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Climate Change

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## **Report on the individual review of the annual submission of the European Union submitted in 2020\***

**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 2020 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 9 to 14 November 2020.

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\* In the symbol for this document, 2020 refers to the year in which the inventory was submitted, not to the year of publication.



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## Abbreviations and acronyms

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
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”
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
ESD	European Union effort-sharing decision
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
JRC	Joint Research Centre
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
MSW	municipal solid waste
N	nitrogen
NA	not applicable
NE	not estimated
NF <sub>3</sub>	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
N <sub>2</sub> O	nitrous oxide
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation

SEF	standard electronic format
SF <sub>6</sub>	sulfur hexafluoride
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	<i>2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands</i>
2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>

## I. Introduction

1. This report covers the review of the 2020 annual submission of the EU,<sup>1</sup> 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 9 to 14 November 2020 and was coordinated by Suvi Monni and Claudia do Valle (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	Agita Gancone	Latvia
	Mauro Meirelles de Oliveira Santos	Brazil
Energy	Pierre Boileau	Canada
	Vincent Camobreco	United States
IPPU	Pia Forsell	Finland
Agriculture	Marta Alfaro	Chile
LULUCF and KP-LULUCF	Yasna Rojas Ponce	Chile
Waste	Excellent Hachileka	Zambia
Lead reviewers	Pierre Boileau	
	Mauro Meirelles de Oliveira Santos	

2. The basis of the findings in this report is the assessment by the ERT of the Party’s 2020 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>2</sup> designated as problems.<sup>3</sup> Other findings, and, if applicable, the encouragements of the ERT to the EU to resolve related issues, are also included.

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.

<sup>1</sup> For the purpose of this report and in the interest of conciseness, EU member States, Iceland and the United Kingdom are together referred to as “member States”.

<sup>2</sup> Issues are defined in decision 13/CP.20, annex, para. 81.

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

## II. Summary and general assessment of the Party's 2020 annual submission

7. In accordance with paragraph 76 of the UNFCCC review guidelines and paragraphs 47 and 65 of the Article 8 review guidelines, the ERT has prioritized the review of issues and problems identified in previous review reports or in the initial assessment, recalculations that have changed the emission or removal estimate for a category by more than 2 per cent or national total emissions by more than 0.5 per cent for any of the recalculated years and supplementary information reported under the Kyoto Protocol. Table 2 provides the assessment by the ERT of the Party's 2020 annual submission with respect to the tasks undertaken during the desk review. Further information on the issues identified, as well as additional findings, may be found in tables 3, 5 and 6.

Table 2

### Summary of review results and general assessment of the 2020 annual submission of the European Union

Assessment		Issue/problem ID#(s) in table 3, 5 or 6 <sup>a</sup>	
Dates of submission	Original submission: NIR, 15 April 2020; CRF tables (version 1), 15 April 2020; SEF tables, 14 April 2020 (SEF-2019-CP2 tables), 18 August 2020 (SEF CP1-2019 tables)  Revised submissions: NIR, 27 May 2020; CRF tables (version 2), 27 May 2020; SEF tables, 29 April 2020 (SEF-2019-CP2 tables)  Unless otherwise specified, values from the most recent submission are included in this report		
Review format	Desk review		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	Yes	G.6, G.7
	(b) Selection and use of methodologies and assumptions?	Yes	I.7, A.12, L.8
	(c) Development and selection of EFs?	No	
	(d) Collection and selection of AD?	No	
	(e) Reporting of recalculations?	Yes	I.21, I.22, I.23, I.24, W.1
	(f) Reporting of a consistent time series?	No	
	(g) Reporting of uncertainties, including methodologies?	Yes	G.5
	(h) QA/QC?	QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below)	
	(i) Missing categories, or completeness? <sup>b</sup>	Yes	A.11, KL.4
	(j) Application of corrections to the inventory?	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	No	A.14
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes	
Supplementary information under the Kyoto Protocol	Have any issues been identified related to the following aspects of the national system:		
	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?		
		No	

Assessment	Issue/problem ID#(s) in table 3, 5 or 6 <sup>a</sup>		
	(b) Performance of the national system functions?	No	
	Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry?	No	
	(b) Performance of the functions of the national registry and the adherence to technical standards for data exchange?	No	
	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 standard independent assessment report?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of the reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	No	
	Have any issues been identified related to the following reporting requirements for KP-LULUCF:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	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?	Yes	KL.6
	(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.7
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> The ERT identified additional issues and/or problems related to the general, energy, IPPU, agriculture and LULUCF sectors that are not listed in this table but are included in tables 5–6.

<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 24 April 2019,<sup>4</sup> and had not been resolved by the time of publication of the review report of the Party's 2018 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. The ERT noted that the individual review of the 2019 annual submission of the EU did not take place in 2019 owing to insufficient funding for the review process.

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 made in previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	Key category analysis (G.6, 2018) Convention reporting adherence	Conduct QA/QC checks on the database used for the calculation of key categories, and ensure that all key category analyses are carried out using the same set of data.	Resolved. The Party reported in NIR table 1.12 the key categories including LULUCF and noted below the table that EU totals in the energy and IPPU sectors included in the table may not include data for Sweden owing to confidentiality issues. Annex 1 to the NIR includes the results of the key category analysis for 1990, 2018 and the trend. The Party also reported in the NIR (p.861) that all key category analyses were carried out using the same set of data, and that information on the reporting of confidential data is provided in section 1.7.2 (pp.58–59) of the NIR. The previous ERT had noted differences between the total emissions included in CRF table summary 2 and those included in the key category analysis. Therefore, this ERT requested the Party to provide the key category analysis calculations. During the review, the Party provided the requested spreadsheet containing the key category analysis, although this contained some different figures and minor differences in the key categories compared with the information in the NIR. The total emissions reported in the key category analysis were lower than those in the CRF tables, which the Party explained was due to confidential emissions not being included in the key category analysis. The Party stated that it plans to include this explanation in the next NIR. The ERT considers that the issue regarding QA/QC of the database and the use of the same set of data for all key category analyses has been resolved. See ID# G.2 below regarding transparency of the treatment of confidential data and ID# G.6 in table 6 regarding other QA/QC issues.
G.2	Key category analysis (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.	Addressing. The Party stated in its NIR (p.58) that Sweden reported 13 subcategories in the energy and IPPU sectors as confidential (fewer than the 176 subcategories reported as confidential in the 2018 submission according to the 2018 NIR, p.53) and explained in the footnote to NIR table 1.12 that EU totals for 2018 in the energy and IPPU sectors may not include data for Sweden owing to confidential reporting. Although the NIR states (p.59)

<sup>4</sup> FCCC/ARR/2018/EU. The ERT notes that the report on the individual inventory review of the 2019 annual submission of the EU has not been published yet. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2018 annual submission.



<i>ID#</i>	<i>Issue/problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
			that no data were reported as confidential (“C”) by the member States and thus notation key “C” is not included in the comments in the relevant cells in the CRF tables, some data for category 1.A.2.f (non-metallic minerals) in CRF table 1.A(a)s2 were reported as confidential for Sweden. The ERT considers that the recommendation has not yet been fully addressed since the Party has not clarified the categories from which confidential data have been excluded in the key category analysis or reported the total amount of confidential emissions excluded from the analysis. The Party acknowledged this issue and stated that information on the use of confidential data from member States at the sectoral level of the key category analysis will be included in the EU NIR 2021.
G.3	Methods (G.2, 2018) (G.3, 2016) (G.3, 2015) (14, 2014) Transparency	Work with member States in order to report consistent notation keys among member States for describing the completeness of the overall inventory.	Resolved. The Party addressed one of the two outstanding issues listed in the 2018 review report, namely the use of “NO” for SF <sub>6</sub> emissions from aluminium and magnesium foundries in one member State (NIR p.849). See also ID# I.16 below. Therefore, the only issue which is still pending is covered under ID# KL.1 below.
G.4	Methods (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.	Addressing. The Party included in annex III to its NIR spreadsheets containing a description of the methodologies used by member States. In the NIR (p.861), the Party explained that annex III is sent to member States between September and November each year and should be updated with any changes in the methodologies used by member States by 15 January the following year and, if necessary, again during the initial check phase between 15 January and 31 March. During the review, the EU further explained that this annex reflects the latest submissions of member States and is consistent with the information in the NIR and CRF tables. Nevertheless, inconsistencies were found (see ID#s E.1, I.1–I.2, I.4–I.5, I.15 and A.5 below). The Party acknowledged the inconsistencies and explained that this recommendation will be addressed in the next NIR at the level of the individual inconsistencies found by the ERT and reflected in ID#s E.1, I.1–I.2, I.4–I.5, I.15 and A.5.
G.5	Uncertainty analysis (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.	Not resolved. The Party reported in NIR table 1.15 the uncertainty estimates by sector. The EU did not attribute the uncertainty values to the level of emissions reported in the CRF tables. It outlined in the NIR (p.861) the challenges involved and stated that it plans to explore the options available to address the issue. Furthermore, the ERT noted that the emission estimates for the sectors presented in NIR table 1.15 do not match those reported in CRF table summary 2. During the review, the Party clarified that NIR table 1.15 does not include confidential data. Furthermore, the uncertainty estimates are carried out following the initial submissions by the member States in January, while member State inventories may be corrected and finalized at a later date. The Party indicated it is searching for the most effective solutions to the issue and that it will attempt to update its procedures for the next submission, in line with the priorities in the EU's improvement plan.

ID#	Issue/problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
<b>Energy</b>			
E.1	1. General (energy sector) (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.	Addressing. The previous review report explained that the 2018 NIR included tables with the methodology used and EF applied for subcategories 1.A.1.a and 1.A.1.c, but not for the key categories 1.A.2.g, 1.A.3.b or 1.A.5.b. In the 2020 NIR, tables 3.48 and 3.60 provide a summary of methodologies for categories 1.A.2.g (CO <sub>2</sub> emissions (all fuels)) and 1.A.3.b (CO <sub>2</sub> emissions (all fuels)), respectively; table 3.70 provides a summary for category 1.A.3.b (N <sub>2</sub> O emissions (all fuels)); and table 3.108 provides a summary for category 1.A.5.b (CO <sub>2</sub> emissions (all fuels)), although this is not a key category for 2018. During the review, the Party indicated that it is taking steps to collect and include additional methodological summaries in future submissions to provide a further level of detail on the fuel split for the key categories identified, namely CO <sub>2</sub> emissions for categories 1.A.2.g (solid fuels), 1.A.3.b (diesel oil), 1.A.3.b (gasoline) and 1.A.3.b (liquefied petroleum gas), which will be reported in NIR tables 3.50, 3.63, 3.64 and 3.65, respectively; and N <sub>2</sub> O emissions for category 1.A.3.b (diesel oil), which will be reported in NIR table 3.71. The ERT considers that the recommendation has not yet been fully addressed because the Party did not include methodological summaries at the fuel split level for the key categories identified.
E.2	1. General (energy sector) – gaseous, solid and liquid fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.2, 2018) (E.9, 2016) (E.9, 2015) Accuracy	Work with member States to improve the methodology used to estimate emissions for key categories by using a methodological tier for each member State in accordance with the decision trees in the 2006 IPCC Guidelines, the key category analysis of the EU and the relative importance of the contribution of member State emissions to total emissions at the EU level.	Resolved. The Party reported in its NIR (p.26) on the capacity-building activities that are organized each year in order to discuss implementation of the 2006 IPCC Guidelines with member States. During the review, the Party indicated that the share of higher-tier methods applied by member States continues to rise. For example, higher-tier methodologies were used for 89 per cent of emission estimates in energy sector key categories in the 2020 submission, up from 79 per cent in the 2018 submission. The ERT considers that the recommendation has been fully addressed because the Party has worked with member States to improve their methodologies and is continuing to do so.
E.3	1. General (energy sector) – gaseous fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (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.	Addressing. The Party discussed CH <sub>4</sub> recovery from coal mining (category 1.B.1) in its NIR (pp.351–352) and reported information on the categories under which emissions from the combustion of CH <sub>4</sub> recovered are included. During the review, the Party indicated that Germany was the only member State to report recovery of CH <sub>4</sub> emissions from venting and flaring at oil and gas facilities (category 1.B.2.c). Further, the EU explained that gas recovery systems liquify most recovered CH <sub>4</sub> emissions and return them to refining processes or to refinery combustion systems and stated that the emissions are reported under category 1.A.1.b. The ERT considers that including this information in the NIR would resolve the issue.
E.4	1.A.1.a Public electricity and heat production – liquid, solid and gaseous fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	Clarify whether confidential emission data from Sweden have been included in NIR tables 3.7–3.10.	Resolved. The Party reported emission data from Sweden in NIR tables 3.7–3.10. During the review, the Party clarified that there are no longer any confidentiality issues regarding the energy consumption data from Sweden under this category. The EU also stated that the NIR includes all reported emissions from Sweden and that these data are consistent between the NIR and the CRF tables. The ERT confirmed this by comparing the sum of

