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Report on the individual review of the annual submission of France submitted in 2021*

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 2021 annual submission of France, 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 20 to 25 September 2021 remotely.

* In the symbol for this document, 2021 refers to the year in which the inventory was submitted, not to the year of publication.



Contents

	<i>Page</i>
Abbreviations and acronyms	3
I. Introduction	5
II. Summary and general assessment of the Party's 2021 annual submission	6
III. Status of implementation of recommendations included in the previous review report.....	8
IV. Issues and problems identified in three or more successive reviews and not addressed by the Party	32
V. Additional findings made during the individual review of the Party's 2021 annual submission	36
VI. Application of adjustments.....	43
VII. Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol	43
VIII. Questions of implementation	43
Annexes	
I. Overview of greenhouse gas emissions and removals and data and information on activities under Article 3, paragraphs 3–4, of the Kyoto Protocol, as submitted by France in its 2021 annual submission	44
II. Information to be included in the compilation and accounting database	48
III. Additional information to support findings in table 2	51
IV. Reference documents	52

Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AAU	assigned amount unit
AD	activity data
ADEME	French Environment and Energy Management Agency
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”
B ₀	maximum methane-producing capacity
C	carbon
CER	certified emission reduction
CH ₄	methane
CM	cropland management
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
COD	chemical oxygen demand
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”
CP	commitment period
CPR	commitment period reserve
CRF	common reporting format
dm	dry matter
DOM	dead organic matter
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU	European Union
EU ETS	European Union Emissions Trading System
Eurostat	statistical office of the European Union
FM	forest management
FMRL	forest management reference level
F _{NON-CON}	fraction of non-consumed protein added to wastewater
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
IPCC good practice guidance for LULUCF	<i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>
IPPU	industrial processes and product use
ITOM	household waste treatment facilities
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
N	nitrogen

N ₂ O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
NF ₃	nitrogen trifluoride
NFI	national forest inventory
NIR	national inventory report
NO	not occurring
OMINEA	organization and methods of national inventories of atmospheric emissions in France
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF ₆	sulfur hexafluoride
SIAR	standard independent assessment report
SOC	soil organic carbon
SWDS	solid waste disposal site(s)
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>

I. Introduction

1. This report covers the review of the 2021 annual submission of France, 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 20 to 25 September 2021 remotely¹ and was coordinated by Sabin Guendehou, Veronica Colerio and Pedro Torres (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for France.

Table 1

Composition of the expert review team that conducted the review for France

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Newton Paciornik	Brazil
	Detelina Petrova	Bulgaria
Energy	Branca Americano	Brazil
	Melanie Hobson	United Kingdom
	Katrina Young	United Kingdom
IPPU	Clemencio Nhantumbo	Mozambique
	Kendal Blanco Salas	Costa Rica
	Koen E.L. Smekens	Belgium
Agriculture	Steen Gyldenkærne	Denmark
	Baasansuren Jamsranjav	Mongolia
	Miguel Angel Taboada	Argentina
LULUCF and KP-LULUCF	Markus Didion	Switzerland
	Inge G.C. Jonckheere	Belgium
	Timothy Paul Liersch	Australia
Waste	Gabor Kis-Kovacs	Hungary
	Inês Sousa Mourão	Cabo Verde
	Hans Oonk	Netherlands
Lead reviewers	Newton Paciornik	
	Koen E.L. Smekens	

2. The basis of the findings in this report is the assessment by the ERT of the Party’s 2021 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines.

3. The ERT has made recommendations that France resolve identified findings, including issues² designated as problems.³ Other findings, and, if applicable, the encouragements of the ERT to France to resolve related issues, are also included in this report.

4. A draft version of this report was communicated to the Government of France, which provided no comments.

¹ Owing to the circumstances related to the coronavirus disease 2019, the review had to be conducted remotely.

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

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

5. Annex I presents the annual GHG emissions of France, including totals excluding and including LULUCF, indirect CO₂ emissions, and emissions by gas and by sector, and contains background data on emissions and removals from KP-LULUCF, if elected by the Party, by gas, sector and activity.
6. Information to be included in the compilation and accounting database can be found in annex II.

II. Summary and general assessment of the Party's 2021 annual submission

7. Table 2 provides the assessment by the ERT of the Party's 2021 annual submission with respect to the tasks undertaken during the review. Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.

Table 2

Summary of review results and general assessment of the 2021 annual submission of France

Assessment	Issue/problem ID#(s) in table 3 or 5 ^a
Dates of submission	Original submission: NIR, 13 April 2021; CRF tables (Convention, version 2), 15 April 2021; CRF tables (Kyoto Protocol, version 1), 21 April 2021; SEF tables (SEF-2020-CP1 and SEF-2020-CP2), 13 April 2021 Unless otherwise specified, values from the most recent submission are included in this report
Review format	Centralized review conducted remotely
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:
	(a) Identification of key categories? No
	(b) Selection and use of methodologies and assumptions? Yes I.13, I.14, I.19, L.10, L.22, W.14, KL.4, KL.5, KL.7, KL.11, KL.21
	(c) Development and selection of EFs? Yes L.5, L.12, L.13, W.12, KL.2
	(d) Collection and selection of AD? Yes E.5, I.7, I.16, I.20, I.21, A.3, L.7, W.15, KL.1, KL.8
	(e) Reporting of recalculations? No
	(f) Reporting of a consistent time series? Yes I.13, I.21
	(g) Reporting of uncertainties, including methodologies? Yes G.7
	(h) QA/QC? QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below)
	(i) Missing categories, or completeness? ^b Yes L.15, L.17, L.20, L.23, L.25, L.26, KL.6
	(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 G.5
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	Have any issues been identified related to the following aspects of the national system:

<i>Assessment</i>	<i>Issue/problem ID#(s) in table 3 or 5^a</i>		
the Kyoto Protocol	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	No	
	(b) Performance of the national system functions?	No	KL.1
	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?	Yes	G.3
	Have any issues been identified related to the reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the SIAR?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of the reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	No	
	Have any issues been identified related to the following reporting requirements for KP-LULUCF:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	Yes	KL.2, KL.8, KL.9
	(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.10, KL.11, KL.14
(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.5, KL.15	
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	France 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	

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

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

III. Status of implementation of recommendations included in the previous review report

8. Table 3 compiles the recommendations from previous review reports that were included in the most recent previous review report, published on 7 February 2020,⁴ and had not been resolved by the time of publication of the report on the review of the Party's 2019 annual submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue or problem by the time of publication of this review report and has provided the rationale for its determination, which takes into consideration the publication date of the most recent previous review report and national circumstances.

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

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	CPR (G.8, 2019) KP reporting adherence	Report a CPR that is calculated on the basis of either 90 per cent of the assigned amount, as published in document FCCC/IRR/2016/FRA, or 100 per cent of eight times the emission total in the Party's most recently reviewed inventory, whichever figure is lower.	Resolved. The Party reported in its NIR (p.737) a correct calculation of its CPR based on 90 per cent of the assigned amount.
G.2	EFs (G.9, 2019) Transparency	(a) Add references to the OMINEA database spreadsheet for those EFs used in the GHG inventory – a cross reference to the Citepa PDF file would be sufficient where the PDF has a clear reference to the source of the EF; (b) Either apply units commonly used for reporting under the UNFCCC, consistently with the 2006 IPCC Guidelines (e.g. kg/t, t/t), in the spreadsheet, or include any conversion factors applied; (c) Ensure that the archiving system includes the two above-mentioned Citepa website files associated with each annual NIR.	(a) Addressing. During the review, the Party stated that in the OMINEA database (available at www.citepa.org/fr/omineia – in French) the column “CRF” enables users to find the related part of the NIR, including the background sources of reference of the EF, and vice versa. The ERT noted that it is still difficult to follow the external references provided by the Party in the OMINEA file, and that in some cases the data in the OMINEA file do not correspond to the data in the CRF tables. The ERT considers that, in order for the OMINEA database to be considered as part of the submission and contribute to enhancing transparency, the cross references between the NIR and the OMINEA database must be improved; (b) Not resolved. The Party did not apply the units used in the 2006 IPCC Guidelines in the spreadsheet or provide the conversions factors applied. During the review, the Party explained that since there were more than 30,000 entries in the OMINEA database, which were generally expressed in the original calculation units, it would be useful to know for specifically which entries unit conversions were required. The ERT notes that this recommendation could be addressed by including the conversion factors applied;

⁴ FCCC/ARR/2019/FRA. The ERT notes that the report on the individual inventory review of France's 2020 annual submission has not been published yet owing to insufficient funding for the review process. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2019 annual submission.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
			(c) Resolved. During the review, the Party indicated that archived information is now accessible on the Citepa website (https://www.citepa.org/fr/).
G.3	National registry (G.3, 2019) (G.10, 2017) (G.22, 2016) (G.22, 2015) Comparability	Establish a previous period surplus reserve as soon as technically possible, which the ERT assumes will be prior to the 2017 annual submission.	Not resolved. The Party has not yet established a previous period surplus reserve. During the review, the Party stated that, as the Doha Amendment entered into force on 31 December 2020, it will be in a position to establish such a reserve in accordance with the EU commitment rules, and it expects to report on this issue in the next annual submission.
G.4	NIR (G.4, 2019) (G.1, 2017) (G.4, 2016) (G.4, 2015) (16, 2014) Transparency	Clearly explain the methodologies and the sources of data used for each part of the French metropolitan and overseas territories.	Addressing. The ERT noted that, during the previous review, it was determined that the issues yet to be resolved in respect of this recommendation were those described under ID#s L.15, L.27 and W.3 of the previous review report (see ID#s L.10, L.28 and W.4 below respectively). During the review, the Party clarified that the last two of these issues were resolved and that the remaining issue will be addressed for in the 2022 annual submission.
G.5	Other (G.7, 2019) (G.13, 2017) Completeness	Provide in the NIR the likely level of emissions for each category reported as “NE” on the basis of the judgment that France considers the emissions for the categories to be insignificant, in order to demonstrate that the total national aggregate of estimated emissions for all gases and categories considered insignificant remains below 0.1 per cent of the national total GHG emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Nor resolved. In response to a question raised by the ERT during the review, the Party confirmed that this recommendation has not yet been addressed.
G.6	Recalculations (G.11, 2019) Transparency	Correct the name of the recalculations file referenced in the NIR to match the name of the file submitted and available for download.	Resolved. The recalculations file (recalculs-d.xlsm) was provided with the annual submission and was correctly referenced throughout the NIR.
G.7	Uncertainty analysis (G.6, 2019) (G.7, 2017) (G.18, 2016) (G.18, 2015) Transparency	Transparently report the information and assumptions used when defining the uncertainty of AD and EFs in line with the 2006 IPCC Guidelines (vol. 1, chap. 3.5).	Addressing. During the review, the Party informed the ERT that the transparency of the uncertainty assessments has been improved by adding more information on the references used for defining uncertainty values in the sections of the NIR relating to uncertainty and time-series consistency. The ERT noted the improved reporting of uncertainty in the sectoral parts of the NIR, particularly for the LULUCF sector; however, for some sectors, such as IPPU, no improvements were made. The Party clarified that more detailed information is needed for the expert judgment references (see annex 6 to the NIR).

