the accounting under Article 3, paras. 3–4, of the Kyoto Protocol would be made to the Kyoto Protocol registries of member States, Iceland and the United Kingdom.

## 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 EU. 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 European Union

(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>CPR</b>	<b>14 231 780 406</b>			<b>14 231 780 406</b>
<b>Annex A emissions</b>				
CO <sub>2</sub>	2 962 216 178			2 962 216 178
CH <sub>4</sub>	420 081 150			420 081 150
N <sub>2</sub> O	227 480 073			227 480 073
HFCs	89 350 999			89 350 999
PFCs	2 188 172			2 188 172
Unspecified mix of HFCs and PFCs	1 604 462			1 604 462
SF <sub>6</sub>	5 523 546			5 523 546
NF <sub>3</sub>	60 171			60 171
<b>Total Annex A sources<sup>a</sup></b>	<b>3 708 504 751</b>			<b>3 708 504 751</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–52 080 494			–52 080 494
Deforestation	33 479 050			33 479 050
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–299 589 399			–299 589 399
CM	26 032 552			26 032 552
CM for the base year	38 733 560			38 733 560
GM	30 849 108			30 849 108
GM for the base year	44 554 306			44 554 306
RV	–1 283 801			–1 283 801
RV for the base year	–1 970 096			–1 970 096
WDR	204 591			204 591
WDR for the base year	286 436			286 436

<sup>a</sup> 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 European Union

(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 286 683 350			3 286 683 350
CH <sub>4</sub>	425 928 312			425 928 312
N <sub>2</sub> O	230 410 270			230 410 270
HFCs	100 332 287			100 332 287
PFCs	2 829 744			2 829 744

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Unspecified mix of HFCs and PFCs	1 669 994			1 669 994
SF <sub>6</sub>	6 712 218			6 712 218
NF <sub>3</sub>	57 490			57 490
<b>Total Annex A sources<sup>a</sup></b>	<b>4 054 623 665</b>			<b>4 054 623 665</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	-49 836 970			-49 836 970
Deforestation	35 013 085			35 013 085
FM	-311 605 403			-311 605 403
CM	25 082 599			25 082 599
CM for the base year	38 733 560			38 733 560
GM	31 075 888			31 075 888
GM for the base year	44 554 306			44 554 306
RV	-1 275 863			-1 275 863
RV for the base year	-1 970 096			-1 970 096
WDR	210 357			210 357
WDR for the base year	286 436			286 436

<sup>a</sup> The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.3

**Information to be included in the compilation and accounting database for 2018 for the European Union**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 444 350 445			3 444 350 445
CH <sub>4</sub>	434 808 808			434 808 808
N <sub>2</sub> O	233 861 030			233 861 030
HFCs	103 675 503			103 675 503
PFCs	3 614 365			3 614 365
Unspecified mix of HFCs and PFCs	1 832 922			1 832 922
SF <sub>6</sub>	6 737 764			6 737 764
NF <sub>3</sub>	68 108			68 108
<b>Total Annex A sources<sup>a</sup></b>	<b>4 228 948 945</b>			<b>4 228 948 945</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	-47 201 356			-47 201 356
Deforestation	35 156 331			35 156 331
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	-326 454 842			-326 454 842
CM	25 899 508			25 899 508
CM for the base year	38 733 560			38 733 560
GM	31 663 385			31 663 385
GM for the base year	44 554 306			44 554 306
RV	-1 269 410			-1 269 410
RV for the base year	-1 970 096			-1 970 096
WDR	210 714			210 714
WDR for the base year	286 436			286 436

<sup>a</sup> 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 European Union**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 526 129 734			3 526 129 734
CH <sub>4</sub>	441 025 439			441 025 439
N <sub>2</sub> O	237 297 945			237 297 945
HFCs	107 641 944			107 641 944
PFCs	3 452 462			3 452 462
Unspecified mix of HFCs and PFCs	1 117 529			1 117 529
SF <sub>6</sub>	6 555 922			6 555 922
NF <sub>3</sub>	60 244			60 244
<b>Total Annex A sources<sup>a</sup></b>	<b>4 323 281 219</b>			<b>4 323 281 210</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	-48 312 191			-48 312 191
Deforestation	33 018 031			33 018 031
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	-320 911 252			-320 911 252
CM	26 668 600			26 668 600
CM for the base year	38 733 560			38 733 560
GM	34 427 572			34 427 572
GM for the base year	44 554 306			44 554 306
RV	-1 255 398			-1 255 398
RV for the base year	-1 970 096			-1 970 096
WDR	223 026			223 026
WDR for the base year	286 436			286 436