<i>ID#</i>	<i>Issue/problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	(E.15, 2018) Transparency		emissions from all member States with the totals reported by the EU in NIR tables 3.7–3.10 and CRF table 1.A(a)s1.
E.5	1.A.1.a Public electricity and heat production – peat – CO <sub>2</sub> (E.13, 2018) Transparency	Include in the NIR clear reasons for the inter-annual fluctuation in CO <sub>2</sub> emissions from peat consumption in public electricity and heat production.	Resolved. The Party added a paragraph to NIR section 1.A.1.a (p.113) explaining that fluctuations in peat emissions were mainly a result of weather conditions. The ERT considers that the recommendation has been fully addressed because the Party has provided the information on fluctuations in CO <sub>2</sub> emissions from peat consumption from the inventory of Finland, which is the primary source of emissions and fluctuations.
E.6	1.A.1.a Public electricity and heat production – other fossil fuels – CO <sub>2</sub> (E.14, 2018) Transparency	Include in the NIR an updated version of figure 3.6 that includes the emission trends and AD for other fossil fuels.	Resolved. The Party included in its NIR (p.96) an updated version of figure 3.6 that includes the emission trends and AD for other fossil fuels.
E.7	1.A.1.a Public electricity and heat production – other fossil fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.16, 2018) Transparency	Include in the NIR all types of fuel consumed in MSW incineration, including hazardous waste, bulky waste and waste sludge.	Resolved. The Party reported in its NIR (p.109) that the fossil component in MSW incineration includes plastics, hazardous waste, bulky waste and waste sludge.
E.8	1.A.1.c Manufacture of solid fuels and other energy industries – solid fuels – CO <sub>2</sub> (E.17, 2018) Transparency	Remove from the NIR the note under table 3.16 referring to confidential emission data from Sweden being excluded from the table.	Resolved. The Party reported emission data from Sweden in NIR table 3.16 and did not include the note referred to in the previous recommendation. During the review, the Party clarified that there are no longer any confidentiality issues concerning the energy consumption data from Sweden under this category.
E.9	1.A.1.c Manufacture of solid fuels and other energy industries – biomass – CO <sub>2</sub> (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.	Not resolved. The Party reported the change in overall biomass energy use and emissions over time for category 1.A.1.c in NIR figure 3.24; however, the information is not broken down by type of biomass. During the review, the Party explained that Germany is responsible for the increase in energy use and emissions from biomass and that, according to the energy balance of Germany, its biomass mainly consists of biogas that is used in gasification plants. The ERT considers that the Party could resolve the issue by including this information in NIR section 3.2.1.3.
E.10	1.A.2.a Iron and steel – liquid fuels – CO <sub>2</sub> (E.19, 2018) Transparency	Include in the NIR the reasons for the high CO <sub>2</sub> IEF for liquid fuels for 2008–2012 and for the large increase in the IEF observed between 2015 and 2016.	Resolved. The Party reported in its NIR (p.145) that the high CO <sub>2</sub> IEF reported for 2008–2012 was mainly due to the contribution of Spain's CO <sub>2</sub> emissions to the EU total and the member State's high CO <sub>2</sub> IEF for those years. The EU also reported that the change in IEF between 2015 and 2016 was due to Sweden's data being excluded for 2016 owing to confidentiality concerns. During the review, the Party further clarified that the changes in IEF for category 1.A.2.a (liquid fuels) over the time series resulted from changes in the

ID#	Issue/problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
			share of member States' contributions to total CO <sub>2</sub> emissions and their respective EFs for liquid fuels.
E.11	1.A.2.a Iron and steel – solid fuels – CO <sub>2</sub> (E.20, 2018) Transparency	Include in the NIR an explanation for the trend in the CO <sub>2</sub> IEF for solid fuels, particularly for 2011 onward.	Resolved. The Party included in its NIR (p.149) an explanation for the trend in the CO <sub>2</sub> IEF for solid fuels for category 1.A.2.a. Italy's share of CO <sub>2</sub> emissions decreased while Germany's share of CO <sub>2</sub> emissions, with one of the highest IEFs, increased.
E.12	1.A.2.f Non-metallic minerals – liquid fuels – CO <sub>2</sub> (E.22, 2018) Transparency	Include in the NIR the reason for the emissions from liquid fuels in Sweden being reported as confidential and how time-series consistency at the EU level has been preserved.	Resolved. The Party documented in its NIR (p.200) that emissions from liquid fuels for category 1.A.2.f in Sweden have been reported as confidential ("C") since 2016 in order to comply with the Swedish Public Access to Information and Secrecy Act. Furthermore, the note in NIR table 3.44 indicates that Sweden's emissions were not included in the trends reported (changes in 1990–2018 and 2017–2018), with a view to preserving time-series consistency (data for Sweden for 1990 are presented in table 3.44 but not included in the total emissions or trend in the same table). Data from Sweden are included for all years in figure 3.81 under "other" countries category to preserve confidentiality.
E.13	1.A.2.f Non-metallic minerals – other fossil fuels – CO <sub>2</sub> (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.	Addressing. The Party clarified in its NIR (p.211) that the comparatively low IEF reported by almost all member States for other fossil fuels was mainly due to incineration of industrial waste. The Party reported in its 2020 NIR (p.209), as in its 2018 submission, that examples of industrial waste include waste tyres, waste oil/lubricants, solvents, plastic waste and paper waste. During the previous review the Party had indicated that the typical values of EFs for waste oil, waste tyres and plastics incinerated in cement kilns are around 80 t fossil CO <sub>2</sub> /TJ fossil energy, which is consistent with the IEF reported in NIR figure 3.91. The ERT considers that the recommendation has not yet been fully addressed because the information on the main components incinerated in cement kilns remains unchanged from the 2018 submission. While the Party indicated in its 2020 NIR that the combustion of industrial waste led to the low CO <sub>2</sub> IEFs, it did not include information to support the fact that cement kilns mainly use industrial waste, which has an EF below the IPCC default EF for industrial wastes combusted in manufacturing industries and construction (2006 IPCC Guidelines, vol. 2, chap. 2, table 2.3). The ERT considers that stating in the NIR that the EFs for industrial waste components are typically around 80 t fossil CO <sub>2</sub> /TJ fossil energy would help to resolve this issue.
E.14	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.24, 2018) Transparency	Include in NIR table 3.49 a note explaining why cells for CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O emissions from liquid fuels for off-road vehicles were left blank (i.e. for Cyprus, Czechia, Estonia, France, Italy, Malta, Poland, Romania and Spain).	Resolved. Table 3.49 of the 2018 NIR included a breakdown of off-road vehicle emissions as a portion of the total emissions for category 1.A.2.g. That level of detail was not reported in the 2020 NIR. During the review, the Party further clarified that only Greece reported emissions as "IE" (included in category 1.A.2.f) for category 1.A.2.g and confirmed that all other member States reported emission estimates for this category. The ERT considers that the recommendation has been resolved because the table in question was not included in the latest NIR, so no explanation is needed. Furthermore, the Party indicated in the 2018 NIR (p.212 and p.281) that emissions from off-road vehicles could be reported in several places, including under subcategories 1.A.2.g (other (manufacturing

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			industries and construction)), 1.A.3.e (other transportation) or 1.A.4.c.ii (off-road vehicles and other machinery). See also ID# E.20 in table 6.
E.15	1.A.3.b Road transportation – liquid fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.12, 2018) (E.15, 2016) (E.15, 2015) Comparability	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 to report emissions from lubricants combusted in two-stroke engines under the transport category in accordance with the 2006 IPCC Guidelines.	Addressing. The Party included in its NIR (pp.268–269) information on how emissions from use of lubricants were reported by the different member States. During the review, the Party indicated that three member States still do not report emissions from lubricants combusted in two-stroke engines under the transport category and stated that efforts would be made to allocate emissions in line with the 2006 IPCC Guidelines, where possible. The Party further explained that it will work with member States on the issue but it is ultimately the decision of individual member States to implement the 2006 IPCC Guidelines, taking into account inventory priorities and resource constraints, in particular where emission sources are small and the only issue is allocation rather than completeness.
E.16	1.A.4.b Residential – biomass – CH <sub>4</sub> (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.	Not resolved. The Party explained in its NIR (p.318) that the change in the CH <sub>4</sub> IEF was due to improvements in combustion technologies. However, the text also indicates that several member States are still using the IPCC default EFs (2006 IPCC Guidelines, vol. 2, chap. 2, table 2.5) and therefore the improvements in combustion technologies are not reflected in their emission estimates. During the review, the Party clarified that France reported the biggest change in overall emissions (and CH <sub>4</sub> IEF) for biomass in this subcategory and that the emission estimates reported and EF used by France reflect new combustion technologies, which explains the change in the IEF at EU level. The ERT considers that the recommendation has not yet been addressed because the Party did not clarify in the NIR that the most significant change in the CH <sub>4</sub> IEF for biomass was for France for 1990–2018 and that this change reflects improvements to combustion technologies, making it the main driver for the trend at EU level.
E.17	1.A.5.a Stationary – solid fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.26, 2018) Accuracy	Ensure that Poland's CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O emissions for this category are included in the EU inventory, and include in the NIR a description of where these emissions are included.	Resolved. The Party stated in NIR table 3.103 that Poland reported emissions for category 1.A.5.a stationary as "IE" and that the emissions are included under category 1.A.4.c.
E.18	1.B.1.a Coal mining and handling – solid fuels – CH <sub>4</sub> (E.27, 2018) Transparency	(a) Work with Belgium to ensure the correct reporting of AD for underground coal mining in CRF table 1.B.1; (b) Correct the explanation of the trend for this subcategory in the NIR (i.e. that Belgium was responsible for 73 per cent of AD, not CH <sub>4</sub> emissions, in 1990).	Resolved. (a) The Party corrected the reporting of Belgium's AD for underground coal mining in CRF table 1.B.1. During the review, the Party confirmed that Belgium provided corrected AD for underground coal mining which was in turn included in the EU's submission. (b) The NIR (p.354) was updated to reflect the fact that Germany and the United Kingdom of Great Britain and Northern Ireland, rather than Belgium, were the largest contributors to the decreasing trend.
E.19	1.C CO <sub>2</sub> transport and storage – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	Use in CRF table 1.C the notation key for fugitive emissions from CO <sub>2</sub> capture and storage reported by Finland (i.e. "NA") and	Resolved. The Party reported "NA" for Finland in CRF table 1.C and provided an explanation in the NIR (p.400). The ERT considers that the recommendation has been fully addressed because the Party has explained in the NIR that CO <sub>2</sub> is captured in pulp

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	(E.28, 2018) Transparency	explain in the NIR why its use is appropriate.	and paper mills in Finland, where precipitated calcium carbonate is formed, and then used in the paper and paperboard industry. Therefore, there are no transport emissions since precipitated calcium carbonate is used on-site, which is why transport emissions were reported as “NA” in the CRF table.
IPPU			
I.1	2. General (IPPU) (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.	Addressing. There were improvements in the consistency between the NIR tables and annex III to the NIR, for example with regard to the information on cement production in Lithuania (table 4.4). However, some inconsistencies remain, for example NIR table 4.4 on cement production and annex III to the NIR contain inconsistent information on the methodologies of Austria, Croatia and Cyprus.
I.2	2. General (IPPU) (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.	Addressing. The EU provided methodological information for key categories for all member States in the category-specific sections of NIR tables and in annex III to the NIR. Since the previous submission, the Party has also included information on the level of complexity of the country-specific methods, for example, for cement production for Greece, Hungary and Sweden (see ID# I.4 below). However, NIR tables 4.4, 4.18 and 4.22, for example, do not provide the corresponding tier of country-specific methods for all member States.
I.3	2. General (IPPU) – CO <sub>2</sub> (I.38, 2018) Transparency	Include in the NIR a corrected description of the three-step procedure used to fill gaps in AD for the categories lime production (2.A.2), glass production (2.A.3) and ammonia production (2.B.1).	Resolved. The error was corrected in the NIR (p.549) and step three of the procedure used to fill gaps in AD is correctly presented in the NIR.
I.4	2.A.1 Cement production – CO <sub>2</sub> (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.	Addressing. The EU provided information in NIR table 4.4 on the corresponding level of complexity (IPCC tier) of the country-specific methods used by Greece, Hungary and Sweden, but not by Cyprus or the Netherlands, for which the methods are still reported as “CS” (country-specific).
I.5	2.A.2 Lime production – CO <sub>2</sub> (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.	Addressing. The EU provided in NIR table 4.6 the recommended information for all member States listed except Malta and Latvia (method and EF reported as “NA”). These member States have reported emissions for 1990 but report “NO” for 2017–2018. They have reflected the methods and EFs used for 1990 in their CRF table summary 3.
I.6	2.A.2 Lime production – CO <sub>2</sub> (I.9, 2018) (I.31, 2016)	Work with the Netherlands to report CO <sub>2</sub> emissions from lime production under the	Resolved. CO <sub>2</sub> emissions from lime production of the Netherlands were included under category 2.A.2 (see NIR table 4.6).