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
Energy			
E.1	1. General (energy sector) (E.2, 2019) (E.4, 2017) (E.21, 2016) (E.21, 2015) Accuracy	For fuels used in the activities that are key in the French GHG inventory, determine country-specific values for the CO ₂ EFs (e.g. for gasoline and diesel oil used in road transportation).	Resolved. The Party applied country-specific CO ₂ EFs for diesel oil and gasoline for its estimates under subcategory 1.A.3.b road transportation and category 1.A.4 other sectors. The NIR (pp.141–146) reports the methodology used to calculate country-specific values, in particular for the CO ₂ EFs for diesel oil and gasoline (74.52 and 72.48 kg CO ₂ /GJ, respectively, NIR p.145). These values are higher than the default EFs for diesel oil (74.1 kg CO ₂ /GJ) and gasoline (69.3 kg CO ₂ /GJ) from the 2006 IPCC Guidelines.
E.2	Fuel combustion – reference approach – liquid, solid, gaseous and other fossil fuels – CO ₂ (E.15, 2019) Transparency	Report in the NIR the reasons for any differences greater than 2 per cent between the reference and sectoral approaches for liquid, solid, gaseous and other fossil fuels, focusing on 2011 onward.	Resolved. The Party provided in its NIR (pp.131–135) additional information to explain the most significant discrepancies between the reference and sectoral approaches for each type of fuel. It also provided a comparison of consumption and CO ₂ emissions using the reference and sectoral approaches for solid fuels (NIR table 36, p.134) and gaseous fuels (NIR table 37, p.135), which enhances transparency. The ERT noted that in the 2021 submission discrepancies greater than 2 per cent in CO ₂ emissions were observed only for solid fuels for a few years.
E.3	Fuel combustion – reference approach – solid and other fossil fuels – CO ₂ (E.6, 2019) (E.7, 2017) (E.22, 2016) (E.22, 2015) Transparency	(a) Subtract the non-energy use of the fuels in the reference approach to have a consistent comparison with the sectoral approach; (b) Properly identify and allocate the emissions from the industrial gases by origin from the primary fuels, in line with the 2006 IPCC Guidelines and avoiding double counting, and provide relevant explanations in the NIR.	(a) Resolved. The Party improved consistency between the reference and sectoral approaches (CRF table 1.A(c)), and discrepancies between the reference and sectoral approaches for solid fuels consumption reduced from 30.87 per cent for 2014 and 36.27 per cent for 2017 in the 2016 and 2019 annual submissions, respectively, to 1.95 per cent for 2014 and 5.10 per cent for 2017 in the 2021 annual submission. The Party stated in the NIR (p.132–134) that many of the remaining discrepancies for solid fuels can be explained by statistical differences. During the review, when asked by the ERT for clarification on the nature of these statistical differences, the Party stated that they are defined in the monthly oil and gas questionnaire of the International Energy Agency. (b) Resolved. As indicated in the previous review report, France changed the reporting for the reference approach in the 2019 annual submission and emissions from industrial gases are now properly allocated under liquid fuels. The Party explained in the NIR (pp.131–135) how consistency between the reference and sectoral approaches were improved.
E.4	Fuel combustion – reference approach – other fossil fuels – CO ₂ (E.7, 2019) (E.24, 2017) Transparency	Provide in the NIR information on the difference between the sectoral and reference approaches; that is, that the reference approach uses default EFs from the 2006 IPCC Guidelines whereas the sectoral approach uses country- or plant-specific EFs.	Resolved. The ERT noted that the difference between reference and sectoral approaches in the 2021 annual submission for the latest years of the time series is well below 2 per cent (around 0.01 per cent). The Party included in the NIR (p.135) information on the reasons for the differences between the two approaches for other fossil fuels.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
E.5	Feedstocks, reductants and other non-energy use of fuels – solid fuels – CO ₂ (E.16, 2019) Comparability	Disaggregate the consumption of the non-energy use of solid fuels (coking coal and coke oven coke) used for non-energy use and correctly allocate the consumption of the different fuel types in CRF table 1.A(d).	Addressing. France reported separately the consumption of coke oven/gas coke and anthracite in CRF table 1.A(d). However, coking coal is still reported as “IE” and there is no clear indication in table 1.A(d) where these emissions are reported (whether under anthracite or coke oven/gas coke). The Party did not explain in the NIR why coking coal consumption was not disaggregated in CRF table 1.A(d) and no corresponding explanation was added in CRF table 9. The Party reported in its NIR (p.138) how non-energy use of fuels is disaggregated and allocated in CRF table 1.A(d) and that all coking coal consumption is reported under energy use as all of it is consumed in coke ovens. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet updated table 1.A(d).
E.6	International bunkers and multilateral operations – liquid fuels (E.5, 2019) (E.8, 2017) (E.24, 2016) (E.24, 2015) Transparency	Explain in the NIR the discrepancies between the sectoral and the reference approaches for international aviation (jet kerosene) and international navigation (residual fuel oil and gas/diesel oil) reported in the CRF tables.	Addressing. The Party listed a number of reasons for the discrepancies in its NIR (pp.135–137); however, the ERT considers that the explanations provided (e.g. difference in the scope of the reference approach and the sectoral tables reported under the Kyoto Protocol) were not sufficient to explain the discrepancies. The Party also indicated that it would continue to strive to achieve harmonization in its reporting approaches in the future.
E.7	1.A Fuel combustion – sectoral approach (E.18, 2019) Transparency	Report in CRF tables 1.A(a)s1, 1.A(a)s2, 1.A(a)s3 and 1.A(a)s4 the calorific value used, filling in the relevant column with “NCV” for the entire time series.	Resolved. The Party has implemented the recommendation and correctly filled CRF tables 1.A(a)s1, 1.A(a)s2, 1.A(a)s3 and 1.A(a)s4 with “NCV” in the relevant column.
E.8	1.A Fuel combustion – sectoral approach – liquid fuels – CO ₂ (E.19, 2019) Transparency	Update NIR table 38 with the EFs for diesel oil and domestic heating oil used in the emission calculations and include the relevant references from NIR table 38 in the reference list of the NIR.	Addressing. The Party updated NIR table 40 (p.143) to reflect the EFs used in the emission calculations for diesel oil and domestic heating oil. The Party indicated in the NIR (pp.144–145) that for diesel oil a country-specific CO ₂ EF (74.52 kg CO ₂ /GJ) was calculated (see ID# E.1 above). A very low value (37,7 kg/GJ) in the OMINIA database was an error that has meanwhile been corrected. During the review, the ERT noted that the EF for domestic heating oil, as shown in table 40, is the same as the one used for diesel oil. The Party clarified that the EF for diesel oil can be used for domestic heating oil because the two fuels are similar and have the same carbon content. It informed the ERT that it will include the EF for diesel oil and domestic heating oil in NIR table 40 of its next annual submission and ensure consistency of the information.
E.9	1.A Fuel combustion – sectoral approach – liquid fuels – CO ₂ (E.20, 2019) Transparency	Provide in the NIR a detailed explanation regarding the criteria for selecting the fuel samples used for estimating the CO ₂ EF for fossil diesel.	Resolved. The Party included in its NIR (pp.144–145) a detailed explanation of how the samples were selected for fossil diesel oil and gasoline. It stated that the samples are representative of the gasoline and diesel oil used in France.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
E.10	1.A Fuel combustion – sectoral approach – liquid fuels – CO ₂ (E.21, 2019) Transparency	Describe in the NIR how the CO ₂ EFs for biogasoline (ethanol), biodiesel (fatty acid methyl ester) and synthetic biodiesel are estimated, and provide information on their source (the name of the report and the number of the page on which the data used can be found).	Resolved. The Party described in its NIR how the CO ₂ EFs for biofuels were estimated (pp.146–147) and the carbon content considered for the biofuels (p.147), together with the source and page number where the information can be found.
E.11	1.A.3 Transport – liquid fuels – CO ₂ (E.22, 2019) Transparency	Update the second table on page 130 of the NIR with the correct value for the CO ₂ EF for diesel oil, expressed in g CO ₂ /g fuel, using the NCV in table 37 of the NIR; and correct the unit from g/GJ to kg/GJ in the same table.	Resolved. The Party updated the CO ₂ EF for diesel oil in the second table on page 145 of the NIR (3.175 g CO ₂ /g fuel) to reflect the NCV reported in NIR table 39 (42.6 MJ/kg). The Party also corrected the unit of the CO ₂ EF from g/GJ to kg/GJ (74.52 kg/GJ) in the same table on page 145 of the NIR.
E.12	1.A.3.c Railways – solid fuels – CO ₂ , CH ₄ and N ₂ O (E.23, 2019) Transparency	Explain in the NIR (chap. 3.2.7.1.3) that a small number of steam trains consuming coal operate in France, but that the associated AD and GHG emissions are included under category 1.A.4.a. In addition, explain in the NIR the rationale for allocating some coal consumed in locomotives to category 1.A.4.a.	Resolved. The Party reported in its NIR (p.211) that only a few tourist trains run on coal and their consumption is not significant enough to be included in the energy balance as a separate entry, hence the reporting of these emissions under category 1.A.4.a (commercial/institutional).
E.13	1.A.3.c Railways – liquid fuels – CO ₂ (E.24, 2019) Transparency	Clarify in the NIR the difference between diesel and non-road diesel used by railways, recognizing that the Party applies the same country-specific CO ₂ EF for both fuels. In addition, justify the application of a CO ₂ EF for diesel for 2006 (75.39 kg/GJ) that differs from the country-specific CO ₂ EF for diesel used for 2007–2017 (75.59 kg/GJ), given that the Party has stated that diesel and non-road diesel is used for all these years (2006–2017). If the CO ₂ EF for diesel for 2006 cannot be justified, apply the same value as for 2007–2017 (75.39 kg/GJ) or another appropriately justified country-specific value.	Resolved. The Party reported in its NIR (pp.143 and 145) and CRF tables only one country-specific EF for diesel oil and non-road diesel oil (74.52 kg/GJ). It clarified in the NIR (p.211) that diesel oil and non-road diesel oil are identical but are taxed differently.
E.14	1.A.3.e.ii Other (other transportation) – all fuels – CO ₂ , CH ₄ and N ₂ O (E.26, 2019) Transparency	Change the information in the NIR (p.185) regarding which category ground transport activities in airports are reported under from category 1.A.2.g other (manufacturing industries and construction) to category 1.A.4.a (commercial/institutional).	Resolved. The Party included in its NIR (p.219) a new section for subcategory 1.A.3.e.ii other transport, in which it explained that emissions from ground transport activities in airports are now reported under subcategory 1.A.4.a commercial/institutional.
E.15	1.A.3.e.ii Other (other transportation) – liquid fuels – CO ₂ , CH ₄ and N ₂ O (E.25, 2019) Transparency	Include in the NIR a new chapter for category 1.A.3.e.ii and clarify therein under which category fuel consumption by and CO ₂ , CH ₄ and N ₂ O emissions from ground transport activities in airports and harbours (off-road vehicles) are included, and explain the rationale for not reporting these data under category 1.A.3.e.ii.	Resolved. The Party included in its NIR (p.219) a new section for subcategory 1.A.3.e.ii other transport, in which it explained that the emissions from ground transport activities in airports and harbours (off-road vehicles) are reported under subcategory 1.A.4.a commercial/institutional owing to the energy balance not disaggregating fuel consumption for airport and harbour ground transport activities from consumption of fuels in commercial activities (reported under subcategory 1.A.4.a). It provided a corresponding explanation in CRF table 9.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
E.16	1.A.4 Other sectors – solid, liquid and gaseous fuels – CO ₂ , CH ₄ and N ₂ O (E.11, 2019) (E.26, 2017) Transparency	Include in the NIR the reason why the AD used to estimate emissions from military activities are not separately provided, and indicate where the emissions from military activities are included in the annual submission or provide estimates for these emissions.	Resolved. During the 2019 review, the Party clarified that GHG emissions from military activities were included under subcategory 1.A.4.a commercial/institutional for confidentiality reasons and that it would include a new chapter in the NIR for subcategory 1.A.5.b mobile (other) to explain where emissions from military activities were included. In the 2021 annual submission, the Party reported emissions in CRF table 1.A(a) (sheet 4) for the first time under subcategory 1.A.5.a stationary (other) and included in the NIR a new section for category 1.A.5 other, in which it described methods, EFs and AD for subcategory 1.A.5.a stationary (other). It informed the ERT that emissions from subcategory 1.A.5.b mobile (other) are included under subcategory 1.A.5.a stationary (other) for confidentiality reasons (p.256).
E.17	1.A.4.b Residential – all fuels – CO ₂ (E.27, 2019) Transparency	Provide in the NIR the values for and references to the sources of the EFs for each fuel type consumed under category 1.A.4.b residential and specify if they are default EFs from the 2006 IPCC Guidelines or country-specific EFs.	Resolved. The Party included in the NIR (p.251) a reference to the general section on energy, indicating that the CO ₂ EFs used for each fuel type consumed under subcategory 1.A.4.b residential are country-specific values, as described in the general energy section of the NIR. During the review, the Party confirmed that the EFs for subcategory 1.A.4.b residential are reported in the NIR, in the general section on energy (table 40, p.143).
E.18	1.A.5.b Mobile – solid, liquid and gaseous fuels – CO ₂ and CH ₄ (E.12, 2019) (E.27, 2017) Comparability	Correct the notation key to “IE”.	Resolved. The Party updated the notation keys used for subcategory 1.A.5.b mobile (other), which is reported for the first time in the 2021 annual submission, and reported “IE” for the consumption and emissions of liquid fuels in CRF table 1.A(a) (sheet 4) for subcategory 1.A.5.b (see ID# E.16 above), while for other fuel types it used “NO”.
E.19	1.B.2.a Oil – liquid fuels – CO ₂ (E.28, 2019) Comparability	Correct in CRF table 1.B.2 the notation key from “NE” to “NO” for CO ₂ captured from oil exploration (1.B.2.a.1) for the entire time series.	Resolved. The Party reported “NO” for CO ₂ captured from oil exploration (1.B.2.a.1) in CRF table 1.B.2 for the entire time series.
E.20	1.C.2 Injection and storage – gaseous fuels – CO ₂ (E.29, 2019) Comparability	Report “IE” for CO ₂ emissions from injection for the years in which injection was occurring but emissions were reported under category 1.A.2.b natural gas (i.e. from 2010 to 2013) and “NO” for the years in which injection was not occurring. In addition, report “NA” for CO ₂ emissions from storage for the years in which injection occurred but CO ₂ emissions were not detected from the storage site and continue to report “NA” for as long as the measurement campaign is under way, and report “NO” for CO ₂ emissions from storage for the year prior to injection taking place.	Addressing. During the review, the Party clarified that it reported “IE” for CO ₂ emissions from injection and storage for the entire time series because it had encountered difficulties when inputting different notation keys for the same time series into CRF Reporter. It added that an explanation of the plant operation and the correct notation keys are included in the documentation box to CRF table 1.C but the notation keys remain incorrect.