<sup>a</sup> 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 European Union**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 514 743 220			3 514 743 220
CH <sub>4</sub>	442 195 759			442 195 759
N <sub>2</sub> O	232 982 607			232 982 607
HFCs	108 014 852			108 014 852
PFCs	3 869 946			3 869 946
Unspecified mix of HFCs and PFCs	779 898			779 898
SF <sub>6</sub>	6 320 698			6 320 698
NF <sub>3</sub>	61 491			61 491
<b>Total Annex A sources<sup>a</sup></b>	<b>4 308 968 471</b>			<b>4 308 996 471</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	-51 090 140			-51 090 140
Deforestation	38 266 942			38 266 942
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	-374 873 047			-374 873 047
CM	26 204 135			26 204 135
CM for the base year	38 733 560			38 733 560
GM	33 133 016			33 133 016

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
GM for the base year	44 554 306			44 554 306
RV	-1 240 953			-1 240 953
RV for the base year	-1 970 096			-1 970 096
WDR	223 377			223 377
WDR for the base year	286 436			286 436

<sup>a</sup> 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 European Union**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 530 632 921			3 530 632 921
CH <sub>4</sub>	448 830 115			448 830 115
N <sub>2</sub> O	233 491 597			233 491 597
HFCs	106 319 406			106 319 406
PFCs	3 473 585			3 473 585
Unspecified mix of HFCs and PFCs	765 237			765 237
SF <sub>6</sub>	6 049 636			6 049 636
NF <sub>3</sub>	65 574			65 574
<b>Total Annex A sources<sup>a</sup></b>	<b>4 329 627 071</b>			<b>4 329 627 071</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	-50 161 075			-50 161 075
Deforestation	35 659 673			35 659 673
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	-385 622 515			-385 622 515
CM	29 392 082			29 392 082
CM for the base year	38 733 560			38 733 560
GM	32 043 225			32 043 225
GM for the base year	44 554 306			44 554 306
RV	-1 236 967			-1 236 967
RV for the base year	-1 970 096			-1 970 096
WDR	224 687			224 687
WDR for the base year	286 436			286 436

<sup>a</sup> 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 European Union**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 494 207 317			3 494 207 317
CH <sub>4</sub>	449 154 886			449 154 886
N <sub>2</sub> O	234 003 489			234 003 489
HFCs	111 955 033			111 955 033
PFCs	3 378 942			3 378 942
Unspecified mix of HFCs and PFCs	772 146			772 146
SF <sub>6</sub>	5 709 176			5 709 176
NF <sub>3</sub>	70 063			70 063
<b>Total Annex A sources<sup>a</sup></b>	<b>4 299 251 052</b>			<b>4 299 251 052</b>

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	-50 702 396			-50 702 396
Deforestation	32 203 894			32 203 894
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	-399 528 624			-399 528 624
CM	33 552 837			33 552 837
CM for the base year	38 733 560			38 733 560
GM	32 598 337			32 598 337
GM for the base year	44 554 306			44 554 306
RV	-1 230 210			-1 230 210
RV for the base year	-1 970 096			-1 970 096
WDR	225 383			225 383
WDR for the base year	286 436			286 436

<sup>a</sup> 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 European Union**  
(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 670 076 051			3 670 076 051
CH <sub>4</sub>	456 821 567			456 821 567
N <sub>2</sub> O	230 706 904			230 706 904
HFCs	109 433 145			109 433 145
PFCs	3 708 680			3 708 680
Unspecified mix of HFCs and PFCs	983 810			983 810
SF <sub>6</sub>	6 033 648			6 033 648
NF <sub>3</sub>	66 076			66 076
<b>Total Annex A sources<sup>a</sup></b>	<b>4 477 829 881</b>			<b>4 477 829 881</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	-48 892 621			-48 892 621
Deforestation	32 870 197			32 870 197
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	-422 916 232			-422 916 232
CM	34 526 674			34 526 674
CM for the base year	38 733 560			38 733 560
GM	34 560 597			34 560 597
GM for the base year	44 554 306			44 554 306
RV	-1 223 125			-1 223 125
RV for the base year	-1 970 096			-1 970 096
WDR	225 579			225 579
WDR for the base year	286 436			286 436

<sup>a</sup> 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) 3.B manure management - direct N<sub>2</sub>O emissions from manure management for composting systems for the United Kingdom (N<sub>2</sub>O) (see ID# A.5 in table 3);
- (b) Article 3.4 activities - 4(KP).B.2 CM and 4(KP).B.3 GM, litter and deadwood (CO<sub>2</sub>) for the United Kingdom (CO<sub>2</sub>) (see ID# KL.4 in table 3).



## 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 2012, 2013, 2014, 2015, 2016, 2018 and 2020 annual submissions of the EU, contained in documents FCCC/ARR/2012/EU, FCCC/ARR/2013/EU, FCCC/ARR/2014/EU, FCCC/ARR/2015/EU, FCCC/ARR/2016/EU, FCCC/ARR/2018/EU, and FCCC/ARR/2020/EU, 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 EU for 2022. Available at [https://unfccc.int/sites/default/files/resource/asr2022\\_EU.pdf](https://unfccc.int/sites/default/files/resource/asr2022_EU.pdf).

#### C. Other documents used during the review

Responses to questions during the review were received from Ricardo Fernandez (European Environment Agency) and Xavier Seront (European Commission), including additional material on the methodology and assumptions used.