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	(I.31, 2015) Comparability	lime production category (2.A.2) in accordance with the 2006 IPCC Guidelines.	
I.7	2.B.1 Ammonia production – CO <sub>2</sub> (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.	Addressing. Czechia continued to use a tier 1 method to estimate CO <sub>2</sub> emissions from ammonia production according to the EU NIR (table 4.15 and annex III). During the review the EU informed the ERT that the possibility of obtaining a plant-specific EF for Czechia is being looked into, but investigations are still ongoing.
I.8	2.B.1 Ammonia production – CO <sub>2</sub> (I.39, 2018) Comparability	Improve the comparability of the CO <sub>2</sub> IEF estimates with those of other Parties by including in the NIR a table that includes the combustion-related EU ETS emission values for France and Germany rather than only the process-related emissions reported for ammonia production.	Resolved. The EU included a new table in its NIR (table 4.16) that presents the inventory and relevant EU ETS CO <sub>2</sub> emissions from ammonia production, including a column on “potentially combustion-related” emissions. A description of this issue was also included in the NIR (p.476).
I.9	2.B.4 Caprolactam, glyoxal and glyoxylic acid production – N <sub>2</sub> O (I.20, 2018) (I.40, 2016) (I.38, 2015) Accuracy	Work with Czechia to recalculate and report more accurate N <sub>2</sub> O emissions from caprolactam production, taking into account the data collected under the EU ETS.	Resolved. In the NIR (p.847) and during the review the EU clarified that Czechia used a plant-specific EF to calculate N <sub>2</sub> O emissions from caprolactam production. The Party also stated that the EU ETS data cannot be used because the facility reports several emissions sources collectively and separate data for the caprolactam production process are not available. The ERT considers that the issue has been resolved because the reporting by the EU was based on the data available from Czechia.
I.10	2.B.8 Petrochemical and carbon black production – CO <sub>2</sub> (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. During the review the EU informed the ERT that 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.
I.11	2.B.9 Fluorochemical production – PFCs (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).	Not resolved. In the NIR (pp.847–848) and during the review, the EU explained that Italy is still trying to clarify whether the emissions result from an incomplete abatement process, are formed in the course of the treatment process or come from another production process. Owing to this uncertainty and ongoing investigations on the issue, this has not been explained in the NIR and no reallocation of emissions has been undertaken. The Party clarified that work with Italy is ongoing and the EU will continue to work with Italy and encourage them to make efforts to change the allocation of emissions.

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I.12	2.C.1 Iron and steel production – CO <sub>2</sub> (I.29, 2018) (I.49, 2016) Transparency	Work with Hungary to estimate and report the CO <sub>2</sub> IEF, expressed in t CO <sub>2</sub> per t sinter produced.	Resolved. In the NIR (p.848) the EU explained that Hungary provided in its NIR an explanation for the relatively high EF. Hungary explained in its NIR (p.152) that information on the amount of sinter or pellet produced is not available to calculate CO <sub>2</sub> emissions. Therefore, information on the amount of coke and natural gas, limestone and dolomite and other ores and additives used during sintering is used for emission calculation, and this information is available following direct reporting by a manufacturing company from 2004 onward.  The ERT considers that the issue has been resolved because the reporting by the EU was based on the available data from Hungary.
I.13	2.C.3 Aluminium production – CO <sub>2</sub> (I.31, 2018) (I.50, 2016) (I.47, 2015) Transparency	Include in the NIR information on the method, assumptions, EFs and AD used to estimate CO <sub>2</sub> emissions from aluminium production.	Resolved. The Party provided in the NIR (pp.514–515) aggregated information on the methods and EFs used by member States to estimate CO <sub>2</sub> emissions from aluminium production. It also referred to CRF tables and NIRs of individual member States for further information. During the review, the EU informed the ERT that the scope of the NIR is limited to information on EU key categories only and CO <sub>2</sub> emissions from aluminium production is not a key category. The ERT considers that the information provided in the NIR is therefore sufficient.
I.14	2.D Non-energy products from fuels and solvent use – CO <sub>2</sub> (I.33, 2018) (I.52, 2016) (I.49, 2015) Transparency	Provide in the NIR information on the methodologies, assumptions, EFs and AD used to estimate CO <sub>2</sub> emissions from non-energy products from fuel and solvent use, which is a key category.	Resolved. The EU informed the ERT during the review that the scope of the NIR is limited to information on EU key categories only, and under category 2.D (non-energy products from fuels and solvent use) only category 2.D.3 (other) is identified as a key category and information on methodologies is included in the NIR for that subcategory (pp.519–524). NIR table 4.43 provides an overview of the member States and their CO <sub>2</sub> emissions for category 2.D.3 (other), specifying by subcategory.
I.15	2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.34, 2018) (I.20, 2016) (I.20, 2015) (74, 2014) Transparency	Endeavour to provide in the NIR summary overviews of methodologies used to estimate 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.	Addressing. The EU reported information on the methodologies used to estimate HFC emissions from refrigeration and air conditioning and foam blowing for all member States in NIR tables 4.48–4.49. Regarding aerosols, methodological information was reported for all member States (including Cyprus, for which the information was missing from table 4.48 in the 2018 NIR) except Denmark, in NIR table 4.51.
I.16	2.F Product uses as substitutes for ozone-depleting substances – HFCs, PFCs and SF <sub>6</sub> (I.35, 2018) (I.21, 2016) (I.21, 2015) (75, 2014) Transparency	Make the necessary corrections in the use of the notation keys to ensure the transparency of the reporting (specifically: “NE” reported by Denmark for the amount of gas remaining in products at decommissioning; “NO” reported by Finland for SF <sub>6</sub> emissions from aluminium and magnesium foundries; “IE” and “NA” reported by Ireland for AD and emission estimates for HFC emissions from refrigeration and air-conditioning	Resolved. The previous ERT reported that there was only one outstanding issue from the original recommendation: “NO” reported for SF <sub>6</sub> emissions from aluminium and magnesium foundries for Finland. In the NIR (p.849) and during the review the EU explained that this issue has been resolved, as Finland only reported SF <sub>6</sub> emissions for category 2.C.4 for 1994–2009 and 2012 and these emissions have since ceased. The member State reported “IE” for the above-mentioned years and SF <sub>6</sub> emissions are included under category 2.H.3. Finland reported “NO” for category 2.C.4 for 2013–2018, as no magnesium die casting occurred in this period.



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		equipment (except mobile air conditioning); “NO” reported by Luxembourg for potential emissions of PFCs from refrigeration and air-conditioning equipment; “NA” and “NA and NO” reported by the Netherlands for AD and IEFs of emissions from stocks in industrial refrigeration and mobile equipment, whereas the emissions are actually estimated; and empty cells in the CRF tables for Spain as a replacement of “NA” and “NE” notation keys for reporting emissions from semiconductor manufacturing).	
I.17	2.F.1 Refrigeration and air conditioning – HFCs and PFCs (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 reflecting 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).	Addressing. The EU reported in NIR table 10.9 that the issue was followed up in the second step of the 2020 ESD review and that analysis is ongoing in member States. During the review the EU informed the ERT that the issue will be checked again during the 2021 reporting cycle and the information in table 10.9 of the EU NIR will be updated as appropriate.
I.18	2.F.1 Refrigeration and air conditioning – HFCs (I.41, 2018) Transparency	Include information in the NIR to explain the rationale for the reporting of a 100 per cent disposal loss factor in 1995 for the subcategory mobile air conditioning (2.F.1.e).	Resolved. The EU explained the rationale for the reporting of a 100 per cent disposal loss factor in 1995 in the NIR (pp.533–534).
I.19	2.F.4 Aerosols – HFCs (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. The EU continued to report HFC emissions from aerosols as “NO” for the Netherlands (see NIR table 4.47, which corresponds to table 4.44 of the 2018 NIR). The EU explained during the review that although the notation key has not been corrected in its NIR, it included a note below table 4.47 explaining that the Netherlands reported HFC emissions for categories 2.F.2, 2.F.3, 2.F.4 and 2.F.5 under category 2.F.6. During the review the EU clarified that the Netherlands is implementing new reporting methods and category 2.F.1 was reported separately for its 2020 submission, while other categories were still reported collectively. The Party further explained that it will continue to work with the Netherlands and encourage them to report the correct notation key.
I.20	2.F.6 Other applications (product uses as	Include an explanation in the annual submission on the reporting of the	Addressing. According to the NIR of the Netherlands (p.161), HFC emissions for categories 2.F.2, 2.F.3, 2.F.4 and 2.F.5 were reported under category 2.F.6 because of the

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	substitutes for ozone-depleting substances) – HFCs, PFCs and SF <sub>6</sub> (I.37, 2018) (I.25, 2016) (I.25, 2015) (77, 2014) Transparency	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.	sensitive nature of the data involved, given that many processes relating to the use of HFCs take place in only one or two companies. This indicates that “IE” would be an appropriate notation key for HFCs from categories 2.F.2, 2.F.3, 2.F.4 and 2.F.5. In CRF table 2(I)s2 the Netherlands used the notation key “NO” for HFCs from 2.F.2 and 2.F.4, while the cells for 2.F.3 and 2.F.5 are blank. Table 4.47 of the NIR (HFC emissions for categories under 2.F) reported HFC emissions from the Netherlands as “NO” for categories 2.F.2 and 2.F.4 and as “-” for categories 2.F.3 and 2.F.5. Below the table the EU explains that the Netherlands reported HFC emissions for categories 2.F.2, 2.F.3, 2.F.4 and 2.F.5 under category 2.F.6. This information is also included in table 4.49 (foam blowing). However, the ERT considers that the issue is not yet fully resolved because the Party did not include similar information in table 4.50 (fire protection) and 4.51 (aerosols – metered dose inhalers).
Agriculture			
A.1	3. General (agriculture) – CO <sub>2</sub> (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.	Addressing. The Party explained in its NIR (table 10.7, p.850) that the required information was included in chapter 9.1 (p.271) of the Netherlands’ NIR and in table 9.1 (p.833) of the EU NIR, table. However, the Party did not specify in its NIR or during the review where those emissions are included in the Netherlands’ inventory. During the review, the Party explained that the Netherlands reports total GHG emissions including indirect CO <sub>2</sub> emissions in its NIR. However, detailed data on indirect CO <sub>2</sub> emissions are reported only for the IPPU sector, in table 4.1. The Party stated that it will work with the Netherlands to improve the reporting of indirect CO <sub>2</sub> emissions in the national inventory.
A.2	3. General (agriculture) – CO <sub>2</sub> (A.2, 2018) (A.8, 2016) (A.8, 2015) Transparency	Work with Slovakia to use the appropriate notation key to report indirect CO <sub>2</sub> emissions from the agriculture sector or explain where in the inventory Slovakia has reported these emissions.	Resolved. During the review, the EU explained that, in its CRF table 6, Slovakia has changed the notation key from “IE” to “NE”. This notation key for Slovakia was included in the comment box for indirect CO <sub>2</sub> emissions from the agriculture sector in CRF table 6.
A.3	3. General (agriculture) – CH <sub>4</sub> (A.3, 2018) (A.9, 2016) (A.9, 2015) Transparency	Compile and report information on the methodology and CH <sub>4</sub> EFs used to estimate emissions from cattle, sheep and swine for all member States and Iceland.	Resolved. The Party reported information on the methodologies and EFs used to estimate CH <sub>4</sub> emissions. For enteric fermentation, summary information on methodology and EFs was provided for all member States in NIR table 5.4 and specific information for key categories was provided in NIR tables 5.5 (cattle) and 5.6 (sheep). For manure management, summary information on methodology and EFs was provided for all member States in NIR table 5.15, and specific information for the main subcategories was provided in NIR tables 5.16 (cattle) and 5.17 (swine).
A.4	3. General (agriculture) – CO <sub>2</sub> (A.14, 2018) Convention reporting adherence	Work with Slovakia to clarify where indirect CO <sub>2</sub> emissions from the agriculture sector are reported and ensure those emissions are included in the EU NIR.	Resolved. See ID# A.2 above.

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A.5	3.A.1 Cattle – CH <sub>4</sub> (A.5, 2018) (A.11, 2016) 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 milk yield (kg/head/day) for member States in NIR table 5.10, but did not include this value for the Netherlands. A note in the NIR (p.577) indicates that although the Netherlands did not report milk yield in its CRF tables, relevant data are available in the member State's NIR, and refers to annex III of the EU NIR. The ERT checked annex III to the EU NIR but noted that it does not contain information on milk yield for the Netherlands. During the review, the Party confirmed that milk yield data were not reported in the Netherlands' NIR, which only includes a reference to a national statistics report; and explained that the member State plans to include milk yield data in the updated version of the methodology report that is planned for its 2021 submission, including a check for time-series consistency. The Party further explained that it will check during the 2021 reporting cycle whether the Netherlands has reported milk yield data in its 2021 inventory and, if not, will raise this issue with the member State.
A.6	3.A.1 Cattle – CH <sub>4</sub> (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.	Not resolved. The Party provided in the NIR information on the IEF for enteric fermentation from dairy cattle (figure 5.13 and table 5.8) and analysed gross energy and milk yield (pp.576–577). During the review, the Party stated that it will include in its next NIR an analysis of the contribution of each member State to the total dairy cattle population of the EU as a driver for the CH <sub>4</sub> IEF for enteric fermentation from dairy cattle.
A.7	3.A.2 Sheep – CH <sub>4</sub> (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.	Not resolved. The Party reported in NIR table 5.6 that Denmark used a tier 2 approach with a default EF for CH <sub>4</sub> emissions from sheep. The reporting is the same as the 2018 submission, according to the 2018 review report. During the review, the Party clarified that the 2020 ESD review concluded that Denmark uses a country-specific EF for CH <sub>4</sub> from sheep, and not a default EF, which is consistent with information reported in Denmark's NIR (section 5.3, p.380). The ERT considers that the recommendation has not yet been addressed, as the EU has not updated the information in its NIR to reflect the fact that Denmark used a country-specific EF to estimate CH <sub>4</sub> emissions from enteric fermentation from sheep.
A.8	3.B Manure management – N <sub>2</sub> O (A.6, 2018) (A.12, 2016) (A.12, 2015) Comparability	Work with the Netherlands to investigate whether N <sub>2</sub> O emissions from manure management can be estimated and reported separately for each livestock category.	Resolved. Section 5.3.3 of the NIR (pp.599–620) provides information on emissions from manure management. The NIR presents member States' emissions for cattle (NIR table 5.29), swine (NIR table 5.30) and other livestock (NIR table 5.31), including those of the Netherlands. Emissions from poultry were also reported separately in NIR figure 5.45, although this does not explicitly include emissions from the Netherlands.
A.9	3.B Manure management – N <sub>2</sub> O (A.19, 2018) Transparency	Work with Bulgaria and Poland to clarify why they use "NA" to report N <sub>2</sub> O emissions from manure management systems when manure is not reported in those manure management systems in their NIRs.	Resolved. According to the Party's CRF table 3.B(b), Bulgaria and Poland no longer report N <sub>2</sub> O emissions from manure management systems as "NA". The notation key used by these member States for daily spread of manure in the 2020 submissions is "NO".