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
IPPU			
I.1	2. General (IPPU) – (I.2, 2019) (I.17, 2016) (I.17, 2015) Transparency	If different data sources and methodologies or tiers are used for different periods (e.g. production of lime, ammonia, nitric acid, and iron and steel), provide explanations for such inter-annual changes, where applicable, including information on how the consistency of the time series is ensured when different data sources or methodologies are used to estimate emissions for different periods of time.	Resolved. The Party reported in its NIR a detailed explanation of how different data sources and methodological tiers are applied across the time series for categories 2.A.2 lime production, 2.B.1 ammonia production and 2.B.2 nitric acid production (pp.291, 307 and 309 respectively). The ERT could not identify any significant inter-annual changes in the years where the Party applied different data sources or methods across the time series for these categories.
I.2	2. General (IPPU) (I.20, 2019) Transparency	Increase the transparency and comparability of the reporting by providing, on a yearly basis for each submission, in line with the UNFCCC Annex I inventory reporting guidelines, not only the tier level for each EF applied but also units and references.	Resolved. The Party provided in CRF table summary 3 (sheet 1) the tiers and EFs applied. Furthermore, for all key categories, the NIR contains a description of the methodology applied, indicating the tier and the origin of EFs. The OMINEA database referred to in the NIR contains detailed time-series information for the AD and EFs (both with units) for each category.
I.3	2.A.1 Cement production – CO ₂ (I.21, 2019) Accuracy	Recalculate the time series of AD for clinker production on the basis of the plant-specific statistics the Party plans to collect.	Resolved. The Party reported in its 2020 NIR (p.289) that the AD time series was recalculated for all years after 2004 and provided an explanation of the revision process. The Party revised the value of AD for clinker production for 2017 (now 12,357.63 kt) and the significant inter-annual change in the CO ₂ IEF between 2016 and 2017 identified in the previous review report no longer occurs. The CO ₂ IEF for 2017–2019 is now 0.52 t CO ₂ /t. The error in the AD was due to an inconsistency in the statistics provided by the cement producers federation for 2017 and did not affect emissions. The NIR contains a description of the QA/QC procedures in place to ensure AD time-series consistency (p.299).
I.4	2.A.2 Lime production – CO ₂ (I.5, 2019) (I.11, 2017) Comparability	Report emissions from lime production in sugar mills in category 2.A.2 lime production and report the CO ₂ removals in category 2.H.2 food and beverage industry.	Resolved. The Party reported in CRF table 2(I).A-H (sheet 2) the CO ₂ recovered from sugar mills and in CRF table 2(I).A-H (sheet 1) the CO ₂ emissions from lime production under the corresponding categories. An explanation is included in the NIR (pp.284, 295–296 and 440). During the review, the Party clarified that recovered CO ₂ emissions are reported for informational purposes only under category 2.H.2 and that the emissions reported under category 2.A.2 cover only the net emissions from sugar mills.
I.5	2.A.2 Lime production – CO ₂ (I.22, 2019) Transparency	Include information in the NIR on the production of lime by type of lime (hydraulic lime, quicklime and lime produced in sugar mills), the sources of the AD, including any assumptions regarding data provided by the lime producers federation, and the reasons for any change in the CO ₂ EF between 2016 and 2017.	Addressing. The NIR contains information on the production of lime by type of lime, the sources of AD for category 2.A.2, including assumptions regarding data provided by the lime producers federation (pp.283–284, 291–296) and an explanation of the QA/QC procedures for the AD (p.300). It also contains information on the share of lime produced by type of lime (pp.292–296). However, the ERT noted that the CO ₂ IEF shows a decrease

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
			for 2015–2017, but the Party did not provide the reasons for this decrease in the NIR.
I.6	2.B.1 Ammonia production – CO ₂ (I.6, 2019) (I.12, 2017) Transparency	Include information in the NIR on the comparison between the total estimated CO ₂ emissions (combustion and process emissions) included in the inventory and the estimated emissions reported under the EU ETS.	Resolved. The Party included in its NIR (p.309) a table comparing the CO ₂ EU ETS and inventory emissions after 2013.
I.7	2.C.1 Iron and steel production – CO ₂ (I.10, 2019) (I.16, 2017) Accuracy	Collect data – from governmental agencies responsible for manufacturing or energy statistics, business or industry trade associations, or individual iron and steel companies – on the following national process materials for the entire time series: steel scraps, electrode consumption and pig iron for electric arc furnace steel production; steel scraps, iron ore and dolomite consumption for basic oxygen furnace steel production; iron ore and sinter consumed for pig iron production in blast furnaces; and iron ore consumed for sinter production, and include the AD in the country-specific model and provide new CO ₂ emission estimates.	Addressing. The Party reported in its NIR (pp.326–327) which sources it used for AD but did not provide any information on the AD themselves. During the review, the Party clarified that the AD reported in the CRF tables for category 2.C.1 cover both basic oxygen furnace steel and electric arc furnace steel and are based on data provided by the French Steel Federation for the years up to 2013 and EU ETS and European Pollutant Release and Transfer Register reports for 2013 onward. The Party also clarified that AD are used only to calculate the IEF. Furthermore, in the QA/QC section (NIR p.335), the French Steel Federation is still mentioned as a data source, while on page 327 it is stated that its data delivery ceased after 2013.
I.8	2.C.1 Iron and steel production – CO ₂ (I.11, 2019) (I.17, 2017) Transparency	Explain in the NIR that CO ₂ emissions from coal, coke, coke oven gas, blast furnace gas, petroleum coke, natural gas and domestic fuel oil used in sinter production are allocated to the energy sector on the basis of the structure of the available AD in order to ensure clearer fuel use allocation in the relevant CRF tables for the energy and IPPU sectors and to avoid the possibility of double counting of energy consumption.	Resolved. The Party revised its emission estimation method and now reports all emissions from carbon-containing materials under category 2.C.1, including those for sinter production, as per the 2006 IPCC Guidelines and reported this information in the NIR (pp.326–330). Furthermore, a diagram provided in the NIR (p.327) shows the carbon fluxes and allocation of CO ₂ emissions from the iron and steel industry. During the review, the Party clarified that only emissions from coke production (that are considered for energy use) are reported under subcategory 1.A.c.1 manufacture of solid fuels and other energy industries.
I.9	2.C.1 Iron and steel production – CO ₂ (I.12, 2019) (I.17, 2017) Comparability	Investigate ways to report emissions from carbonate use, coke breeze, coke oven gas, blast furnace gas and other materials containing carbon under iron and steel production (2.C.1).	Resolved. The Party revised its emission estimation method and now reports all emissions from carbon-containing materials under category 2.C.1, including those from use of carbonates, coke breeze, coke oven gas, blast furnace gas and other materials containing carbon, as per the 2006 IPCC Guidelines and reported this information in the NIR (pp.326–330). During the review, the Party clarified that only emissions from coke production are reported under subcategory 1.A.c.1 manufacture of solid fuels and other energy industries, which is in accordance with the 2006 IPCC Guidelines. Furthermore, a diagram provided in the NIR (p.327) shows the carbon fluxes and allocation of CO ₂ emissions from the iron and steel industry.
I.10	2.C.1 Iron and steel production – CH ₄	Report CH ₄ emissions from sinter production under iron and steel production.	Addressing. During the review the Party clarified that, in line with a recommendation in the previous review report (ID# I.11, 2019), it has

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	(I.8, 2019) (I.14, 2017) Transparency		allocated all relevant CO ₂ and CH ₄ emissions, including CH ₄ emissions from sinter production, to category 2.C.1 instead of 1.A.2.a.d. During the review the Party clarified that the methodology is described under subcategory 1.A.2.a (NIR p.186) and is based on EU ETS data in individual reports, which do not distinguish AD for sinter plants from those for other iron and steel workshops in the industrial plants and that is the reason CH ₄ emissions are reported under 2.C.1.a instead of 2.C.1 (“IE”). It indicated that it will add sinter plants to the list of facilities concerned by CH ₄ emissions and include the description of the methodology in the chapter related to category 2.C.1 of the NIR of its next annual submission.
I.11	2.D.3 Other (non-energy products from fuels and solvent use) – CO ₂ (I.25, 2019) Convention reporting adherence	Report indirect CO ₂ emissions from solvent use in category 2.D.3 solvent use.	Resolved. The Party confirmed during the review that indirect CO ₂ emissions from solvent use are included under category 2.D.3.
I.12	2.F.1 Refrigeration and air conditioning – fluorinated gases (I.23, 2019) Transparency	Describe in the NIR the methodology used for estimating fluorinated gas emissions from heat pump dryers and wine cellars, including the sources and values of AD and EFs, along with any assumptions applied.	Resolved. The Party reported in its NIR (pp.369–375) the methodology used for estimating fluorinated gas emissions from heat pump dryers and wine cellars, including the sources and values of AD and EFs, along with any other assumptions applied.
I.13	2.G.1 Electrical equipment – SF ₆ (I.24, 2019) Consistency	Verify that the time series between 2015 and 2017 is accurate, and, if applicable, describe in the NIR the rationale for any fluctuation and peak in 2016 in order to improve the transparency and accuracy of reporting.	Not resolved. The Party provided information in its NIR (pp.433–434) on the methodology applied to collect AD and emission data. However, the Party did not provide any rationale or background information for the inter-annual fluctuations in the amount of SF ₆ remaining in products at decommissioning or for the identified peak value for 2016, or any verification of the accuracy of the time series values, in particular for 2015–2017. During the review, the Party clarified that all data for category 2.G.1 are obtained from plants (bottom-up approach) rather than calculated. Specifically, emissions are reported directly by Enedis (the distribution system operator), RTE (the transmission system operator) and EDF (the largest producer and supplier of electricity in France). The ERT noted that operational and end of life emissions are only a fraction of the amount of new fillings and that would not be expected if new fillings (1/3 to 2/3 of stock) are used to compensate leakage. The Party also added that emissions are subject to detailed monitoring but the monitoring of the quantities installed is less precise; however, this does not affect emission estimates.
I.14	2.G.4 Other (other product manufacture and use) – CO ₂	Ensure that all CO ₂ emissions from decarbonization that are reported under subcategory 2.A.4.d other process uses of carbonates in the 2017 submission continue to be	Addressing. CO ₂ emissions reported under category 2.G.4 comprise only CO ₂ emissions from flue gas desulfurization in urban heat boilers and in thermal power plants. During the review, the Party explained that CO ₂