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A.10	3.B Manure management – N <sub>2</sub> O (A.20, 2018) Transparency	Work with Croatia, Poland and Slovenia to clarify in their NIRs the use of the notation key “NA” to report direct N <sub>2</sub> O emissions from manure management for composting systems.	Resolved. During the review, the Party explained that these member States no longer reported direct N <sub>2</sub> O emissions from manure management for composting systems as “NA” in CRF table 3.B(b). The ERT noted that this is the case for Croatia, Poland and Slovenia, which reported these emissions as “NO”.
A.11	3.B Manure management – N <sub>2</sub> O (A.21, 2018) Completeness	Work with the United Kingdom to clarify the use of the notation key “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.	Not resolved. According to the comment in CRF table 3.B(b) of the EU, the United Kingdom still reported direct N <sub>2</sub> O emissions from manure management as “NE” for composting systems. During the review and on page 875 of the NIR, the Party clarified that the United Kingdom is reviewing AD on composting and the application of compost to land. The ERT noted that this indicates a lack of completeness of the EU inventory. However, since direct N <sub>2</sub> O emissions from manure management for composting systems generally represent a small emissions source, the missing emissions are not expected to be above the significance threshold in accordance with paragraph 37(b) of the reporting guidelines and considering the guidelines under decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11. Given that this activity does occur in the United Kingdom and that it is reviewing AD and compost application to land, the ERT considers that the recommendation has not yet been addressed because this category was still reported as “NE” and the use of this notation key has not been clarified in the EU NIR.
A.12	3.B.3 Swine – CH <sub>4</sub> (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. According to NIR table 5.17, Cyprus and Slovakia used a tier 2 method, while Czechia and Greece used a tier 1 method. During the review, the EU provided further information on the methods used by Cyprus and Slovakia. The Party further explained that it will follow up during the 2021 reporting cycle and check whether these member States have used higher-tier methods in their 2021 submissions and, if they have not, it will work with them and encourage them to make efforts to implement the 2006 IPCC Guidelines and move to higher tiers for key categories. The Party explained that Czechia plans to implement improvements for this category in the next submission and that further work needs to be done with Greece.
A.13	3.B.3 Swine – CH <sub>4</sub> (A.22, 2018) Transparency	Report accurately in the NIR the method and CH <sub>4</sub> EF used by Cyprus and the United Kingdom to estimate CH <sub>4</sub> emissions from manure management for swine.	Resolved. The Party reported in NIR table 5.17 the methodologies used by member States to estimate CH <sub>4</sub> emissions from manure management for swine. The NIR states that Cyprus and the United Kingdom used a tier 2 method and a default EF, which is in accordance with the information reported by those member States in CRF table summary 3 of their national inventory submissions.
A.14	3.D.a.2 Organic N fertilizers – N <sub>2</sub> O (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	Addressing. The Party reported direct N <sub>2</sub> O emissions from other organic fertilizers applied to soils as “NE” for Croatia and Iceland. During the review, the Party clarified that Iceland used data relating to the application of bonemeal and compost in 2018 to justify the reporting of “NE” and show that emissions are below the threshold of significance. Considering these elements, N <sub>2</sub> O emissions would reach 1.2 kt CO <sub>2</sub> eq, which is below the threshold of significance for Iceland of 2.4 kt CO <sub>2</sub> eq. In the case of Croatia, emissions are below the threshold of significance given that even if all composted

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		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.	waste reported in CRF category 5.B.1 was applied to agricultural soils, the resulting direct and indirect N <sub>2</sub> O emissions would still be below the threshold of significance for all reviewed years. Given that both Croatia and Iceland continued to report emissions for category 3.D.a.2 as “NE” in their 2020 submissions, and no further information was included in the NIRs to explain why these emissions are considered to be below the threshold of significance, the ERT considers that the recommendation has not yet been fully addressed.
A.15	3.D.a.5 Mineralization/immobilization associated with loss/gain of soil organic matter – N <sub>2</sub> O (A.24, 2018) Transparency	Work with Iceland to include in the NIR and CRF table 3.D the justification for the use of “NE” for reporting direct N <sub>2</sub> O emissions from mineralization/immobilization associated with loss/gain of soil organic matter.	Resolved. The EU reported “NO” in the comment to CRF table 3.D regarding direct N <sub>2</sub> O emissions from mineralization/immobilization associated with loss/gain of soil organic matter for Iceland. During the review, the Party further explained that Iceland reported this category as “NO” in its submission (see Iceland’s NIR, section 5.7.2.5).
A.16	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N <sub>2</sub> O (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.	Addressing. Improvements have been made to consistency. According to the 2018 review report, the total area of cultivated organic soils reported in CRF table 3.D was over 10 times greater than the sum of the areas reported in CRF tables 4.B and 4.C. In the 2020 submission under the Convention, the total area of organic soils reported by the Party in the agriculture sector was 4,298.92 kha (CRF table 3.D), compared with a total of 4,439.68 kha reported in the LULUCF sector (CRF tables 4.B and 4.C), which is larger by 3.3 per cent. However, in the reporting under the Kyoto Protocol, the area is reported as 4,645.48 kha for the agriculture sector (CRF table 3.D), while the figures reported in LULUCF sector categories 4.B and 4.C amount to 6,000.77 kha. Therefore, the area reported under the LULUCF sector is 29.2 per cent larger. In the NIR (p.764), the Party stated that organic soils for unmanaged grassland were reported in the LULUCF sector, but not in the agriculture sector. The ERT noted that as the Party reported the area of unmanaged grassland as 400.04 kha for 2018 (CRF table 4.1), there should also be other reasons for the differences. During the review, the Party explained that it carried out additional checks between the agriculture and the LULUCF sectors during the 2020 ESD review to ensure consistency across sectors. The ERT considers that the recommendation has not yet been fully addressed because significant inconsistencies remain and have not been explained.
A.17	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N <sub>2</sub> O (A.25, 2018) Convention reporting adherence	Work with the Netherlands to correct the error made in reporting the area of cultivated histosols in CRF table 3.D and report the correct value in the EU CRF table 3.D.	Resolved. The Netherlands revised the area reported for cultivated organic soils in CRF table 3.D, and the area reported by the EU was revised accordingly.

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<b>LULUCF</b>			
L.1	4. General (LULUCF) (L.1, 2018) (L.1, 2016) (L.1, 2015) (13, 2014) (27, 2013) (12, 2012) Completeness	Continue efforts to improve the completeness of the reporting of emissions from all mandatory source categories in the LULUCF sector.	Resolved. The EU has continued its efforts to improve the completeness of the reporting of emissions from all mandatory categories in the LULUCF sector. The EU reported in its NIR (p.675) several improvements that have resulted in more complete reporting (e.g. carbon stock changes under HWP for the entire time series for Belgium; see ID# L.10 below). In addition, the EU adequately justified the use of “NE” for France (see ID# L.8 below).
L.2	4. General (LULUCF) (L.2, 2018) (L.2, 2016) (L.2, 2015) (95, 2014) (76, 2013) (86, 2012) Completeness	Work with member States with a view to reporting mandatory pools and categories that are currently not estimated in order to increase the completeness of the inventory.	Resolved. See ID# L.1 above.
L.3	4. General (LULUCF) (L.3, 2018) (L.13, 2016) (L.13, 2015) Convention reporting adherence	Include in the NIR information on planned inventory improvements for the LULUCF sector and KP-LULUCF.	Resolved. The EU reported in its NIR (sections 6.4.4 and 11.3.6) planned improvements in enough detail to enable the ERT to identify the type of improvements that are being considered by the EU for future submissions. During the review, the Party explained that it has revised NIR sections 6.4.4 and 11.3.6 since the 2019 submission to improve its description of the planned improvements to reporting for the LULUCF sector and KP-LULUCF. This has resulted in a more transparent description of planned improvements.
L.4	4. General (LULUCF) (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 inconsistencies for some land-use categories between CRF tables 4.1 and 4.A–4.F have been reduced. For example, for 2018, CRF table 4.1 reports a total final area of forest land (managed and unmanaged) of 166,789.62 kha, while the total area in CRF table 4.A is reported as 166,791.25 kha. The difference (1.63 kha) is smaller than that in the 2018 submission for 2016 (4.65 kha). For some land-use categories, however, there are larger differences, for example CRF table 4.1 reports for 2018 a total final area of cropland of 124,779.44 kha while the total area in CRF table 4.B is reported as 124,736.52 kha. During the review, the EU clarified that it evaluates the aggregation process of member States’ inventories on an annual basis as a specific QA/QC check. This process has reduced inconsistent reporting in CRF tables 4.1 and 4.A–4.F. However, the EU indicated that, despite this check and its recommendation to member States to correct the discrepancies if this issue was identified in individual inventories, some discrepancies remain.
L.5	4. General (LULUCF) – CO <sub>2</sub> (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).	Addressing. The EU encouraged the member States to report stock changes from carbon pools where carbon stock changes are neutral as “NA”. According to the NIR (p.718), Lithuania and Slovakia reported “NA” for carbon stock change in mineral soils for grassland remaining grassland, which was reported as “NO” in the 2018 submission. Furthermore, Italy provided a quantitative assessment of carbon stock changes in mineral soils for grassland remaining grassland instead of using a notation key. However, some member States continued to report stock changes from carbon pools where carbon stock changes are neutral as “NO”. For instance, Estonia, Greece and Luxembourg used this

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			notation key to report carbon stock changes in mineral soils for grassland remaining grassland. During the review, the EU clarified that member States' submissions undergo QA/QC checks to ensure correct use of notation keys as part of initial routine checks carried out every year before submission of the EU inventory. However, some member States continued to use "NO" or "NE" because they were more focused on improving the accuracy, consistency and completeness of reporting for the sector than on changing their use of notation keys. Nevertheless, the EU plans to continue tracking and to follow up on individual member States' submissions to ensure that carbon stock changes from carbon pools where carbon stock changes are neutral (i.e. where net emissions are equal to net removals) are reported as "NA", as recommended by the ERT, at least by those member States that did not receive from their ERT a recommendation that they should use a different notation key for reporting those pools.
L.6	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.6, 2018) (L.17, 2016) (L.16, 2015) Consistency	Work with Luxembourg to improve the time-series consistency of net carbon stock changes in deadwood in forest land remaining forest land.	Resolved. The EU reported (NIR, p.695, and CRF table 4.A) a complete time series of carbon stock changes in deadwood in forest land remaining forest land for Luxembourg. A combination of notation keys and estimated figures was reported in the 2018 submission.
L.7	4.A.2 Land converted to forest land – CO <sub>2</sub> (L.7, 2018) (L.4, 2016) (L.4, 2015) (97, 2014) (80, 2013) Transparency	Improve the transparency of the reporting, including the provision of updated information from member States and internal QA/QC checks, in order to ensure that the aggregated reporting is complete and consistent among member States.	Resolved. In the NIR (p.860) the EU explained that it has improved the transparency of the reporting with the inclusion of updated information from member States and on its internal QA/QC checks to ensure that the aggregated reporting is complete and consistent. The EU referred, for example, to NIR section 6.4.2, which has been elaborated to better describe the specific QA/QC checks implemented in the LULUCF sector. The original recommendation was related to the methodology used by Italy: emissions/removals from land converted to forest land and forest land remaining forest land are estimated together and disaggregated between the two categories only on the basis of the proportion of area of each category. During the review, the EU explained that it had requested Italy to provide specific information on the methodology used, which was then included in the EU NIR (section 6.2.1.3, pp.699–700), in order to ensure that the aggregated reporting is complete and consistent among member States.
L.8	4.B.2 Land converted to cropland – CO <sub>2</sub> (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 worked with the member States to improve the completeness of their reporting and to encourage the use of higher-tier methods in order to enhance accuracy. In its NIR (p.860), the EU explained that it has organized annual LULUCF workshops to support member States in addressing sector-specific reporting issues and to discuss the use of higher-tier methods. This work has contributed to improved completeness and increased use of higher-tier methods. The EU indicated in the NIR (p.712) that France reported carbon stock changes for other land converted to cropland as "NE" because, by definition, other land includes areas with no or insignificant carbon stock and because these conversions occur in a very small area (1.58 kha) of the territory, justifying properly that these conversions are insignificant for the EU. The ERT considers

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			that the completeness issue is resolved (see ID# L.1 above). The EU included information on improvements in its NIR (p.712), including on the use of higher-tier methods by some member States. For instance, Latvia reported carbon stock changes from dead organic matter following conversion of forest land to cropland for 2009–2018, having reported “NO” for 2012–2016 in the 2018 submission. Furthermore, the recommendation from the 2014 annual review report noted that some member States, including Italy and Luxembourg, reported emissions and removals for pools using only a lower-tier method. The ERT noted that this is still the case for the most recent submissions, and that land converted to cropland is a key category for Italy. The ERT considers that the recommendation has not yet been fully addressed because a number of member States did not report using higher-tier methods in order to enhance accuracy.
L.9	4.F Other land – CO <sub>2</sub> (L.11, 2018) (L.20, 2016) (L.19, 2015) Transparency	Include in the NIR information on whether land areas reported under other land in Finland, Portugal and the United Kingdom are unmanaged, and if not, work with these member States to report these areas and the associated CO <sub>2</sub> emissions and removals under the appropriate land-use categories.	Resolved. The EU contacted the member States to obtain information about whether the lands included under other land category were managed or unmanaged. In response, the United Kingdom and Finland clarified that land areas reported under other land are unmanaged and this is explained in the NIR (p.738). In the case of Portugal, the EU has worked with this member State, which resulted in a more transparent and complete reporting of this land-use category (i.e. Portugal included shrubland areas under other land) and the NIR (p.738) contains an explanation regarding future improvements.
L.10	4.G HWP – CO <sub>2</sub> (L.16, 2018) (L.22, 2016) (L.21, 2015) Completeness	Work with Belgium and Cyprus to ensure that the information on HWP in CRF table 4.G is complete for the whole time series.	Resolved. The 2018 review report noted that the issue had been resolved for Cyprus. As explained in the NIR (section 6.1.3, p.675, and section 10.4.1, p.855), CRF table 4.G includes complete information on HWP for the whole time series for Belgium.
Waste			
W.1	5.B Biological treatment of solid waste – CH <sub>4</sub> (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.	Addressing. The Party reported in NIR table 7.10, which corresponds to table 7.13 of the 2018 NIR, information on the drivers of significant recalculations in category 5.B for CH <sub>4</sub> . The table provides information on member States’ contributions to EU recalculations for 1990 and 2017. However, in some cases, the explanations for the largest recalculations in relative terms are not detailed enough. For example, the only explanation given for the 103 per cent increase in CH <sub>4</sub> emissions reported by one member State is “updated data”, with no further information provided. The ERT considers that although transparency has been improved, the Party should provide a more detailed explanation of the drivers of significant recalculations at the level of the EU inventory in the NIR.
W.2	5.B.1 Composting – CH <sub>4</sub> and N <sub>2</sub> O (W.3, 2018) Comparability	Report the CH <sub>4</sub> and N <sub>2</sub> O emissions of each type of composting waste in the correct subcategory: 5.B.1.a (for MSW) or 5.B.1.b (for other organic waste).	Resolved. The Party reported in its NIR (pp.810–811) and CRF table 5.B CH <sub>4</sub> and N <sub>2</sub> O emission estimates separately for subcategories 5.B.1.a (MSW) and 5.B.1.b (other) under category 5.B.1 composting. The Party also explained in the NIR (p.810) and during the review why disaggregated data for subcategories 5.B.1.a and 5.B.1.b are not available for all member States. In particular, the EU noted that in many member States, MSW and other waste are composted together, which means that there is no information on the split between the two types of waste. Only 10 member States (Czechia, Denmark, Estonia,



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			Finland, Hungary, Lithuania, Luxembourg, Netherlands, Poland and Slovakia) reported emissions from composting of other waste, while others generally reported emissions from composting for all types of waste (municipal, industrial, sludge) under subcategory 5.B.1.a since available composting data generally relate to total waste with no distinction between the various types of waste. The ERT considers that the reporting by the EU is adequate, as it reflects the sum of the amounts reported by the member States.
W.3	5.B.1 Composting – CH <sub>4</sub> and N <sub>2</sub> O (W.3, 2018) Transparency	Improve the transparency of the NIR by including more information on both types of waste composted (MSW and other organic waste), including AD, EFs and the type of waste included under other (5.B.1.b).	Resolved. The Party reported in its NIR (pp.810–811) more information on composting of MSW (subcategory 5.B.1.a) and other waste (subcategory 5.B.1.b), including the fact that only 10 member States reported emissions from composting of other waste (see ID# W.2 above). The methodological descriptions contained in annex III to the NIR include member State-specific information on AD, EFs and types of waste composted.
W.4	5.B.2 Anaerobic digestion at biogas facilities – CH <sub>4</sub> and N <sub>2</sub> O (W.4, 2018) Comparability	Improve the comparability of the inventory by working with member States to ensure that AD on the annual amount of waste treated through anaerobic digestion at biogas facilities (category 5.B.2) are reported for all Parties, thereby allowing the correct calculation and reporting of the CH <sub>4</sub> and N <sub>2</sub> O IEFs for this category.	Resolved. The Party reported in CRF table 5.B AD for the entire time series (“NE” was reported in the 2018 submission), providing values or notation keys for member States in the comments.
W.5	5.B.2 Anaerobic digestion at biogas facilities – CH <sub>4</sub> and N <sub>2</sub> O (W.4, 2018) Transparency	Improve the transparency of the NIR by including information on the AD and EFs used, as well as the calculation methodology followed, for the estimation of CH <sub>4</sub> and N <sub>2</sub> O emissions for this category.	Resolved. The Party reported in CRF table 5.B AD for the entire time series, with values for member States in the comments. See ID# W.4 above.
W.6	5.C Incineration and open burning of waste – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (W.5, 2018) Convention reporting adherence	Ensure that the section for the category incineration and open burning of waste (5.C) is included in the NIR and conduct a quality check of the NIR before submission.	Resolved. The Party included a section on the category incineration and open burning of waste in its NIR (p.813) and stated that this is not a key category for the EU. Quantitative information on the aggregated emissions from non-key categories in the waste sector was provided in section 7.2.5 of the NIR. The fact that the NIR contains the section that was missing from a previous submission indicates that a quality check was performed.
W.7	5.D.1 Domestic wastewater – CH <sub>4</sub> (W.6, 2018) Transparency	Include in the NIR a table reporting the amount of CH <sub>4</sub> emissions, CH <sub>4</sub> recovered and CH <sub>4</sub> flared by member State, and provide the results of an analysis of major trends related to CH <sub>4</sub> recovery and flaring practices.	Resolved. The Party included in the NIR (p.818 and p.820) two figures to present CH <sub>4</sub> recovery in domestic wastewater treatment plants, following the same approach presented for category 5.A.1 (pp.797–798). Figure 7.16 (p.818) presents the time series of the CH <sub>4</sub> emissions, CH <sub>4</sub> recovered for energy use and CH <sub>4</sub> flared. Figure 7.17 (p.820) shows the share of CH <sub>4</sub> recovery (energy use and flaring by member State). In addition, the Party increased the transparency in the NIR relating to the context on how CH <sub>4</sub> recovery and flaring in individual member States are reported under this category and the consistency of the technologies applied. For example, the Party explained that an important remark in the interpretation of data on CH <sub>4</sub> recovery that are reported in the EU CRF tables (and the

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			individual countries' CRF tables) for wastewater treatment is that the reported CH <sub>4</sub> recovery generally takes places during sludge digestion for biogas production in a follow-up step for aerated wastewater treatment plants. Conversely, CH <sub>4</sub> emissions relate mainly to anaerobic treatment systems (septic tanks and natural lagoons). Therefore, CH <sub>4</sub> emissions and recovery occur in different processes. It should be noted that the reporting of the amount of CH <sub>4</sub> recovered from sludge digesters is not mandatory, according to the 2006 IPCC Guidelines, and not all member States report this source.
KP-LULUCF			
KL.1	General (KP-LULUCF) (KL.2, 2018) (KL.1, 2016) (KL.1, 2015) (121, 2014) Transparency	Work with and support member States to improve consistency in the use of notation keys and further improve the transparency of future submissions.	Addressing. Although the EU included more detailed information in NIR table 11.17, which summarizes the information provided by member States to demonstrate that omitted carbon pools are not a net source of emissions, the use of notation keys by member States still lacks consistency and transparency. In the NIR (p.855) and during the review, the Party explained that it continues to work with member States to improve consistency with regard to the use of notation keys. The initial routine checks of the annual inventory of the EU ahead of its submission include QA/QC checks of member States' submissions for the correct use of notation keys. The issue was also discussed with member States during the annual LULUCF workshops organized by JRC and during meetings of the Climate Change Committee organized by the European Commission. In addition, the EU explained that "NA" has become more widely used among member States to report carbon stock changes from carbon pools where carbon stock changes are neutral, although it did not provide examples of improvements. The Party further explained that some member States continued to use "NO" or "NE" because they focused on improving the accuracy, consistency and completeness of reporting in the sector, rather than on their use of notation keys. The EU plans to continue tracking and following up on individual member States' submissions to ensure that carbon stock changes from carbon pools where carbon stock changes are neutral (i.e. where net emissions are equal to net removals) are reported as "NA", as recommended by the ERT, at least by those member States that did not receive from their ERT a recommendation that they should use a different notation key for reporting those pools. The ERT considers that the recommendation has not yet been fully addressed because, as explained by the EU, some inconsistencies remain with regard to the use of notation keys.
KL.2	General (KP-LULUCF) (KL.4, 2018) (KL.7, 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. Regarding the improvements pending according to the previous review report, the Party has included in its submission additional transparent information on approaches used to identify HWP from deforestation events (see ID# KL.10 below). Regarding the information on background level of emissions from natural disturbances included in the FMRL, progress has been made (see ID# KL.7 below). Some inconsistencies were still identified in the data included in CRF tables NIR-2 and 4(KP)A.1–4(KP)B.4. For example, the total area for deforestation for 2018 is different in CRF tables 4(KP-I)A.2 (3,637.37 kha) and NIR-2 (3,638.06 kha). During the review, the EU explained that it evaluates the aggregation process of member States' inventories on

<i>ID#</i>	<i>Issue/problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
			an annual basis as a specific QA/QC check. This process has reduced inconsistencies among CRF tables NIR-2 and 4(KP)A.1–4(KP)B.4 in terms of the areas reported. However, the EU indicated that despite this check and the recommendation it provided to its member States whenever this issue was identified in individual inventories, some discrepancies remain in the 2020 submission.
KL.3	General (KP-LULUCF) (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.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. In its NIR (pp.907–908), the EU included the information reported by the United Kingdom on its use of “NE” to report carbon stock changes in the litter and deadwood pools under CM and GM and CO <sub>2</sub> emissions/removals from WDR. In addition, the EU explained in NIR table 11.17 that the United Kingdom is not yet in a position to report all emissions and removals from these activities, which is why the relevant tables contain “NE”. During the review, regarding the reporting of WDR, the EU clarified that it had requested information from the United Kingdom to clarify the reporting status of WDR. During the most recent LULUCF workshops organized by JRC, the United Kingdom provided information on its research and ongoing methodological development programme to enable the reporting of carbon stock changes for this category by the end of the second commitment period. Additionally, the EU clarified that regarding CM and GM, the United Kingdom explained in its NIR that no quantitative estimation was given for carbon stock changes in litter and deadwood under CM and GM, as these pools are not a source. The ERT considers that the recommendation has not yet been fully addressed because the United Kingdom plans to include information for WDR only at the end of the commitment period, and because the EU has not included in its NIR the explanation of the United Kingdom on its use of “NE” to report net carbon stock changes in the litter and deadwood pools under CM and GM on the basis that the pools are not a source.
KL.5	FM – CO <sub>2</sub> (KL.13, 2018) (KL.14, 2016) (KL.14, 2015) Completeness	Work with Cyprus and Malta to estimate net CO <sub>2</sub> emissions/removals from FM activities.	Resolved. The EU has worked with Cyprus and Malta and included relevant information in its NIR. According to the EU’s 2018 review report, the issue has been resolved for Cyprus. The EU reported “NO” for all pools for Malta in CRF table 4(KP-I)B.1. Information for Malta has been included in NIR table 11.17, explaining that Malta considers that its areas subject to FM are in equilibrium. During the review, the Party further clarified that Malta is not reporting carbon stock changes under FM following a recommendation from the LULUCF expert during its most recent in-country review. Further information on Malta is included in the EU NIR (p.857 and p.906).
KL.6	FM – CO <sub>2</sub> (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	Addressing. The EU did not provide in CRF table 4(KP-I)B.1.1 accurate information on the FMRL inscribed in the appendix to the annex of decision 2/CMP.7, as recommended by previous ERTs. It provided this value only in the documentation box to CRF table 4(KP-I)B.1.1 and for information purposes in the NIR (p.930). The value reported in CRF table 4(KP-1)B.1.1 is –315,476.00 kt CO <sub>2</sub> eq, whereas the value inscribed in the appendix