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
(I.25, 2019) Accuracy		reported in category 2.G.4 other – other product use and manufacture and explain in the NIR the sources of emissions included under category 2.G.4.	emissions from decarbonization that were previously reported under subcategory 2.A.4.d were disaggregated and reported under several subcategories. For example, the Party explained during the review that the CO ₂ emissions reported for 2015 in the 2017 annual submission (938.44 kt CO ₂) were disaggregated as follows: (a) 847.56 kt CO ₂ under subcategory 2.C.1.d sinter; (b) 21.2 kt CO ₂ under subcategory 2.G.4.b other (other product manufacture and use); (c) 56.23 kt CO ₂ under category 2.B.10 other (chemical industry); and (d) 13.45 kt CO ₂ under category 2.C.7 other (metal industry). The ERT also noted that the value reported for 2015 under subcategory 2.A.4.d in the 2017 annual submission was 923.15 kt CO ₂ (instead of 938.44 kt CO ₂ , as indicated by the Party). The Party clarified during the review that the total of 938.44 kt CO ₂ refers to 2015 considering recalculations and modifications since the 2017 annual submission. The ERT further noted that the CO ₂ emissions reported under subcategory 2.G.4.b are above 400 kt CO ₂ for 2015–2019 (469.90 kt CO ₂ in 2015) and that the value for 2015 is different from that indicated by the Party during the review (21.2 kt CO ₂). The ERT noted that this may represent a problem in the reallocation implemented, including some missing estimates or in the information provided by the Party. The ERT could not check the value of CO ₂ emissions indicated for subcategory 2.C.1.d as the Party reported these emissions as “IE” in CRF table 2(I).A-H (sheet 2) (see ID# I.10 above). Values reported for categories 2.B.10 and 2.C.7 in the CRF tables match the values indicated by the Party.
Agriculture			
A.1	3.A.1 Cattle – CH ₄ (A.2, 2019) (A.3, 2017) (A.20, 2016) (A.20, 2015) Transparency	Provide in the NIR disaggregated values at a livestock subcategory level for animal body weight and any other important parameters used (e.g. net energy intake, organic matter intake, feed digestibility) and explain the approach used to calculate weighted average values.	Resolved. The Party provided additional information in its NIR on average live weight (table 91, p.482) and gross energy intake and the methane conversion factor (table 93, p.488) and explained the origin of the relevant parameter (pp.487–489).
A.2	3.B Manure management – CH ₄ (A.5, 2019) (A.10, 2017) (A.24, 2016) (A.24, 2015) Comparability	Report the corresponding calculation parameters (methane conversion factors, animal waste management system distribution) under manure management system digesters in CRF table 3.B(a)s2.	Resolved. The Party reported the relevant parameters under anaerobic digesters (methane conversion factors and allocation) in CRF table 3.B(a) (sheet 2).
A.3	3.B Manure management – CH ₄ and N ₂ O (A.19, 2019) Accuracy	Implement data-collection efforts that allow for the separate reporting of data on the allocation of manure subject to composting by climate region and the methane conversion factor, nitrogen excretion for composting and N ₂ O emissions associated with the composting manure	Addressing. During the review, the Party informed the ERT that it has encountered difficulties in collecting data on composting per region but is taking steps to overcome them.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
		management systems, noting that this would improve the accuracy and comparability of the inventory.	
A.4	3.C.1 Irrigated – CH ₄ (A.20, 2019) Comparability	Replace in CRF table 3.C the notation key “NE” with the correct amount of organic amendments added to continuously flooded fields (currently 0.12 t/ha).	Resolved. The Party replaced the notation key “NE” in CRF table 3.C with values for amendments of rice straw in t/ha for the whole time series (0.11 t/ha in 2019).
A.5	3.D Direct and indirect N ₂ O emissions from agricultural soils – N ₂ O (A.12, 2019) (A.17, 2017) (A.15, 2016) (A.15, 2015) (81, 2014) Transparency	Improve the QC activities and correct the discrepancies in the nitrogen input to soils between the NIR and the CRF tables (differences for the nitrogen input to soils from synthetic fertilizers and animal manure; correct error for nitrogen deposited in the NIR).	Resolved. The Party correct the discrepancies in the nitrogen input to soils between the NIR and the CRF tables. The total values reported in NIR tables 129–130 (pp.543–544) are equivalent to the values reported in the CRF tables.
A.6	3.F Field burning of agricultural residues – CH ₄ and N ₂ O (A.21, 2019) Comparability	Report the AD from other non-specified crops in category 3.F.5 other (field burning of agricultural residues), removing the misreported areas of crops burned from category 3.F.2 other non-specified (pulses).	Resolved. The Party reported the AD in question in category 3.F.5 other and removed the misreported areas from category 3.F.2 other non-specified (pulses).
A.7	3.H Urea application – CO ₂ (A.22, 2019) Transparency	Include in the NIR a description of AD collection for this category, including the use of three-year averaging for the fertilizer applied to take into account the effect of stock variation on farms.	Resolved. The Party included a description in the NIR (p.555–556) of AD collection for category 3.H urea application, including the use of three-year averaging for the fertilizer applied.
LULUCF			
L.1	4. General (LULUCF) (L.2, 2019) (L.2, 2017) (L.5, 2016) (L.5, 2015) (88, 101, 2014) (86, 2013) Completeness	Include all territories so as to cover the entire geographical area in the annual submission, and harmonize the different sources of data to ensure consistency, completeness and accuracy of reporting.	Resolved. Areas of all territories in France have been described and their emissions and removals included in the inventory. The Party corrected the information reported on Guadeloupe, Saint-Barthélemy and Saint-Martin in its NIR (pp.566 and 573) that was identified as incorrect in the previous review report indicating what type of information was used for each one of the territories.
L.2	4. General (LULUCF) (L.3, 2019) (L.3, 2017) (L.6, 2016) (L.6, 2015) (89, 2014) (87, 2013) Transparency	Improve the transparency of the reported information on the uncertainty analysis and update the values once data and methodological improvements are implemented for the estimates.	Resolved. The Party improved the transparency of the reported information on the uncertainty analysis and updated the estimates for individual categories. In response to the assessment of the previous ERT, the Party indicated in the NIR (p.650) that it is using a simplified Monte Carlo methodology based on averaged parameters at the national level to estimate uncertainties associated with the AD and EFs.
L.3	4. General (LULUCF) – CO ₂ , CH ₄ and N ₂ O (L.4, 2019) (L.4, 2017)	Report in the NIR complete information on data sources, assumptions and methodologies used. In particular, ensure that the following information is reported:	Addressing. France resolved a number of issues and made some progress on others, as follows:

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
(L.22, 2016) (L.22, 2015)	Transparency	<p>(a) The land use and land-use change matrix (for 1990 to the latest reported year) using the relevant categories from TERUTI;</p> <p>(b) The time series 1971–1989 of the land use and land-use change matrix (equivalent to CRF table 4.1);</p> <p>(e) Information on how the monitoring system is able to identify land-use changes occurring in the unmanaged forest land from those occurring in the managed forest land;</p> <p>(f) Information on how the monitoring system is able to identify disturbances occurring in the unmanaged forest land from those occurring in the managed forest land and whether the time series of data used for calculating the background level of natural disturbances, and its margin, includes GHG emissions from natural disturbances that occurred in unmanaged forest land;</p> <p>(g) The time series from 1990 to the latest reported year of the area subject to each KP-LULUCF activity;</p> <p>(h) The time series from 1990 to the latest reported year of the biomass average gross annual increment (t C/ha) in forest land remaining forest land and in land converted to forest land together with the area across which the value has been calculated, disaggregated at the level of regions and forest types applied for calculating the national total biomass gross annual increment;</p> <p>(i) The time series from 1990 to the latest reported year of the mortality (t C/ha) in forest land remaining forest land and in land converted to forest land, disaggregated at the level of regions and forest types applied for calculating the national total biomass gross annual increment;</p> <p>(k) For each natural disturbance type, the time series from 1990 to the latest reported year of areas of forest land subject to natural disturbances disaggregated at the level of regions and forest types applied for calculating the national total biomass gross annual increment;</p> <p>(l) The time series from 1990 to the latest reported year of the total harvested wood subdivided by land of origin (i.e. metropolitan France and overseas territories), and</p>	<p>(a) Resolved. The information previously missing for some territories was included in the NIR (tables 138, 142–148, pp.571–577, and an annex to the NIR “LULUCF Background.xlsx”);</p> <p>(b) Resolved. France added the required information in an annex to the NIR “LULUCF Background.xlsx”;</p> <p>(e) Resolved. The Party provided the required information in the NIR (annex 9, p.828), noting that all forests are now reported as managed in the NIR. Therefore, the ERT considers that the issue is no longer relevant and is resolved;</p> <p>(f) Resolved. The Party provided the required information in the NIR, (annex 9, p.828), noting that all forests are now reported as managed in the NIR. Therefore, the ERT considers that the issue is no longer relevant and is resolved;</p> <p>(g) Resolved. The Party reported the time series of the area of land subject to each KP-LULUCF activity in the NIR (table 221, p.728);</p> <p>(h) Resolved. By way of example, France reported total gross increments (kt C/year) for 2007 by forest type and zone for the metropolitan territory (table 160, p. 600). The time series since 1990 of the gross increment fluxes (kt C/ha) can be found in NIR table 162 (p.602);</p> <p>(i) Resolved. The required information was included in the NIR (table 161, p.601) as an example. The time series since 1990 of the fluxes due to mortality (kt C/ha) can be found in NIR table 162 (p.602);</p> <p>(k) Addressing. The information is not available in the annual submission. During the review, the Party provided the ERT with background documents containing the required information;</p> <p>(l) Addressing. The information is not available in the annual submission. During the review, the Party provided the ERT with detailed, disaggregated information on HWP;</p> <p>(q) Addressing. The Party indicated in the NIR that it has improved the transparency of reporting on forest land. During the review, it provided the ERT with a summary table of the information to be included in the next annual submission to aid understanding of the NFI data.</p>

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
		<p>land use of origin (i.e. forest land, possibly subdivided between FM and AR lands, cropland and grassland);</p> <p>(q) Information on EFs to clarify the timing of collection, the methodology applied for data collection, the method (including any assumption and equation) applied for the elaboration of EFs from rough data.</p>	
L.4	4. General (LULUCF) (L.6, 2019) (L.6, 2017) (L.24, 2016) (L.24, 2015) Transparency	Report in the NIR information on the uncertainty value and associated probability density function for all parameters and data used to prepare the GHG estimates. This could be achieved by, for example, including in the NIR, for each land use and land-use change category, a table that includes, for all parameters and data used for preparing the GHG estimate, the average value, the unit, the assigned confidence interval, together with information on how the confidence interval has been calculated, and information on the type of probability density function applied to the parameter or data uncertainty.	Resolved. The Party provided in its NIR a description of the uncertainty assessment for the LULUCF sector, including information on how the TERUTI model was considered (pp.592–593).
L.5	4. General (LULUCF) – CO ₂ and N ₂ O (L.8, 2019) (L.10, 2017) (L.25, 2016) (L.25, 2015) Accuracy	Apply the IPCC default SOC values and SOC change factors for those territories (e.g. overseas territories) for which country-specific factors have not been calculated.	Not resolved. During the review, the Party indicated that this issue has yet to be addressed. Generally, IPCC default values are used where no country-specific values are available. The reference SOC stocks (forest) are based on country-specific values, while SOC for other categories is based on the IPCC default stock change factors (forest) or on specific assumptions where default IPCC values are not applicable. In any case, data are available to estimate SOC for cropland and grassland, which the Party may consider using in the future to better estimate stock change factors on the basis of country-specific data. However, the specificities of these territories make it difficult to consistently and directly apply the same assumptions and default values.
L.6	4. General (LULUCF) – CO ₂ and N ₂ O (L.30, 2019) Transparency	Include in the NIR a methodological description, the assumptions and the carbon stock change factors used for calculating emissions and removals in mineral soils for forest land converted to other land uses (and vice versa) for the overseas territories.	Addressing. The NIR (section 6.3) contains information on the methodological descriptions and assumptions and the carbon stock change factors used for calculating emissions and removals in mineral soils for land uses converted to forest land for the overseas territories. However, the Party indicated during the review that information is not available for all land uses converted to forest land (NIR sections 6.5–6.9).
L.7	Land representation – CO ₂ and N ₂ O (L.12, 2019) (L.33, 2017) Accuracy	Identify land representation of cropland accurately in order to report emissions and removals taking into account the 20-year transition period for land conversions. In doing so, depending on available resources, consider (1) improving the spreadsheets for	Not resolved. The Party indicated in the NIR (annex 9, p.830) that this issue has not yet been addressed.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
		allocation of the known total organic soils area across all relevant land-use subcategories; or (2) linking land use and soils by implementing approach 3 for land representation provided in the 2006 IPCC Guidelines through enhanced use of spatial features from the TERUTI-LUCAS survey (see http://agreste.agriculture.gouv.fr/enquetes/territoire-prix-des-terres/teruti-lucas-utilisation-du/) (e.g. either rely on TERUTI-LUCAS soil information or match its spatial grid with (organic) soils map and derive grid plots where organic soils occur, then improve the land-use conversion matrix with this information).	
L.8	4.A Forest land – CO ₂ , CH ₄ and N ₂ O (L.16, 2019) (L.14, 2017) (L.27, 2016) (L.27, 2015) Accuracy	Harmonize the application of the unmanaged forest definition across the entire national territory and, in doing so, ensure consistency between the reporting of managed forest land and of FM and complete coverage of forest lands in the metropolitan territory, regardless of their accessibility.	Resolved. The Party reported all forest as managed in its NIR, thus harmonizing the application of the unmanaged forest definition across the entire national territory.
L.9	4.A Forest land – CO ₂ (L.14, 2019) (L.12, 2017) (L.9, 2016) (L.9, 2015) (91, 2014) Transparency	Provide more transparent information regarding the integration between TERUTI and the NFI data, and also explain the reasons for the changes in the nomenclature of TERUTI and the per cent coverage of the sampled data for TERUTI and NFI purposes.	Not resolved. The Party did not provide information in its NIR on any changes made to increase transparency regarding the integration between TERUTI and the NFI data, including reasons for the changes in the nomenclature of TERUTI and the percentage of the sampled data covered for TERUTI and NFI purposes. During the review, the Party stated that, since it used tier 2 rather than tier 3 methodologies, such changes were not required. The ERT notes that providing an explanation of the integration between TERUTI and NFI data would increase the transparency of the calculations as a whole, regardless of which tier was used.
L.10	4.A Forest land – CO ₂ (L.15, 2019) (L.13, 2017) (L.11, 2016) (L.11, 2015) (95, 2014) (90, 2013) Transparency	Assess and report on the potential impact of using NFI data on carbon stocks and carbon stock changes, calculated over the NFI area, together with the TERUTI areas data set.	Addressing. The Party provided an explanation in its NIR (p.568) for the use of both TERUTI and NFI data sets in its inventory. However, data sets are difficult to compare owing to differences in nomenclature, time period covered and spatial resolution.
L.11	4.A Forest land – CO ₂ (L.32, 2019) Transparency	Provide sufficient information in the NIR on how the removal factors, based on biomass net growth increments, are estimated for land remaining forest land and land converted to forest land.	Resolved. The Party reported in the NIR (section 6.4, pp.594–604) information on the estimation of the increment factors. More accurate data on growth rate factors were provided in an annex to the NIR (“LULUCF Background.xlsx”) and in the OMINEA annex (p.820).
L.12	4.A Forest land – CO ₂ (L.33, 2019) Accuracy	Stratify the forest land area in French Guiana (and other overseas territories) such that growth rate factors can be differentiated by different management intensity in the	Addressing. During the review, the Party clarified that it calculated forest biomass carbon stock variation in French Guiana using a tier 2 approach taking into account the harvesting zones and single specific regeneration