ID#	Issue/problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
KL.7	FM – CO <sub>2</sub> (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 JRC 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>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> <p>to the annex of decision 2/CMP.7 is –306,736 kt CO<sub>2</sub> eq/year for the member States excluding Croatia and Iceland, applying the first-order decay function for HWP, and – 6,298 and –154 kt CO<sub>2</sub> eq/year for Croatia (which was not included in the EU FMRL contained in decision 2/CMP.7) and Iceland, respectively, assuming instantaneous oxidation. The ERT considers that the difference between the FMRL provided for the EU in the appendix to the annex to decision 2/CMP.7 and the one reported by the EU should be reflected as a technical correction and described in the NIR. The EU did not provide the value of the technical correction for the EU as a whole, contrary to the requirements of decision 2/CMP.8, annex II, paragraph 5(f). Although the EU reported a technical correction in the CRF accounting table (32,310.72 kt CO<sub>2</sub> eq), this value does not cover all member States. The EU reported in its NIR (section 11.5.2.3) that to date 18 member States have implemented technical corrections to the FMRL and some have indicated that they expect a technical correction to be implemented. In its NIR (p.857) the Party stated that it considers that the value in the CRF table should not be the value inscribed in the appendix to the annex to decision 2/CMP.7 but rather the sum of values for FMRLs and technical corrections as reported by member States. The EU further explained that, using such reporting, the sum of accounting quantities for FM submitted by individual member States would be equal to the accounting quantity that is reflected in the EU CRF accounting table. If the difference between the FMRL provided for the EU in the appendix to the annex to decision 2/CMP.7 and that reported by the EU (which takes into account only the current composition of the EU) was reflected as a technical correction, the sum of the technical corrections of its member States would not match the technical correction of the EU. During the review, the EU further explained that it plans to provide a technical correction for each member State by the end of the second commitment period when the accounting quantities have been derived.</p> <p>The ERT considers that the recommendation has not yet been fully addressed because the EU has not yet provided in the NIR and 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, in accordance with the requirements of decision 2/CMP.8, annex II, paragraph 5(f), and taking into consideration the changes in the coverage of the FMRL.</p> <p>Addressing. The EU reported information on the background level of emissions and the margin associated with natural disturbances for more member States compared with the 2018 submission (e.g. for Cyprus) (NIR section 11.5.3 and table 11.24). This demonstrates that the EU has made an effort to improve its reporting in this regard. However, the EU did not provide the background level of emissions associated with natural disturbances of its FMRL. During the review, the EU clarified that it included additional information in its NIR (section 11.5.2.2). However, the ERT observed that it contains the same information as the 2018 submission. The EU clarified that it has worked bilaterally with some member States to support the calculation of the technical correction.</p>

ID#	Issue/problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
KL.8	CM – CO <sub>2</sub> (KL.20, 2018) Completeness	Provide transparent and verifiable information on the use of notation key “NE” to report carbon stock changes in mineral soils under CM for Italy in order to increase transparency.	Resolved. The EU reported in CRF table 4(KP-I)B.2 carbon stock changes from mineral soils in CM for Italy, replacing the notation key “NE” previously reported.
KL.9	HWP – CO <sub>2</sub> (KL.18, 2018) (KL.19, 2016) (KL.19, 2015) Completeness	Work with Belgium to estimate net CO <sub>2</sub> emissions/removals from HWP.	Resolved. Belgium estimated AD and net CO <sub>2</sub> emissions and removals from HWP for the years prior to 2000 (see ID# L.10 above) and recalculated the estimates for HWP under KP-LULUCF accordingly. The EU reported in its NIR (section 11.3.6, p.917) that Belgium estimated carbon stock changes in HWP for the whole time series, which resulted in the current reporting of this carbon pool under KP-LULUCF.
KL.10	HWP – CO <sub>2</sub> (KL.19, 2018) (KL.20, 2016) (KL.20, 2015) Accuracy	Work with member States to ensure that HWP from deforestation events are accounted for on the basis of instantaneous oxidation and report explicit information regarding HWP from deforestation events in CRF table 4(KP-I)C, in accordance with good practice requirements in the <i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i> (p.2.119).	Resolved. The previous review report noted that the EU reported quantitative carbon stock changes in HWP for land subject to deforestation for Denmark, Hungary, Latvia and Romania but that information on how these member States distinguish HWP from regrowth on deforested land and from deforestation events was not included in the NIR. The EU reported in its NIR (p.926) that the information on HWP under deforestation has been corrected for Hungary, Latvia and Romania and that CRF table 4(KP-I)C no longer reports quantitative carbon stock changes for these member States. Denmark reported quantitative carbon stock changes in HWP for land subject to deforestation and the EU included in its NIR (p.926) the member State’s explanation of how it distinguishes between HWP from deforestation events and HWP from trees growing in previously deforested lands.

<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 2019 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 2018 annual review report. For the same reason, 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 2020 annual submission of the EU, and had not been addressed by the Party at the time of publication of this review report.

Table 4

##### Issues and/or problems identified in three or more successive reviews and not addressed by the European Union

ID#	Previous recommendation for the issue	Number of successive reviews issue not addressed <sup>a</sup>
General	No issues identified.	

<i>ID#</i>	<i>Previous recommendation for the issue</i>	<i>Number of successive reviews issue not addressed<sup>a</sup></i>
<b>Energy</b>		
E.1	Present methodological summaries that are consistent among member States and categories, at least for the key categories.	4 (2014–2020)
E.3	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.	3 (2015/2016–2020)
E.15	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 to report emissions from lubricants combusted in two-stroke engines under the transport category in accordance with the 2006 IPCC Guidelines.	3 (2015/2016–2020)
<b>IPPU</b>		
I.1	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.	3 (2015/2016–2020)
I.2	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.	3 (2015/2016–2020)
I.4	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.	3 (2015/2016–2020)
I.5	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.	3 (2015/2016–2020)
I.7	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.	3 (2015/2016–2020)
I.10	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.	3 (2015/2016–2020)
I.11	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).	3 (2015/2016–2020)
I.15	Endeavour to provide in the NIR summary overviews of methodologies used to estimate 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.	4 (2014–2020)
I.20	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.	4 (2014–2020)

<i>ID#</i>	<i>Previous recommendation for the issue</i>	<i>Number of successive reviews issue not addressed<sup>a</sup></i>
<b>Agriculture</b>		
A.1	Indicate in the NIR where in the inventory of the Netherlands indirect CO <sub>2</sub> emissions from the agriculture sector are included.	3 (2015/2016–2020)
A.5	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.	3 (2015/2016–2020)
A.12	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.	3 (2015/2016–2020)
A.16	Work with member States to ensure more consistent reporting of the area of organic soils between the agriculture and LULUCF sectors.	4 (2014–2020)
<b>LULUCF</b>		
L.4	Correct the inconsistencies in the reported areas in CRF tables 4.1 and 4.A–4.F.	3 (2015/2016–2020)
L.5	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).	3 (2015/2016–2020)
L.8	Work with the member States to improve the completeness of their reporting and use higher-tier methods in order to enhance accuracy.	6 (2012–2020)
Waste	No issues identified.	
<b>KP-LULUCF</b>		
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.	4 (2014–2020)
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.	3 (2015/2016–2020)
KL.3	Ensure that issues identified during the aggregation process, which affect the accuracy and completeness of the submission, are resolved.	3 (2015/2016–2020)
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.	3 (2015/2016–2020)
KL.6	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.	3 (2015/2016–2020)
KL.7	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 JRC approach, in order to	3 (2015/2016–2020)

<i>ID#</i>	<i>Previous recommendation for the issue</i>	<i>Number of successive reviews issue not addressed<sup>a</sup></i>
	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.	

<sup>a</sup> Reports on the reviews of the 2017 and 2019 annual submissions of the EU have not yet been published. Therefore, 2017 and 2019 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 2020 annual submission

10. Tables 5–6 present findings made by the ERT during the individual review of the 2020 annual submission of the EU that are additional to those identified in table 3. In accordance with paragraph 76(b) of the UNFCCC review guidelines, the ERT has prioritized in table 5 recalculations that changed the total emissions or removals for a category by more than 2 per cent and/or national total emissions by more than 0.5 per cent for any of the recalculated years.

Table 5

### Additional findings made during the individual review of the 2020 annual submission of the European Union related to recalculations

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?<sup>a</sup></i>
Energy			
		Recalculations were made for the energy sector that changed the emission or removal estimate for some categories by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with these recalculations.	
IPPU			
I.21	2.A Mineral industry – CO <sub>2</sub>	<p>The ERT noted that NIR table 4.3 and CRF table 8 contain inconsistent data on total recalculations for 1990 and 2017 for mineral industry. Recalculations for 1990 increased estimated emissions from the mineral industry by 38.24 kt CO<sub>2</sub> (CRF table 8), while NIR table 4.3 reports a change of –8 kt CO<sub>2</sub> for the member States excluding Iceland. During the review, the EU clarified that incorrect values had been entered in NIR table 4.3 for Romania, making the total recalculations shown in that table incorrect.</p> <p>The ERT recommends that the EU ensure consistency between the information on the magnitude of recalculations for mineral industry in the NIR tables and CRF table 8.</p>	Yes. Convention reporting adherence
I.22	2.B.9 Fluorochemical production – HFCs	<p>Recalculations were made for this category that changed its emission or removal estimate by more than 2 per cent. In its 2018 submission, the EU reported HFC-125 emissions from the production of HCFC-22 for 1990–2016 under category 2.B.9.a, while in the 2020 submission it reported HFC-125 emissions for this category as “NO” and “NA” for 1990–2005 and 2014 onward. No explanation was provided in the 2019 or 2020 NIRs.</p> <p>During the review the EU clarified 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</p>	Yes. Transparency



<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?<sup>a</sup></i>
		from the production of HFC-125 (category 2.B.9.b). The difference between the submissions is related to a change in the United Kingdom's submission and concerns only the reallocation of emissions.  The ERT recommends that the EU include the information provided during the review in its next NIR if still relevant.	
I.23	2.F.1 Refrigeration and air conditioning – HFCs	Recalculations were made for this category that changed its emission or removal estimate by more than 2 per cent. The EU reported an unspecified mix of HFCs from stationary air conditioning in the 2018 submission for 1995–2016. These emissions were reported as “NO” for 1990–2013 in the 2019 submission, and as “NO” for the whole time series except 2018 in the 2020 submission. Neither the 2019 nor the 2020 NIR provides details of the recalculations.  During the review, the EU clarified that the change in the EU inventory between the 2018 and 2020 submissions relates 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.  The ERT recommends that the EU include the information provided during the review in its next NIR if still relevant.	Yes. Transparency
I.24	2.F.4 Aerosols – HFCs	Recalculations were made for this category that changed its emission or removal estimate by more than 2 per cent. The EU reported an unspecified mix of HFCs from other aerosols for 2001–2006 in the 2018 submission, but reported emissions for this category as “NO” for the whole time series except 2001–2002 in the 2019 and 2020 submissions. No explanation for this recalculation was provided in the 2019 or 2020 NIR.  During the review, the EU clarified that the change in its inventory relates to changes in the inventory of Finland. In the 2018 submission Finland 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.  The ERT recommends that the EU include the information provided during the review in its next NIR if still relevant.	Yes. Transparency
Agriculture		Recalculations were made for the agriculture sector that changed the emission or removal estimate for some categories by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with these recalculations.	
LULUCF		Recalculations were made for the LULUCF sector that changed the emission or removal estimate for some categories by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with these recalculations.	

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?<sup>a</sup></i>
Waste			
		Recalculations were made for the waste sector that changed the emission or removal estimate for some categories by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with these recalculations.	
KP-LULUCF			
		Recalculations made for KP-LULUCF changed the emission or removal estimate for some categories by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with these recalculations.	

<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.

11. Table 6 contains additional findings made by the ERT during the individual review of the 2020 annual submission that are not covered in table 3 or 5, but are within the scope of the desk review as specified in paragraph 76 of the UNFCCC review guidelines or paragraph 65 of the Article 8 review guidelines and are findings that the ERT wishes to convey to the Party.