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
		forest (natural forest, secondary forest and planted forest in concessions) for land converted to forest land and forest land remaining forest land, and distinguish harvest statistics by land practice, stratified for each land-use category.	growth factor (1.75 t C/ha/year). This is also explained in the NIR (pp.602–603). However, the growth rate factors are not differentiated by management intensity.
L.13	4.B.1 Cropland remaining cropland – CO ₂ (L.35, 2019) Accuracy	Distinguish between perennial and annual crops in the area data for the overseas territories, using, in the absence of country-specific information, default carbon stock change factors from the 2006 IPCC Guidelines (vol. 4, tables 5.1–5.3).	Not resolved. During the review, the Party clarified that it has not addressed this issue yet because perennial and annual crops are not distinguished in data for overseas territories. However, in the next few years, it plans to develop a new spatially explicit approach for monitoring land-use change that distinguishes between annual and perennial cropland (and between vineyards and other perennial crops). This approach, so far tested in mainland France, will be used in overseas territories for fruit trees in particular. Further information on the new approach will be reported in the 2023 annual submission.
L.14	4.B.1 Cropland remaining cropland – CO ₂ (L.36, 2019) Accuracy	Estimate and report in CRF table 4.B and the NIR the emissions and removals from living biomass in cropland remaining cropland when a subcategory does not change its land-use type (e.g. orchard remaining orchard) for the metropolitan and overseas territories by either collecting data on the specific growth rates and wood densities, as well as harvest statistics (e.g. from private growers), for different perennial crops or by collecting regular data on growing stock through a field survey.	Resolved. The Party reported in CRF table 4.B the emissions and removals from living biomass in cropland remaining cropland. During the review, the Party stated that, on the basis of an analysis of perennial cropland dynamics, it calculated the regeneration of perennial cropland as land-use change between subcategories of agricultural land.
L.15	4.B.2 Land converted to cropland – CO ₂ (L.18, 2019) (L.19, 2017) (L.18, 2016) (L.18, 2015) (102, 2014) (98, 2013) Completeness	Apply at least a tier 1 method from the IPCC good practice guidance for LULUCF to estimate the net CO ₂ emissions and removals from land converted to perennial crops.	Not resolved. The Party reported in the NIR (annex 9, p.830) that this recommendation has yet to be implemented.
L.16	4.B.2 Land converted to cropland – CO ₂ (L.37, 2019) Comparability	Include the net losses due to the conversion from forest land to cropland in CRF table 4.B under losses, and use the notation key “IE” for gains in the carbon stock change for living biomass per area to indicate that the gains are inherently part of the losses.	Not resolved. The Party did not implement this recommendation in CRF table 4.B.
L.17	Cropland converted to other land uses – CO ₂ (L.19, 2019) (L.20, 2017) (L.19, 2016) (L.19, 2015)	Provide estimates of biomass losses from conversion of perennial crops to other land uses (including cropland converted to wetlands, settlements and other land).	Addressing. The Party reported in its NIR (p.830) estimated biomass loss from the conversion of perennial crops to other land uses (including cropland converted to wetlands and settlements), except for other lands, for which all categories are reported as “NE”. During the review, the Party explained that the reported emission and removal estimates include

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	(103, 2014) Completeness		estimates for both the metropolitan territory and the overseas territories. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet reported the biomass losses for all land-use changes.
L.18	4.B Cropland, 4.C Grassland, 4.E Settlements – CO ₂ (L.21, 2019) (L.22, 2017) (L.31, 2016) (L.31, 2015) Transparency	Report in the NIR complete information on the calculation or selection of each biomass density value.	Resolved. The Party provided information in its NIR (tables 182 and 190, p.654, and OMINEA, table 131) on the selection of each biomass density value for cropland, grassland and settlements.
L.19	4.B Cropland, 4.C Grassland – CO ₂ and CH ₄ (L.34, 2019) Accuracy	Use the IPCC default EF values for tropical regions for overseas territories when estimating CO ₂ and CH ₄ emissions from organic soils in grassland and cropland.	Resolved. The Party reported in its NIR (pp.629, 634, 644) that it used the IPCC default EFs from the Wetlands Supplement.
L.20	4.C Grassland – CO ₂ and N ₂ O (L.22, 2019) (L.25, 2017) (L.30, 2016) (L.30, 2015) Completeness	Applying at least the tier 1 IPCC method, report estimates of biomass and soil carbon stock changes, and associated CO ₂ and N ₂ O emissions, for: (a) Grassland remaining grassland, reporting emissions and removals associated with changes in grassland subcategories; (b) Land converted to grassland, reporting also emissions and removals from conversions of land uses other than forest to grassland subcategories.	Addressing. The Party reported in its NIR (p.830) that N ₂ O emissions from mineralization on grassland remaining grassland were included for the first time. However, the ERT noted that CO ₂ emissions for some pools and land-use changes are still not reported (net carbon stock change in DOM for all types of land converted to grassland except forest land converted to grassland; carbon stock change in living biomass for wetlands and other land converted to grassland). Therefore, the ERT considers that this issue has not yet been fully addressed.
L.21	4.C.1 Grassland remaining grassland – CO ₂ (L.38, 2019) Transparency	Include in the NIR an explanation of how the carbon stock change factors for thickets and hedges are estimated and the assumptions made when compiling NIR table 151.	Resolved. The Party provided the required explanation and information in its NIR (p.641).
L.22	4.D Wetlands – CO ₂ and N ₂ O (L.23, 2019) (L.26, 2017) (L.32, 2016) (L.32, 2015) Accuracy	Either report information to demonstrate that the methodology used to estimate carbon stock changes in land converted from and to wetlands produces more accurate and/or precise estimates than the IPCC methodology (2006 IPCC Guidelines, vol. 4, equation 2.26) or apply the IPCC methodology for estimating GHG emissions and removals from drained (wetlands converted to other land uses) and rewetted (other land uses converted to wetlands) organic soils.	Not resolved. During the review, the Party clarified that this issue has not yet been addressed.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
L.23	4.F.2 Land converted to other land – CO ₂ and N ₂ O (L.25, 2019) (L.28, 2017) (L.33, 2016) (L.33, 2015) Completeness	Estimate SOC losses and associated CO ₂ and N ₂ O emissions originated from conversions of cropland, grassland, wetlands and settlements to other land either applying the IPCC default assumption (i.e. all SOC lost in the conversion) or applying a country-specific SOC factor for other land.	Not resolved. The Party did not report an estimate of the SOC losses and associated CO ₂ and N ₂ O emissions from conversions of cropland, grassland, wetlands and settlements to other land. During the review, the Party clarified that such conversions from and to other land are not identified as reliable enough to estimate emissions and removals.
L.24	4.G HWP – CO ₂ (L.39, 2019) Transparency	Provide information in the NIR on the HWP in SWDS, namely whether the emissions and removals are significant; if they are insignificant, “NE” can be reported, but if they are significant, AD should be collected and tier 1 data, consistent with the waste sector data, used for calculating the estimates.	Not resolved. The ERT noted that France did not provide information in the NIR on the significance of CO ₂ emissions and removals for HWP stored in SWDS and continued to report the notation key “NE” in CRF table 4.G (sheet 1) under approach C. During the review, the Party informed the ERT that it is not planning to address this issue yet.
L.25	4(I) Direct N ₂ O emissions from N input to managed soils – N ₂ O (L.40, 2019) Completeness	Estimate N ₂ O emissions from nitrogen fertilization on forest land, or, if the volumes of fertilizer cannot be distinguished from those reported under the agriculture sector (cropland and grassland), report all the emissions under the agriculture sector and indicate in the documentation box to CRF table 4(I) and in the NIR where these emissions are reported. In addition, ensure that the description of the use of the notation keys in the NIR matches their actual use in the CRF tables.	Not resolved. The ERT noted that France did not estimate N ₂ O emissions from nitrogen fertilization on forest land (reported as “NO”). During the review, the Party clarified that emissions from fertilization of land other than cropland and grassland are currently not estimated., It added that the harmonization of notation key usage between the NIR and the CRF tables will be considered for future annual submissions.
L.26	4(III) Direct N ₂ O emissions from N mineralization/ immobilization – N ₂ O (L.41, 2019) Completeness	Provide in CRF table 4(III) and in the NIR estimates for N ₂ O emissions due to mineralization associated with carbon stock changes in soils on grassland remaining grassland using the carbon stock changes reported in CRF table 4.C.	Not resolved. The Party did not provide estimates for N ₂ O emissions due to mineralization associated with carbon stock changes in soils on grassland remaining grassland in CRF table 4(III). The Party reported in the NIR (p.91) that it determined the emissions to be negligible and hence reported them in the NIR as “NE”. The Party further clarified that it is planning to provide quantitative estimates of such emissions, but there was not enough time to calculate them for the current annual submission (see also ID# G.4 above).
L.27	4(V) Biomass burning – CO ₂ , CH ₄ and N ₂ O (L.28, 2019) (L.31, 2017) (L.35, 2016) (L.35, 2015) Transparency	Provide information on the progress of the collaboration between the National Institute of Geographic and Forest Information and Citepa to refine the calculation of the types of burned forests using data from the PROMETHEE database.	Resolved. During the review, the Party clarified that it was able to refine the calculation of the types of burned forests for the 2021 annual submission thanks to the availability of accurate information on wildfires, including data from the PROMETHEE database for the years prior to 2006 and from the forest fire database of the National Institute of Geographic and Forest Information. The Party reported the required information in its NIR (p.614).
L.28	4(V) Biomass burning – CO ₂ , CH ₄ and N ₂ O (L.27, 2019) (L.30, 2017) (L.21, 2016) (L.21, 2015)	Include transparent information on all the input data necessary to apply the IPCC methodology to estimate CO ₂ and non-CO ₂ emissions from biomass burning, including for overseas countries and territories.	Resolved. The Party reported in its NIR (annex 9, p.831) that, of the territories mentioned, only New Caledonia is concerned by biomass burning outside of the metropolitan area. CO ₂ and non-CO ₂ emissions from biomass burning in New Caledonia were included in the OMINEA report. The Party

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	(107, 2014) Transparency		updated its explanation in the OMINEA report (p.871) for wildfires in all territories to reflect methodological changes.
L.29	4(V) Biomass burning – CO ₂ , CH ₄ and N ₂ O (L.42, 2019) Accuracy	In order to correct for the representation bias in the parameters used and thus improve the accuracy of the inventory, collect additional information for the tropical regions in order to estimate emissions from burned areas; and document the assumptions and methodology for each EF by gas, region and forest type.	Resolved. The methodology for wildfires was thoroughly revised for the 2020 annual submission. The description of the methodology in the NIR was therefore amended accordingly. The Party also reported the revised estimates in the OMINEA report (p.871).
Waste			
W.1	5. General (waste) (W.1, 2019) (W.1, 2017) (W.2, 2016) (W.2, 2015) (111, 2014) (102, 2013) Transparency	Clearly specify when data and figures refer to the geographical coverage under the Convention or under the Kyoto Protocol, and increase the transparency of the reporting of estimated activities for the overseas territories, including the parameters and methodologies used.	Resolved. In the previous review report, the ERT noted that France included information in the 2019 NIR on which geographical coverage tables and graphs refer to the Convention and which to the Kyoto Protocol. However, the previous ERT noted that the Party did not explain in the 2019 NIR the parameters and methodologies used for estimating emissions from industrial wastewater treatment in the overseas territories. In its NIR (p.704), the Party reported that emissions from industrial wastewater from overseas territories are not taken into account in the inventory. During the review, it clarified that the limited industrial activity in these territories generates only negligible emissions.
W.2	5. General (waste) – CH ₄ (W.2, 2019) (W.13, 2017) Transparency	Include in chapter 7.1 of the NIR an overview of all waste generated and the extent to which it is recycled, incinerated, landfilled or treated otherwise (including waste types specified in the 2006 IPCC Guidelines, vol. 5, chap. 3, para. 3.5 and ensuring the inclusion of waste that is considered inert).	Addressing. The Party provided information in section 7.1 of its NIR (p.670, table 203) on the total volume of waste generated in France. A total 326 Mt waste was reported for 2016. Figure 169 (p.671), on waste treatment for 2016, shows that 53.1 Mt waste was treated at ITOM, while figure 170 (p.673), on trends in waste treatment, shows a range of 30–55 Mt household and similar waste generated per year for 1990–2019. The difference between the values reported in table 203 on the one hand and figures 169–170 on the other is largely attributable to the volume of waste accounted for by the construction sector, which is subcategorized into mineral waste, other non-hazardous minerals and landfill. During previous reviews, the Party explained that since construction waste is considered inert, it does not generate any CH ₄ emissions. However, the issue raised by the ERT concerns the discrepancy between the total waste generated in France (326 Mt for 2016) and the volume of waste treated at ITOM (53.1 Mt), which may not be entirely explained by the volume of waste generated by the construction sector (224 Mt). During the previous review, the Party explained that it could not include in its NIR an overview such as the one specified in the 2006 IPCC Guidelines (vol. 5, para. 3.5) as neither the National Institute of Statistics and Economic Studies nor ADEME publishes the required information. The ERT acknowledges the Party's response, but notes that to fully implement the recommendation of the previous ERT it is

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
W.3	5. General (waste) – CH ₄ and N ₂ O (W.15, 2019) Transparency	Clearly specify that tables 158–159 of the NIR relate to the geographical coverage under the Kyoto Protocol.	essential that France demonstrates that all waste generated is appropriately considered in the annual GHG inventory. Resolved. The Party reported in its NIR (p.669) that tables 201–202 (corresponding to tables 158–159 of the 2019 NIR) refer to waste generation in metropolitan France and therefore exclude overseas territories.
W.4	5.A Solid waste disposal on land – CH ₄ (W.3, 2019), (W.2, 2017) (W.10, 2016) (W.10, 2015) (117, 2014) Transparency	Provide more information on the waste composition allocation to the degradation categories used for the estimation for all years of the time series by adding a table to the NIR that explains how the ITOM categories are matched to the degradation categories used for the estimation and provide another table that shows the share of these degradation categories in relation to the total waste landfilled for all years of the time series.	Addressing. The Party reported in its NIR (p.681, table 207) an overview of waste composition for 1950, 1960, 1970, 1980, 1990, 1995, 2000, 2005 and 2010–2017. However, the Party did not explain how the ITOM categories are matched to the degradation categories used for the estimation of emissions. During the 2019 review, the Party explained that the ADEME survey contains more than 100 waste categories, which is too many to incorporate into NIR tables. During the review, the Party indicated that it will include information in the next NIR on the allocation of waste to the ITOM and IPCC categories.
W.5	5.A Solid waste disposal on land – CH ₄ (W.4, 2019) (W.3, 2017) (W.12, 2016) (W.12, 2015) (119, 2014) Accuracy	Allocate the fraction of waste rejected from composting plants to the easily degradable waste category or justify that this waste category is correctly allocated to the moderately degradable category.	Resolved. The Party reported in its NIR (p.681) that the fraction of waste rejected by composting plants corresponds to waste after composting. Easily degradable waste is eliminated during composting, which is why this type of waste after composting is classified as moderately degradable.
W.6	5.A Solid waste disposal on land – CH ₄ (W.6, 2019) (W.7, 2017) (W.21, 2016) (W.21, 2015) Comparability	Report the correct value used for the fraction of degradable organic carbon that decomposes in the CRF tables.	Not resolved. The Party reported in the documentation box to CRF table 5.A that degradable organic carbon is reported instead of the fraction of degradable organic carbon that decomposes. The ERT notes that CRF table 5.A requires the fraction of degradable organic carbon to be reported.
W.7	5.A Solid waste disposal on land – CH ₄ (W.9, 2019) (W.14, 2017) Transparency	Use the terminology as used in the 2006 IPCC Guidelines (unmanaged SWDS instead of uncontrolled SWDS) and traditionally managed SWDS instead of managed, non-compacted SWDS in the NIR.	Resolved. The NIR (pp.675–677) includes definitions of the terminology used for the categories used by the Party as well as a table showing a clear correspondence with the IPCC categories.
W.8	5.A.1 Managed waste disposal sites – CH ₄ (W.16, 2019) Transparency	Report in the NIR up-to-date information on the number of SWDS in operation.	Resolved. The Party reported in its NIR (pp.670 and 674) updated and consistent information on the number of SWDS in operation (218 non-hazardous waste storage facilities), which is based on 2018 data from ADEME.
W.9	5.A.1 Managed waste disposal sites – CH ₄	Report the appropriate AD for annual waste disposed of at anaerobic managed waste disposal sites (category 5.A.1) under the Convention and under the Kyoto	Resolved. The Party reported in CRF table 5.A different AD under the Convention and under the Kyoto Protocol for annual waste disposed of at anaerobic managed waste disposal sites (category 5.A.1) for the entire time

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	(W.17, 2019) Comparability	Protocol, ensuring that the waste in overseas territories is included.	series (e.g. for 2019, 18,334.24 kt under the Convention and 18,343.27 kt under the Kyoto Protocol).
W.10	5.A.2 Unmanaged waste disposal sites – CH ₄ (W.18, 2019) Comparability	Replace the notation key “NO” with the appropriate AD for unmanaged waste at SWDS under the Convention.	Resolved. The Party reported AD for unmanaged waste disposal sites in CRF table 5.A (e.g. 142.79 kt for 2019).
W.11	5.D Wastewater treatment and discharge – N ₂ O (W.19, 2019) Accuracy	Either apply the default value of 1.1 for the parameter F _{NON-CON} , or provide in the NIR a clear justification for applying an F _{NON-CON} of 1.0.	Resolved. The Party reported in its NIR (p.706) that the default value for F _{NON-CON} of 1.1 is applied for overseas territories.
W.12	5.D.1 Domestic wastewater – CH ₄ (W. 13, 2019) (W.10, 2017) (W.25, 2016) (W.25, 2015) Accuracy	Follow the decision tree in the 2006 IPCC Guidelines regarding the value for B ₀ and methane correction factor when estimating CH ₄ emissions from domestic wastewater.	Addressing. During the review, the Party stated that it performed a literature survey for new data on emissions from septic tanks. Owing to a lack of reliable new data, however, the survey did not result in an improved EF.
W.13	5.D.2 Industrial wastewater – CH ₄ (W.14, 2019) (W.11, 2017) (W.24, 2016) (W.24, 2015) Transparency	Include in the NIR clear information on AD and CH ₄ EFs and detailed information about the industries and amounts of wastewater discharged by those industries considered to calculate CH ₄ emissions from industrial wastewater.	Addressing. In response to a question raised by the ERT during the review, the Party referred to information contained in the OMINEA database. However, the crux of the issue is the COD of industrial wastewater and the EFs used for wastewater treatment systems and discharge pathways as indicated in the 2006 IPCC Guidelines (vol. 5, chap. 6, figure 6.1). The ERT considers that the recommendation has not yet been addressed because the Party has not yet included in the NIR clear information on AD and CH ₄ EFs.
KP-LULUCF			
KL.1	General (KP-LULUCF) (KL.1, 2019) (KL.2, 2017) (KL.3, 2016) (KL.3, 2015) KP reporting adherence	<p>Improve the national system for the overseas territories by introducing additional institutional arrangements to ensure that at a minimum information is collected on a continuous basis to be included in France’s future annual submissions on:</p> <ul style="list-style-type: none"> (a) Forest area and forest area changes; (b) Forest areas subject to natural disturbances; (c) Forest biomass carbon stock gains; (d) Forest biomass carbon stock losses associated with harvesting and carbon stock losses associated with natural disturbances. 	Not resolved. The Party did not report any changes in its national system related to introducing additional institutional arrangements for the overseas territories in its NIR. During the review, the Party clarified that several projects are focusing on overseas territories, which should lead to improvements in the next annual submission.