Table 6

**Additional findings made during the individual review of the 2020 annual submission of the European Union**

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?<sup>a</sup></i>
General			
G.6	Key category analysis	<p>The ERT noted conflicting information in the NIR on the number of key categories: on page 47, it states there are 93 key categories excluding LULUCF, 102 including LULUCF, whereas table 1.12 and annex 1 show 88 key categories excluding LULUCF, 100 including LULUCF. The ERT also noted differences in some of the figures for the agriculture sector between NIR table 1.12, annex 1 to the NIR and the CRF tables for the agriculture sector. For example, for CH<sub>4</sub> from enteric fermentation of dairy cattle, the emissions for 2018 included in NIR table 1.12 are 59,788 kt CO<sub>2</sub> eq, in annex 1 to the NIR they are 59,894 kt CO<sub>2</sub> eq and in CRF table 3.As1 they are 75,426.45 kt CO<sub>2</sub> eq. During the review, the Party provided a spreadsheet containing the database used for the key category analysis (see ID# G.1 in table 3). Further, the Party acknowledged that the information on page 47 of the NIR was incorrect: the correct number of key categories is 88 excluding LULUCF and 100 including LULUCF. The Party also explained that an error occurred when summing up the emissions of different cattle subcategories for the key category analysis.</p> <p>The ERT recommends that the Party 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>	Yes. Convention reporting adherence
G.7	Key category analysis	According to the 2006 IPCC guidelines (vol. 1, chap. 4, p.4.15), key categories are those that, when summed together in descending order of magnitude, add up to 95 per cent of the total emissions. On request of the ERT, the Party provided its key category analysis spreadsheet during the review (see ID# G.1 in table 3). The ERT noted that the Party's key category analysis excluded the last category, which surpasses the 95 per cent limit, both with and	Yes. Convention reporting adherence

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?<sup>a</sup></i>
		<p>without LULUCF. Therefore, two more key categories should have been identified by level for 2018, namely category 1.A.3.e (other transportation: gaseous fuels (CO<sub>2</sub>) – with LULUCF) and category 2.D.3 (other non-energy products from fuels and solvent use (CO<sub>2</sub>) – without LULUCF). During the review, the Party explained that this issue was caused by an error in the macro used, which it plans to correct for the next submission.</p> <p>The ERT recommends that the Party 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>	
<b>Energy</b>			
E.20	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	<p>The Party reported in its NIR (p.212) that emissions for category 1.A.2.g other (manufacturing industries and construction) include those from stationary combustion, but may also include emissions from mobile sources (e.g. construction machinery), and that some member States use this category to report emissions that cannot be allocated to categories 1.A.2.a–1.A.2.f owing to a lack of detailed data. Previous versions of the NIR (e.g. in the 2018 submission) included more detail on the emissions from off-road vehicles and other machinery included in this category (see ID# E.14 in table 3). The ERT noted that it is difficult to review the emissions for this category because it is unclear what is included in this category.</p> <p>The ERT recommends that the Party 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.</p>	Yes. Transparency
E.21	1.A.3 Transport – gas/diesel oil and gasoline – CO <sub>2</sub>	<p>The Party reported in the NIR CO<sub>2</sub> EFs for each member State for gas/diesel oil (figure 3.187) and gasoline (figure 3.189) and compared them with the default EFs from the 2006 IPCC Guidelines (vol. 2, chap. 3, table 3.2.1). The legends to these figures indicate that the EFs shown do not consider biofuel. Both figures show that the EF used by Austria is below the IPCC lower value, also included in the figure, and notes to the figures indicate that Austria's EF is used in the reference approach and reflects the growing share of biofuels in blends.</p> <p>During the review, the Party clarified that the EFs for Austria presented in the NIR figures include blended biofuel. The EU also indicated that the EFs in the NIR are different from those given in CRF table 1.A(a)s3, where they are given separately for each energy source (e.g. IEF for fossil diesel, fossil gasoline and biomass).</p> <p>The ERT encourages the Party to either report the EFs for the fossil portion of gas/diesel oil and gasoline for Austria in NIR figures 3.187 and 3.189 or amend the note to the figures to indicate that Austria's EF is used in the reference approach and reflects blended fuel, including biofuels in the blend.</p>	Not an issue/problem
<b>IPPU</b>			
I.25	2.B.10 Other (chemical industry) – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	<p>The ERT noted that NIR tables 4.27–4.31 contain inconsistent data on emissions for 1990 and 2018 for certain member States. For example, table 4.27 reports emissions of 868.82 kt CO<sub>2</sub> for Estonia for 1990, while table 4.28 reports CO<sub>2</sub> emissions for Estonia as “NO”. During the review, the EU clarified that values were entered incorrectly for Estonia, Portugal and the United Kingdom in NIR table 4.27 and for Portugal and the United Kingdom in table 4.31.</p>	Yes. Convention reporting adherence

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?<sup>a</sup></i>
		The ERT recommends that the EU ensure consistency in the reporting of emissions from the chemical industry (other) across NIR tables 4.27–4.31.	
<b>Agriculture</b>			
A.18	3.B Manure management – N <sub>2</sub> O	<p>The Party reported in its NIR information on N<sub>2</sub>O emissions from manure management (see ID# A.8, table 3). NIR tables 5.29 and 5.30 include the contributions of the Netherlands to this category for cattle and swine, respectively, but the methods and EFs used are reported as “NA” for the member State. During the review, the Party confirmed that the Netherlands followed a tier 1 methodology to estimate N<sub>2</sub>O emissions from manure management for cattle and swine.</p> <p>The ERT recommends that the EU 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.</p>	Yes. Convention reporting adherence
A.19	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N <sub>2</sub> O	<p>The Party reported in CRF table 3.D an IEF for cultivation of organic soils ranging from 6.45 to 6.40 kg N<sub>2</sub>O-N/ha (1990 and 2018, respectively). These values are lower than the IPCC default values of 8–16 kg N<sub>2</sub>O-N/ha (2006 IPCC Guidelines, vol. 4, chap. 11, table 11.1). The NIR does not provide information on assumptions and considerations for different member States that could have resulted in a low IEF, nor does it explain how the IEF was derived for the EU NIR.</p> <p>During the review, the Party clarified that the N<sub>2</sub>O IEF for cultivation of organic soils is lower than the range of the IPCC default values for 4 of the 22 member States that reported emissions for this source category (Germany, Iceland, Ireland and Netherlands). The emissions reported by these four member States account for 27 per cent of total EU emissions under this source category. Germany used an average country-specific N<sub>2</sub>O EF (4.7 kg N<sub>2</sub>O-N/ha), which it derived by aggregating regional estimates of EFs. Ireland, which used an EF of 4.3 kg N<sub>2</sub>O-N/ha, estimated emissions from drainage/management of organic soils using the area of drained/managed organic soils used to estimate emissions and removals for category 4.C grasslands and the EF for nutrient-poor grasslands from table 2.5 of the Wetlands Supplement. The EU further stated that Iceland, which used an EF of 0.5 kg N<sub>2</sub>O-N/ha, included in annex 9 to its NIR a justification for its use of a country-specific EF, which was derived from direct measurements of its organic and volcanic soils. The Netherlands, with an EF of 4.4 kg N<sub>2</sub>O-N/ha, used 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<sup>-1</sup>) and nutrient-poor (0.1 kg N<sub>2</sub>O-N ha<sup>-1</sup>) forest soils (2006 IPCC Guidelines, vol. 4, table 11.1). The EU indicated that it plans to include this information in the next submission. The ERT considered that the explanation for the Netherlands lacked clarity regarding how the EF of 4.4 kg N<sub>2</sub>O-N/ha was derived by using the EFs in the 2006 IPCC Guidelines (vol. 4, table 11.1).</p> <p>The ERT recommends that the Party 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.</p>	Yes. Transparency
<b>LULUCF</b>			
L.11	4.A.2.2 Grassland converted to forest land – CO <sub>2</sub>	The Party reported in CRF table 4.A the carbon stock change per area in mineral soils for grassland converted to forest land for 2018 as –0.05 t C/ha, whereas the value lies between +0.04 and +0.05 t C/ha for 2009–2017. During the review, the EU clarified that the 2018 value results from a recalculation implemented by Romania, which used	Yes. Transparency

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?<sup>a</sup></i>
		a new method and data for the forest land category. However, this new method and the new data were only applied for 2018. As part of its internal QA/QC checks, the EU requested Romania to ensure time-series consistency by consistently applying the new method and data for all years in the time series. Romania explained that owing to resource constraints, it expects this improvement to be implemented for its next submission.  The ERT recommends that the EU improve transparency by explaining any significant issues related to time-series consistency for this category in the NIR.	
Waste		No findings for the waste sector additional to those included in table 3 were made by the ERT during the review.	
KP-LULUCF		No findings for KP-LULUCF additional to those included in table 3 were made by the ERT during the review.	

<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

12. The ERT did not identify the need to apply any adjustments for the 2020 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

13. The EU stated in its NIR (chap. 11, p.883) that each member State will individually account for net emissions and removals for each activity under Article 3, paragraphs 3–4, of the Kyoto Protocol by issuing RMUs or by cancelling AAUs, ERUs, CERs and/or RMUs on the basis of the corresponding reported emissions and removals from these activities in the national registry. The EU will neither issue nor cancel units on the basis of the reported emissions and removals from KP-LULUCF.

14. The EU member States have different accounting frequencies: in particular, Hungary has annual accounting for AR, deforestation and FM, and Denmark has annual accounting for AR, deforestation, FM, CM and GM, whereas all other member States have commitment period accounting for their KP-LULUCF.

## VIII. Questions of implementation

15. No questions of implementation were identified by the ERT during the individual review of the Party's 2020 annual submission.

## 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 2020 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 for the European Union, base year<sup>a</sup>–2018

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

	Total GHG emissions excluding indirect CO <sub>2</sub> emissions		Total GHG emissions including indirect CO <sub>2</sub> emissions <sup>b</sup>		Land-use change (Article 3.7 bis as contained in the Doha Amendment) <sup>c</sup>	KP-LULUCF (Article 3.3 of the Kyoto Protocol) <sup>d</sup>	KP-LULUCF (Article 3.4 of the Kyoto Protocol)	
	Total including LULUCF	Total excluding LULUCF	Total including LULUCF	Total excluding LULUCF			CM, GM, RV, WDR	FM
FMRL								–315 476.00
Base year	5 636 011.52	5 866 322.59	5 640 220.90	5 870 531.97	5 560.49		62 319.62	
1990	5 409 151.04	5 654 453.41	5 413 360.41	5 658 662.78				
1995	5 038 639.23	5 311 784.38	5 042 149.06	5 315 294.21				
2000	4 870 383.29	5 174 861.89	4 873 239.75	5 177 718.35				
2010	4 479 457.27	4 804 548.43	4 481 660.67	4 806 751.83				
2011	4 324 139.85	4 644 263.90	4 326 227.24	4 646 351.30				
2012	4 260 114.21	4 582 410.77	4 262 123.15	4 584 419.71				
2013	4 160 844.78	4 484 896.37	4 162 704.54	4 486 756.13		–17 495.17	50 015.82	–484 983.66
2014	4 005 762.95	4 308 598.28	4 007 559.97	4 310 395.29		–20 558.46	47 958.99	–463 077.18
2015	4 049 429.92	4 343 188.57	4 051 218.23	4 344 976.89		–19 664.75	43 650.66	–450 180.04
2016	4 029 316.59	4 316 096.36	4 031 055.80	4 317 835.57		–14 400.38	41 332.76	–445 509.40
2017	4 078 582.21	4 330 907.39	4 080 310.08	4 332 635.26		–16 369.21	42 195.51	–416 834.68
2018	3 968 617.52	4 232 273.60	3 970 229.30	4 233 885.39		–20 508.39	43 308.77	–355 616.62

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

<sup>a</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 all member States except Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986); 1995 for HFCs, PFCs and SF<sub>6</sub> for all member States except Austria, Croatia, France, Iceland, Italy, Malta and Slovakia (1990) and Romania (1989); and 1995 for NF<sub>3</sub> for 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. The values reported refer to the sum of the values reported by the member States 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 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.

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

<sup>c</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 report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of the Party.

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

Table I.2

**Greenhouse gas emissions by gas for the European Union, excluding land use, land-use change and forestry, 1990–2018**

(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>
1990	4 474 783.27	730 016.10	381 336.37	29 206.68	26 373.24	5 840.68	11 082.67	23.78
1995	4 221 244.75	666 894.20	344 384.99	44 156.09	17 359.23	5 916.70	15 238.48	99.77
2000	4 186 013.14	607 211.79	304 500.81	54 703.55	12 345.89	2 213.91	10 625.82	103.44
2010	3 959 597.45	492 003.56	239 524.49	104 571.49	4 056.71	510.80	6 367.73	119.59
2011	3 811 621.34	481 816.07	235 597.97	106 407.89	4 252.56	406.16	6 121.50	127.81
2012	3 753 892.90	477 467.59	233 070.99	109 250.54	3 623.34	786.19	6 235.94	92.22
2013	3 662 879.12	467 815.05	233 480.47	111 720.85	3 743.19	959.20	6 092.17	66.08
2014	3 488 667.74	460 559.99	236 686.32	114 430.26	3 424.70	752.40	5 803.78	70.10
2015	3 526 493.96	460 298.98	237 116.90	110 623.79	3 531.39	747.25	6 099.97	64.65
2016	3 507 562.12	454 561.59	236 258.70	108 305.89	3 940.41	762.65	6 382.61	61.61
2017	3 520 749.20	453 793.04	240 750.26	106 025.23	3 543.37	1 085.65	6 628.10	60.41
2018	3 439 733.61	447 047.58	235 846.74	98 985.36	3 727.16	1 757.85	6 718.77	68.33
<b>Percentage change 1990–2018</b>	<b>–23.1</b>	<b>–38.8</b>	<b>–38.2</b>	<b>238.9</b>	<b>–85.9</b>	<b>–69.9</b>	<b>–39.4</b>	<b>187.4</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 by sector for the European Union, 1990–2018**

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

	Energy	IPPU	Agriculture	LULUCF	Waste	Other
1990	4 352 995.97	517 674.03	546 740.66	–245 302.37	241 252.12	NO, NA
1995	4 092 800.38	499 199.27	475 018.04	–273 145.15	248 276.53	NO, NA
2000	4 024 597.67	455 901.23	464 383.03	–304 478.60	232 836.42	NO, NA
2010	3 813 667.73	397 231.57	426 590.57	–325 091.16	169 261.96	NO, NA

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
2011	3 663 051.28	392 730.18	427 092.74	−320 124.06	163 477.10	NO, NA
2012	3 619 932.13	380 057.13	425 146.75	−322 296.56	159 283.69	NO, NA
2013	3 527 264.32	377 945.50	428 535.11	−324 051.59	153 011.20	NO, NA
2014	3 342 729.10	384 308.63	436 109.09	−302 835.32	147 248.46	NO, NA
2015	3 382 639.22	379 793.06	437 796.75	−293 758.66	144 747.85	NO, NA
2016	3 361 563.14	376 517.03	438 210.22	−286 779.77	141 545.18	NO, NA
2017	3 367 777.89	382 712.13	441 793.91	−252 325.18	140 351.33	NO, NA
2018	3 284 354.38	374 740.82	436 217.61	−263 656.09	138 572.59	NO, NA
<b>Percentage change 1990–2018</b>	<b>−24.5</b>	<b>−27.6</b>	<b>−20.2</b>	<b>7.5</b>	<b>−42.6</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<sup>a</sup>–2018, for the European Union**  
(kt CO<sub>2</sub> eq)

	<i>Article 3.7 bis as contained in the Doha Amendment<sup>b</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				−315 476.00				
Technical correction				32 310.72				
Base year	5 560.49				36 916.28	27 449.63	−2 046.30	NO, NE, IE, NA
2013		−57 913.96	40 418.79	−484 983.66	31 737.06	20 075.24	−1 796.49	NO, NE, IE, NA
2014		−59 993.81	39 435.35	−463 077.18	30 098.19	19 674.48	−1 813.68	NO, NE, IE, NA
2015		−60 404.10	40 739.34	−450 180.04	26 186.21	19 318.05	−1 853.61	NO, NE, IE, NA
2016		−59 867.15	45 466.77	−445 509.40	24 215.84	19 020.09	−1 903.17	NO, NE, IE, NA
2017		−55 194.64	38 825.43	−416 834.68	23 747.86	20 398.96	−1 951.31	NO, NE, IE, NA
2018		−61 226.86	40 718.47	−355 616.62	25 399.13	19 877.25	−1 967.62	NO, NE, IE, NA
<b>Percentage change base year–2018</b>					<b>−31.2</b>	<b>−27.6</b>	<b>−3.8</b>	<b>NA</b>

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

<sup>a</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. The values reported refer to the sum of the values reported by member States 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 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.

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



2. Table I.5 provides an overview of key relevant data from the reporting of the EU under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.5

**Key relevant data for the European Union under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2020 annual submission**

<i>Parameter</i>	<i>Data values</i>
Periodicity of accounting	<p>(a) AR: commitment period accounting for all member States except Denmark and Hungary</p> <p>(b) Deforestation: commitment period accounting for all member States except Denmark and Hungary</p> <p>(c) FM: commitment period accounting for all member States except Denmark and Hungary</p> <p>(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</p> <p>(e) GM: elected by Denmark, Germany, Ireland, Italy, Portugal and the United Kingdom, with commitment period accounting for all indicated member States except Denmark</p> <p>(f) RV: elected by Romania and Iceland, with commitment period accounting for both member States</p> <p>(g) WDR: elected by the United Kingdom, with commitment period accounting</p>
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	<p>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. Member State elections are as follows:</p> <p>(a) CM: elected by Denmark, Germany, Ireland, Italy, Portugal, Spain and the United Kingdom;</p> <p>(b) GM: elected by Denmark, Germany, Ireland, Italy, Portugal and the United Kingdom;</p> <p>(c) RV: elected by Romania and Iceland;</p> <p>(d) WDR: elected by the United Kingdom.</p>
Election of application of provisions for natural disturbances	<p>Yes, elections made by member States are as follows:</p> <p>(a) AR: elected by Bulgaria, Croatia, France, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Romania, Spain, Sweden and the United Kingdom;</p> <p>(b) FM: elected by Austria, Belgium, Bulgaria, Croatia, Cyprus, Estonia, Finland, France, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Romania, Spain, Sweden and the United Kingdom.</p>
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
7. WDR	NA

## Annex II

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

Tables II.1–II.6 include the information to be included in the compilation and accounting database for the EU. Data shown are from 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 2018, including on the commitment period reserve, for the European Union**  
(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>CPR</b>	14 231 780 406	—	—	14 231 780 406
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 439 733 611	—	—	3 439 733 611
CH <sub>4</sub>	447 047 580	—	—	447 047 580
N <sub>2</sub> O	235 846 739	—	—	235 846 739
HFCs	98 985 356	—	—	98 985 356
PFCs	3 727 159	—	—	3 727 159
Unspecified mix of HFCs and PFCs	1 757 846	—	—	1 757 846
SF <sub>6</sub>	6 718 769	—	—	6 718 769
NF <sub>3</sub>	68 331	—	—	68 331
<b>Total Annex A sources</b>	<b>4 233 885 390</b>	—	—	<b>4 233 885 390</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–61 226 863	—	—	–61 226 863
Deforestation	40 718 468	—	—	40 718 468
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–355 616 619	—	—	–355 616 619
CM	25 399 128	—	—	25 399 128
CM for the base year	36 916 284	—	—	36 916 284
GM	19 877 254	—	—	19 877 254
GM for the base year	27 449 632	—	—	27 449 632
RV	–1 967 617	—	—	–1 967 617
RV for the base year	–2 046 297	—	—	–2 046 297
WDR	IE, NA, NE, NO	—	—	IE, NA, NE, NO
WDR for the base year	IE, NA, NE, NO	—	—	IE, NA, NE, NO

Table II.2

**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 estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 520 749 204	—	—	3 520 749 204
CH <sub>4</sub>	453 793 039	—	—	453 793 039
N <sub>2</sub> O	240 750 257	—	—	240 750 257
HFCs	106 025 227	—	—	106 025 227
PFCs	3 543 369	—	—	3 543 369
Unspecified mix of HFCs and PFCs	1 085 645	—	—	1 085 645
SF <sub>6</sub>	6 628 103	—	—	6 628 103

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
NF <sub>3</sub>	60 414	—	—	60 414
<b>Total Annex A sources</b>	<b>4 332 635 257</b>	—	—	<b>4 332 635 257</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–55 194 638	—	—	–55 194 638
Deforestation	38 825 427	—	—	38 825 427
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–416 834 676	—	—	–416 834 676
CM	23 747 855	—	—	23 747 855
CM for the base year	36 916 284	—	—	36 916 284
GM	20 398 962	—	—	20 398 962
GM for the base year	27 449 632	—	—	27 449 632
RV	–1 951 306	—	—	–1 951 306
RV for the base year	–2 046 297	—	—	–2 046 297
WDR	IE, NA, NE, NO	—	—	IE, NA, NE, NO
WDR for the base year	IE, NA, NE, NO	—	—	IE, NA, NE, NO

Table II.3

**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 estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 507 562 122	—	—	3 507 562 122
CH <sub>4</sub>	454 561 587	—	—	454 561 587
N <sub>2</sub> O	236 258 696	—	—	236 258 696
HFCs	108 305 888	—	—	108 305 888
PFCs	3 940 413	—	—	3 940 413
Unspecified mix of HFCs and PFCs	762 646	—	—	762 646
SF <sub>6</sub>	6 382 607	—	—	6 382 607
NF <sub>3</sub>	61 612	—	—	61 612
<b>Total Annex A sources</b>	<b>4 317 835 572</b>	—	—	<b>4 317 835 572</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–59 867 154	—	—	–59 867 154
Deforestation	45 466 770	—	—	45 466 770
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–445 509 403	—	—	–445 509 403
CM	24 215 841	—	—	24 215 841
CM for the base year	36 916 284	—	—	36 916 284
GM	19 020 091	—	—	19 020 091
GM for the base year	27 449 632	—	—	27 449 632
RV	–1 903 168	—	—	–1 903 168
RV for the base year	–2 046 297	—	—	–2 046 297
WDR	IE, NA, NE, NO			IE, NA, NE, NO
WDR for the base year	IE, NA, NE, NO			IE, NA, NE, NO

Table II.4

**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 estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 526 493 964	—	—	3 526 493 964
CH <sub>4</sub>	460 298 983	—	—	460 298 983
N <sub>2</sub> O	237 116 897	—	—	237 116 897
HFCs	110 623 786	—	—	110 623 786
PFCs	3 531 390	—	—	3 531 390
Unspecified mix of HFCs and PFCs	747 249	—	—	747 249
SF <sub>6</sub>	6 099 969	—	—	6 099 969
NF <sub>3</sub>	64 651	—	—	64 651
<b>Total Annex A sources</b>	<b>4 344 976 890</b>	—	—	<b>4 344 976 890</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–60 404 096	—	—	–60 404 096
Deforestation	40 739 344	—	—	40 739 344
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–450 180 040	—	—	–450 180 040
CM	26 186 212	—	—	26 186 212
CM for the base year	36 916 284	—	—	36 916 284
GM	19 318 054	—	—	19 318 054
GM for the base year	27 449 632	—	—	27 449 632
RV	–1 853 610	—	—	–1 853 610
RV for the base year	–2 046 297	—	—	–2 046 297
WDR	IE, NA, NE, NO	—	—	IE, NA, NE, NO
WDR for the base year	IE, NA, NE, NO	—	—	IE, NA, NE, NO

Table II.5

**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 estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 488 667 744	—	—	3 488 667 744
CH <sub>4</sub>	460 559 992	—	—	460 559 992
N <sub>2</sub> O	236 686 319	—	—	236 686 319
HFCs	114 430 256	—	—	114 430 256
PFCs	3 424 697	—	—	3 424 697
Unspecified mix of HFCs and PFCs	752 404	—	—	752 404
SF <sub>6</sub>	5 803 779	—	—	5 803 779
NF <sub>3</sub>	70 101	—	—	70 101
<b>Total Annex A sources</b>	<b>4 310 395 291</b>	—	—	<b>4 310 395 291</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–59 993 810	—	—	–59 993 810
Deforestation	39 435 354	—	—	39 435 354
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–463 077 183	—	—	–463 077 183
CM	30 098 190	—	—	30 098 190
CM for the base year	36 916 284	—	—	36 916 284
GM	19 674 478	—	—	19 674 478
GM for the base year	27 449 632	—	—	27 449 632

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
RV	–1 813 676	–	–	–1 813 676
RV for the base year	–2 046 297	–	–	–2 046 297
WDR	IE, NA, NE, NO	–	–	IE, NA, NE, NO
WDR for the base year	IE, NA, NE, NO	–	–	IE, NA, NE, NO

Table II.6

**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 estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	3 662 879 122	–	–	3 662 879 122
CH <sub>4</sub>	467 815 046	–	–	467 815 046
N <sub>2</sub> O	233 480 473	–	–	233 480 473
HFCs	111 720 853	–	–	111 720 853
PFCs	3 743 187	–	–	3 743 187
Unspecified mix of HFCs and PFCs	959 197	–	–	959 197
SF <sub>6</sub>	6 092 171	–	–	6 092 171
NF <sub>3</sub>	66 078	–	–	66 078
<b>Total Annex A sources</b>	<b>4 486 756 126</b>	–	–	<b>4 486 756 126</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–57 913 957	–	–	–57 913 957
Deforestation	40 418 787	–	–	40 418 787
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–484 983 660	–	–	–484 983 660
CM	31 737 063	–	–	31 737 063
CM for the base year	36 916 284	–	–	36 916 284
GM	20 075 242	–	–	20 075 242
GM for the base year	27 449 632	–	–	27 449 632
RV	–1 796 487	–	–	–1 796 487
RV for the base year	–2 046 297	–	–	–2 046 297
WDR	IE, NA, NE, NO	–	–	IE, NA, NE, NO
WDR for the base year	IE, NA, NE, NO	–	–	IE, NA, NE, NO

## **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 direct N<sub>2</sub>O emissions from manure management for composting systems for the United Kingdom (see ID# A.11 in table 3);
- (b) 4(KP).B.2 CM and 4(KP).B.3 GM, litter and deadwood (CO<sub>2</sub>) for the United Kingdom (see ID# KL.4 in table 3);
- (c) 4(KP).B.5 WDR (CO<sub>2</sub>) for the United Kingdom (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 and 2018 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 and FCCC/ARR/2018/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/sites/default/files/resource/AGI%202020\\_final.pdf](https://unfccc.int/sites/default/files/resource/AGI%202020_final.pdf).

Annual status report for the EU for 2020. Available at [https://unfccc.int/sites/default/files/resource/asr2020\\_EU.pdf](https://unfccc.int/sites/default/files/resource/asr2020_EU.pdf).

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

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