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KL.2	General (KP-LULUCF) (KL.2, 2019) (KL.3, 2017) (KL.4, 2016) (KL.4, 2015) Accuracy	Use the data from the NFI plots collected in the areas subject to disturbance or land-use conversion for estimating biomass and DOM carbon stocks in disturbed or converted areas to enhance the accuracy of estimates of GHG emissions associated with disturbance of forest land and their conversion to other land uses.	Not resolved. The Party did not report the use of the NFI data plots in the areas subject to disturbance or land-use conversion. During the review, the Party clarified that DOM was not included in biomass stocks taken into account for forest fires, since it represented only a very small proportion of biomass. No areas were reported under natural disturbances.
KL.3	General (KP-LULUCF) (KL.3, 2019) (KL.25, 2017) Comparability	Use the notation key “NA” in accordance with footnote 2 to CRF table NIR-2 for the activities not elected to be accounted for in the second commitment period of the Kyoto Protocol.	Not resolved. The Party reported “NE” in CRF table NIR-2 for non-elected activities.
KL.4	General (KP-LULUCF) (KL.4, 2019) (KL.5, 2017) (KL.6, 2016) (KL.6, 2015) Accuracy	Allocate the appropriate portion of harvested wood to AR land and remove it from FM, and revise carbon stock change estimates for AR and FM accordingly.	Not resolved. The Party has not yet allocated the appropriate portion of harvested wood to AR land and removed it from FM. Moreover, it did not revise carbon stock change estimates for AR and FM. During the review, the Party indicated that sources of harvested wood are difficult to monitor, and broad assumptions need to be made to revise this allocation (see also ID# KL.18 below).
KL.5	General (KP-LULUCF) (KL.5, 2019) (KL.7, 2017) (KL.8, 2016) (KL.8, 2015) Accuracy	Address the inconsistency between the information in the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol and the annual submission by including pests and droughts in the estimates of the background level and margin for FM and AR.	Not resolved. The Party reported to the ERT during the review and reported in the NIR (annex 9, p.831) that it has not yet implemented this recommendation.
KL.6	General (KP-LULUCF) (KL.6, 2019) (KL.10, 2017) (KL.9, 2016) (KL.9, 2015) Completeness	Either report evidence that such an assumption is accurate (that in overseas territories the biomass carbon stock in forest land, including both land under FM and AR, is at equilibrium) or estimate, at least at tier 1, biomass net carbon stock changes for FM and AR land in overseas territories and report those estimates.	Addressing. The Party informed the ERT during the review that it calculates forest biomass carbon stock variation in French Guiana using a tier 2 approach and taking into account the harvesting zones and specific regeneration growth factor. However, the Party clarified that addressing this issue is still under consideration.
KL.7	General (KP-LULUCF) (KL.7, 2019) (KL.11, 2017) (KL.10, 2016) (KL.10, 2015) Accuracy	Apply the stock difference method for estimating biomass and DOM net carbon stock changes to verify the estimate reported by applying the gain and loss method. The stock difference method can be applied at the level of each single plot, and to estimates aggregated at the national level or directly applied at the national level; although if implemented at the national level the stock difference method would estimate the aggregated impact of AR, deforestation and FM.	Addressing. During the review, the Party clarified that it conducted a comparative analysis of carbon stock changes, chiefly to improve the reporting under the Convention. It added that any changes would also have an impact on reporting under the Kyoto Protocol.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
KL.8	General (KP-LULUCF) (KL.19, 2019) KP reporting adherence	Provide definitions for planted and natural forests, and distinguish the areas of planted and natural forests in the NIR and report their total areas in CRF table NIR-2.1 instead of “NE”.	Not resolved. The Party reported that it has not yet implemented this recommendation.
KL.9	Article 3.3 activities (KL.8, 2019) (KL.4, 2017) (KL.5, 2016) (KL.5, 2015) Transparency	Report in the NIR the following quantitative information: (a) For both AR and deforestation, the time series (from 1990 to the last reported year) of area subject to the activity (i.e. extend back to the time period 1990–2007 the data series reported in NIR table 69) and of net annual SOC changes; (b) The time series (from 1990 to the last reported year) of annual harvesting, of biomass net annual increment and of GHG emissions from natural disturbances on land subject to AR; (c) The time series (from 1990 to the last reported year) of biomass carbon stock loss from areas deforested every year.	Resolved. The Party reported quantitative information in its NIR as follows: (a) France reported the annual and cumulative areas of AR and deforestation (as well as FM) for 1990–2019 (NIR table 221, p.728). Net annual SOC changes are available in the CRF tables; (b) The Party indicated during the review that it is not planning to calculate and report emissions and removals for years before 2008 under the Kyoto Protocol, which was not mandatory and would be time-consuming. However, the ERT notes that the estimation of GHG emissions from natural disturbances on land subject to AR is still required for the calculation of the background level and margin if the Party intends to apply the natural disturbance provision (see also ID# KL.18 below); (c) The Party indicated during the review that it is not planning to calculate emissions and removals for years before 2008 under the Kyoto Protocol, which was not mandatory and would be time-consuming.
KL.10	FM – CO ₂ , CH ₄ and N ₂ O (KL.10, 2019) (KL.13, 2017) (KL.12, 2016) (KL.12, 2015) KP reporting adherence	Report in the NIR quantitative information on the drivers that have determined the deviation of the actual estimates of GHG emissions and removals reported under FM from the projected GHG emissions and removals included in the FMRL correction value, including: (a) The time series (from 1990 to the latest reported year) of annual harvesting, of biomass gross annual increment, of natural mortality, of FM area and of GHG emissions from natural disturbances used for preparing estimates for FM during the commitment period; (b) The historical time series (1990–2012) of annual harvesting, of biomass gross annual increment, of natural mortality, of FM area and of GHG emissions from natural disturbances used for projecting the FMRL correction value; (c) The amount of annual harvesting, of biomass gross annual increment, of natural mortality, of FM area and of GHG emissions from natural disturbances included in the FMRL correction value.	Not resolved. The Party informed the ERT during the review that this recommendation has not yet been addressed.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
KL.11	FM – CO ₂ (KL.11, 2019) (KL.14, 2017) (KL.13, 2016) (KL.13, 2015) Accuracy	Use the same age-class structure as derived from the NFI for 2010 for calculating the FMRL correction value and ensure consistency in the factors applied in the FMRL and in the FM estimates to calculate the total biomass (above and below ground) of forest from the growing stock volume.	Not resolved. The Party informed the ERT during the review that this recommendation has not yet been addressed.
KL.12	FM – CO ₂ , CH ₄ and N ₂ O (KL.14, 2019) (KL.18, 2017) (KL.16, 2016) (KL.16, 2015) Transparency	Harmonize the application of the unmanaged forest land definition by accounting under FM all the forest land in the metropolitan territory that is not reported under AR or deforestation, regardless of accessibility.	Resolved. The ERT noted that all forest in France is now categorized as managed forest, including forest in the overseas territories.
KL.13	FM – CO ₂ (KL.15, 2019) (KL.19, 2017) (KL.17, 2016) (KL.17, 2015) Transparency	Report 153,455.612 kt CO ₂ eq as the FM cap in the CRF table on accounting.	Resolved. The Party reported 153,455.612 kt CO ₂ eq as the FM cap in the CRF table on accounting.
KL.14	FM – CO ₂ (KL.20, 2019) Transparency	Include in the NIR the calculation of the technical correction and a description of how consistency between the FMRL and the annual GHG inventory is ensured.	Addressing. The Party reported in its NIR (pp.731–732) information on the technical correction and a description of how it strives to ensure consistency between the FMRL and the annual GHG inventory. However, the NIR does not include a detailed description of how the technical correction was calculated or the background assumptions of the model used, which would enable the ERT to ensure that the forest area under FM in the overseas departments was considered and to demonstrate methodological consistency between the FMRL and actual GHG estimates regarding HWP and natural disturbances.
KL.15	FM – CO ₂ (KL.21, 2019) Transparency	Include in the NIR the calculation and results of the background level and margin for both AR and FM that have been provided in CRF tables 4(KP-I)A.1.1 and 4(KP-I)B.1.3.	Not resolved. The Party stated during the review that it will address this issue for the NIR of its next annual submission.
KL.16	HWP – CO ₂ (KL.16, 2019) (KL.21, 2017) (KL.19, 2016) (KL.19, 2015) Transparency	Report in CRF table 4(KP-I)C and in the NIR, as follows: (a) Background data (i.e. the time series of HWP domestically produced from domestic wood) for each HWP category; (b) Information on how HWP domestically produced from domestic wood have been singled out from the total HWP domestically produced; (c) Information on how the HWP contribution of exported HWP, domestically produced with domestic wood, have been estimated;	During the review, the Party informed the ERT that no progress was made on this issue since the previous submission, as follows: (a) Not resolved. France did not provide data in the NIR on the domestic wood from which the HWP were sourced. In CRF table 4(KP-I)C, the notation key “NO” was reported under harvest instead of the values for domestic harvest by category; (b) Addressing. However, while the NIR indicates that it is possible on the basis of incoming flows to distinguish HWP from wood harvested in France

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
		(d) Information that demonstrates the consistency between the harvesting rate reported for estimating biomass net carbon stock change in land under FM and AR and the HWP domestic production.	<p>and HWP from imported wood (p.663), there is no description of how this is done;</p> <p>(c) Addressing. France provided some information on HWP calculations and assumptions in the NIR (pp.660–665). However, while the NIR indicates that statistics on exported wood are available (p.663), no distinction is made for exported wood that is domestically produced and there is no information on how the contribution of exported HWP has been estimated;</p> <p>(d) Not resolved. France did not provide information in the NIR that demonstrates consistency between the harvesting rate reported for estimating biomass net carbon stock change in land under AR and FM and the domestic production of HWP.</p>
KL.17	HWP (KL.17, 2019) (KL.22, 2017) (KL.20, 2016) (KL.20, 2015) Convention reporting adherence	Report verification information for the estimates of the HWP contribution. Verification information may be an alternative estimate prepared applying the default methodology contained in the <i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i> .	Addressing. The Party now applies a tier 2 methodology, but it did not provide verification information for the estimates of the HWP contribution.
KL.18	HWP – CO ₂ (KL.22, 2019) Comparability	Include in CRF table 4(KP-I)C information on the amount of wood originating from deforestation, AR and FM, and include the volumes of wood originating from deforestation (during the event) and other land uses in cells D17 and D18, respectively, of that table. Also, provide in the NIR information that demonstrates that HWP originating from wood harvested during a land-use change on deforested land have been separated from HWP originating from areas under FM.	Not resolved. The Party informed the ERT during the review that it has not yet implemented this recommendation.
KL.19	HWP – CO ₂ (KL.23, 2019) Transparency	Provide in the NIR the quantitative values and calculation for HWP accounted for in the first commitment period of the Kyoto Protocol that are excluded from the second commitment period accounting.	Not resolved. The Party did not provide the quantitative values and calculation for HWP accounted for in the first commitment period of the Kyoto Protocol that are excluded from the second commitment period accounting. During the review, the Party stated that it will address this issue for the NIR of its next annual submission.
KL.20	Biomass burning – CO ₂ , CH ₄ and N ₂ O (KL.18, 2019) (KL. 23, 2017) (KL.2, 2016) (KL.2, 2015) (137, 2014) Transparency	For wildfires, provide the reference for each of the CO ₂ , CH ₄ and N ₂ O EFs used and the underlying assumptions, if applicable.	Resolved. The NIR contains a reference to the relevant EFs (p.615).

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

^b The report on the review of the 2020 annual submission of France was not available at the time of this review. Therefore, the recommendations reflected in this table are taken from the 2019 annual review report. For the same reason, 2020 and 2018 are excluded from the list of review years in which issues could have been identified.

IV. Issues and problems identified in three or more successive reviews and not addressed by the Party

9. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues and/or problems included in table 4 have been identified in three or more successive reviews, including the review of the 2021 annual submission of France, 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 France

<i>ID#</i>	<i>Previous recommendation for issue</i>	<i>Number of successive reviews issue not addressed^a</i>
General		
G.3	Establish a previous period surplus reserve as soon as technically possible, which the ERT assumes will be prior to the 2017 annual submission.	4 (2015/2016–2021)
G.4	Clearly explain the methodologies and the sources of data used for each part of the French metropolitan and overseas territories.	4 (2015/2016–2021)
G.5	Provide in the NIR the likely level of emissions for each category reported as “NE” on the basis of the judgment that France considers the emissions for the categories to be insignificant, in order to demonstrate that the total national aggregate of estimated emissions for all gases and categories considered insignificant remains below 0.1 per cent of the national total GHG emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	3 (2017–2021)
G.7	Transparently report the information and assumptions used when defining the uncertainty of AD and EFs in line with the 2006 IPCC Guidelines (vol. 1, chap. 3.5).	4 (2015/2016–2021)
Energy		
E.6	Explain in the NIR the discrepancies between the sectoral and the reference approaches for international aviation (jet kerosene) and international navigation (residual fuel oil and gas/diesel oil) reported in the CRF tables.	4 (2015/2016–2021)
IPPU		
I.10	Report CH ₄ emissions from sinter production under iron and steel production.	3 (2017–2021)
Agriculture	No issues identified.	4 (2015/2016–2021)
LULUCF		

<i>ID#</i>	<i>Previous recommendation for issue</i>	<i>Number of successive reviews issue not addressed^a</i>
L.2	Improve the transparency of the reported information on the uncertainty analysis and update the values once data and methodological improvements are implemented for the estimates.	6 (2013–2021)
L.3	Report in the NIR complete information on data sources, assumptions and methodologies used. In particular, ensure that the following information is reported: (k) for each natural disturbance type, the time series from 1990 to the latest reported year of areas of forest land subject to natural disturbances disaggregated at the level of regions and forest types applied for calculating the national total biomass gross annual increment; (l) the time series from 1990 to the latest reported year of the total harvested wood subdivided by land of origin (i.e. metropolitan France and overseas territories), and land use of origin (i.e. forest land, possibly subdivided between FM and AR lands, cropland and grassland); and (q) information on EFs to clarify the timing of collection, the methodology applied for data collection, the method (including any assumption and equation) applied for the elaboration of EFs from rough data.	4 (2015/2016–2021)
L.5	Apply the IPCC default SOC values and SOC change factors for those territories (e.g. overseas territories) for which country-specific factors have not been calculated.	4 (2015/2016–2021)
L.7	Identify land representation of cropland accurately in order to report emissions and removals taking into account the 20-year transition period for land conversions. In doing so, depending on available resources, consider (1) improving the spreadsheets for allocation of the known total organic soils area across all relevant land-use subcategories; or (2) linking land use and soils by implementing approach 3 for land representation provided in the 2006 IPCC Guidelines through enhanced use of spatial features from the TERUTI-LUCAS survey (see http://agreste.agriculture.gouv.fr/enquetes/territoire-prix-des-terres/teruti-lucas-utilisation-du/) (e.g. either rely on TERUTI-LUCAS soil information or match its spatial grid with (organic) soils map and derive grid plots where organic soils occur, then improve the land-use conversion matrix with this information).	3 (2017–2021)
L.9	Provide more transparent information regarding the integration between TERUTI and the NFI data, and also explain the reasons for the changes in the nomenclature of TERUTI and the per cent coverage of the sampled data for TERUTI and NFI purposes.	5 (2014–2021)
L.10	Assess and report on the potential impact of using NFI data on carbon stocks and carbon stock changes, calculated over the NFI area, together with the TERUTI areas data set.	6 (2013–2021)
L.15	Apply at least a tier 1 method from the IPCC good practice guidance for LULUCF to estimate the net CO ₂ emissions and removals from land converted to perennial crops.	6 (2013–2021)
L.17	Provide estimates of biomass losses from conversion of perennial crops to other land uses (including cropland converted to wetlands, settlements and other land).	5 (2014–2021)
L.20	Applying at least the tier 1 IPCC method, report estimates of biomass and soil carbon stock changes, and associated CO ₂ and N ₂ O emissions, for (a) grassland remaining grassland, reporting emissions and removals associated with changes in grassland subcategories; and (b) land converted to grassland, reporting also emissions and removals from conversions of land uses other than forest to grassland subcategories.	4 (2015/2016–2021)
L.22	Either report information to demonstrate that the methodology used to estimate carbon stock changes in land converted from and to wetlands produces more accurate and/or precise estimates than the IPCC methodology (2006 IPCC Guidelines, vol. 4, equation 2.26) or apply the IPCC methodology for estimating GHG emissions and removals from drained (wetlands converted to other land uses) and rewetted (other land uses converted to wetlands) organic soils.	4 (2015/2016–2021)

<i>ID#</i>	<i>Previous recommendation for issue</i>	<i>Number of successive reviews issue not addressed^a</i>
L.23	Estimate SOC losses and associated CO ₂ and N ₂ O emissions originated from conversions of cropland, grassland, wetlands and settlements to other land either applying the IPCC default assumption (i.e. all SOC lost in the conversion) or applying a country-specific SOC factor for other land.	4 (2015/2016–2021)
Waste		
W.2	Include in chapter 7.1 of the NIR an overview of all waste generated and the extent to which it is recycled, incinerated, landfilled or treated otherwise (including waste types specified in the 2006 IPCC Guidelines, vol. 5, chap. 3, para. 3.5 and ensuring the inclusion of waste that is considered inert).	3 (2017–2020)
W.4	Provide more information on the waste composition allocation to the degradation categories used for the estimation for all years of the time series by adding a table to the NIR that explains how the ITOM categories are matched to the degradation categories used for the estimation and provide another table that shows the share of these degradation categories in relation to the total waste landfilled for all years of the time series.	5 (2014–2020)
W.6	Report the correct value used for the fraction of degradable organic carbon that decomposes in the CRF tables.	4 (2015/2016–2021)
W.12	Follow the decision tree in the 2006 IPCC Guidelines regarding the value for B _o and methane correction factor when estimating CH ₄ emissions from domestic wastewater.	4 (2015/2016–2021)
W.13	Include in the NIR clear information on AD and CH ₄ EFs and detailed information about the industries and amounts of wastewater discharged by those industries considered to calculate CH ₄ emissions from industrial wastewater.	4 (2015/2016–2021)
KP-LULUCF		
KL.1	Improve the national system for the overseas territories by introducing additional institutional arrangements to ensure that at a minimum information is collected on a continuous basis to be included in France's future annual submissions on: (a) Forest area and forest area changes; (b) Forest areas subject to natural disturbances; (c) Forest biomass carbon stock gains; (d) Forest biomass carbon stock losses associated with harvesting and carbon stock losses associated with natural disturbances.	4 (2015/2016–2021)
KL.2	Use the data from the NFI plots collected in the areas subject to disturbance or land-use conversion for estimating biomass and DOM carbon stocks in disturbed or converted areas to enhance the accuracy of estimates of GHG emissions associated with disturbance of forest land and their conversion to other land uses.	4 (2015/2016–2020)
KL.3	Use the notation key “NA” in accordance with footnote 2 to CRF table NIR-2 for the activities not elected to be accounted for in the second commitment period of the Kyoto Protocol.	3 (2017–2020)
KL.4	Allocate the appropriate portion of harvested wood to AR land and remove it from FM, and revise carbon stock change estimates for AR and FM accordingly.	4 (2015/2016–2020)

ID#	Previous recommendation for issue	Number of successive reviews issue not addressed ^a
KL.5	Address the inconsistency between the information in the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol and the annual submission by including pests and droughts in the estimates of the background level and margin for FM and AR.	4 (2015/2016–2020)
KL.6	Either report evidence that such an assumption is accurate (that in overseas territories the biomass carbon stock in forest land, including both land under FM and AR, is at equilibrium) or estimate, at least at tier 1, biomass net carbon stock changes for FM and AR land in overseas territories, and report those estimates.	4 (2015/2016–2020)
KL.7	Apply the stock difference method for estimating biomass and DOM net carbon stock changes to verify the estimate reported by applying the gain and loss method. The stock difference method can be applied at the level of each single plot, and to estimates aggregated at the national level or directly applied at the national level; although if implemented at the national level the stock difference method would estimate the aggregated impact of AR, deforestation and FM.	4 (2015/2016–2020)
KL.10	Report in the NIR quantitative information on the drivers that have determined the deviation of the actual estimates of GHG emissions and removals reported under FM from the projected GHG emissions and removals included in the FMRL correction value, including (a) the time series (from 1990 to the latest reported year) of annual harvesting, of biomass gross annual increment, of natural mortality, of FM area and of GHG emissions from natural disturbances used for preparing estimates for FM during the commitment period; (b) the historical time series (1990–2012) of annual harvesting, of biomass gross annual increment, of natural mortality, of FM area and of GHG emissions from natural disturbances used for projecting the FMRL correction value; and (c) the amount of annual harvesting, of biomass gross annual increment, of natural mortality, of FM area and of GHG emissions from natural disturbances included in the FMRL correction value.	4 (2015/2016–2020)
KL.11	Use the same age-class structure as derived from the NFI for 2010 for calculating the FMRL correction value and ensure consistency in the factors applied in the FMRL and in the FM estimates to calculate the total biomass (above and below ground) of forest from the growing stock volume.	4 (2015/2016–2020)
KL.16	Report in CRF table 4(KP-I)C and in the NIR, as follows: (a) background data (i.e. the time series of HWP domestically produced from domestic wood) for each HWP category; (b) information on how HWP domestically produced from domestic wood have been singled out from the total HWP domestically produced; (c) information on how the HWP contribution of exported HWP, domestically produced with domestic wood, have been estimated; and (d) information that demonstrates the consistency between the harvesting rate reported for estimating biomass net carbon stock change in land under FM and AR and the HWP domestic production.	4 (2015/2016–2020)
KL.17	Report verification information for the estimates of the HWP contribution. Verification information may be an alternative estimate prepared applying the default methodology contained in the <i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i> .	4 (2015/2016–2020)

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

V. Additional findings made during the individual review of the Party's 2021 annual submission

10. Table 5 presents findings made by the ERT during the individual review of the 2021 annual submission of France that are additional to those identified in table 3.

Table 5

Additional findings made during the individual review of the 2021 annual submission of France

<i>ID#</i>	<i>Finding classification</i>	<i>Description of finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?^a</i>
General			
		No general findings additional to those included in table 3 were made by the ERT during the review.	
Energy			
		No findings for the energy sector additional to those included in table 3 were made by the ERT during the review.	
IPPU			
I.15	2.A.2 Lime production – CO ₂	<p>The Party provided information in its NIR (pp.295–296) and CRF table 2(I).A-H (sheet 1) on CO₂ emissions from sugar refineries. The ERT noted that CO₂ recovery from sugar mills (230.37 kt CO₂ for 2019) is reported in CRF table 2(I).A-H (sheet 2) under category 2.H.2 food and beverages industry, and not in CRF table 2(I) (sheet 2), where only emissions are reported (identical values to those reported under category 2.H.2). During the review, the Party clarified that all CO₂ emissions related to lime production (including in sugar mills) are reported under category 2.A.2 lime production. These emissions take into account CO₂ recovered from sugar mills. Therefore, the emissions from sugar mills reported under category 2.A.2 are net emissions: total CO₂ emissions minus recovered CO₂. The Party also clarified that CO₂ recovery from lime production in sugar mills is reported as CO₂ recovery under category 2.H.2 for informational purposes only, as the recovered amount is already included in the net CO₂ emissions for category 2.A.2. It further clarified that CO₂ recovered from sugar mills and contained in foams is accounted in the agriculture sector and reported under emissions from liming under category 3.G liming.</p> <p>The ERT recommends that the Party improve the explanation provided in the NIR for the reporting of recovered CO₂ emissions from sugar refineries under category 2.H.2, reporting recovery under category 2.A.2 and ensuring that there is no double counting of emissions and removals (e.g. by including the information provided during the review) among categories 2.A.2, 2.H.2 and 3.G (liming).</p>	Yes. Comparability
I.16	2.A.2 Lime production – CO ₂	<p>The Party reported in its NIR (pp.292–296) the AD used to estimate CO₂ emissions from lime production. However, the ERT noted that the share of production accounted for by each type of lime – hydraulic lime, quick lime and lime produced in sugar mills –do not add up to 100 per cent. During the review, the Party clarified that the percentages for the different types of lime were misreported and noted that, at any rate, they are not used to calculate CO₂ emissions, which are estimated using a bottom-up approach.</p>	Yes. Convention reporting adherence

<i>ID#</i>	<i>Finding classification</i>	<i>Description of finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?^a</i>
		The ERT recommends that the Party report the correct shares of lime production in the NIR.	
I.17	2.B.1 Ammonia production – CO ₂	<p>The Party reported in its NIR (pp.307–309) and CRF tables 2(I) (sheet 1) and 2(I).A-H (sheet 1) CO₂ emissions from ammonia production. However, although the NIR refers to CO₂ removals for urea production and CO₂ liquefaction, “NO” is reported under removals in CRF table 2(I).A-H (sheet 1). During the review, the Party clarified that CO₂ emissions from ammonia production are accounted for differently under the EU ETS and in the national GHG inventory. Under the EU ETS, CO₂ emissions equate to CO₂ releases and the consideration of CO₂ recovered from liquefaction of CO₂ and CO₂ recovered from urea production (all CO₂ is accounted in the production sector). In the national GHG inventory, CO₂ recovered from urea production is subtracted from EU ETS CO₂ emissions (to avoid double counting) but CO₂ recovered from liquefaction of CO₂ is not, since CO₂ emissions associated with the use of liquid CO₂ are not reported elsewhere in the inventory. The Party acknowledged that CO₂ emissions recovered from urea production should be reported (for information) in CRF table 2(I).A-H (sheet 1), instead of “NO”, and indicated that this oversight will be corrected for the next annual submission.</p> <p>The ERT recommends that the Party report CO₂ emissions and removals under ammonia production for urea production in CRF table 2(I).A-H (sheet 1) and describe transparently in the NIR how these removals are treated compared with the emissions reported for this category, in particular in reference to CO₂ removals for urea production and CO₂ liquefaction.</p>	Yes. Comparability
I.18	2.B.1 Ammonia production – CO ₂	<p>During the review, the Party clarified that it reports emissions from combustion activities related to ammonia production in the energy sector (category 1.A.2 manufacturing industries and construction), rather than in the IPPU sector (category 2.B.1 ammonia production), to enable the better overall treatment of national energy balance data and to avoid double counting or underestimation. It added that for category 2.B.1 the reporting of emissions is based on detailed fuel consumption data provided by plants (bottom-up approach), whereas for category 1.A.2 it is based on the national energy balance (top-down approach). The ERT notes that this is not in accordance with the 2006 IPCC Guidelines.</p> <p>The ERT recommends that the Party include CO₂ emissions from combustion activities related to ammonia production in the IPPU sector under category 2.B.1 ammonia production in accordance with the 2006 IPCC Guidelines. It also recommends that the Party report on how it ensured the times-series consistency of these data and provide information on the recalculations performed as a result of the reallocation of emissions from the energy to the IPPU sector.</p>	Yes. Comparability
I.19	2.F.1 Refrigeration and air conditioning – HFCs	<p>The Party reported in CRF table 2(II)B-H (sheet 2), under subcategory 2.F.1.c industrial refrigeration, a product manufacturing IEF for HFC-143a of 218.58 per cent for 2019 (compared with 19.48 per cent for 2017). No explanation is provided for this significant increase in the NIR. During the review, the Party clarified that HFC-143a emissions from manufacturing were overestimated for 2018 and 2019, and that the correct value should be around 0.25 t, rather than 4.85 t, equating to a discrepancy of around 20.6 kt CO₂ eq. The Party confirmed that this error will be corrected for the next annual submission.</p> <p>The ERT recommends that the Party revise its calculations and report the correct values in CRF table 2(II)B-H (sheet 2).</p>	Yes. Convention reporting adherence
I.20	2.G.1 Electrical equipment – SF ₆	<p>The Party reported in CRF table 2(II)B-H (sheet 2) the time series of AD and emissions for the use of SF₆ in electrical equipment. However, the ERT noted a significant discrepancy in the amounts of SF₆ reported for stocks and emissions related to new fillings, operation and end of life. The amounts reported for the filling of new equipment correspond to</p>	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
		<p>around a third of total annual stocks. Given the nature and long lifetime (approximately 40 years) of the equipment and the emissions reported for operation and end of life, the ERT considers that reported stocks and new fillings may not be consistent. The ERT ascertained that France and one other EU member State jointly account for three quarters of total amounts reported for new fillings in the EU, which seems unrealistic given that the stocks of electrical equipment are generally proportionate to the size of a country's economy and population and the scale of its industrial activity, among other factors. The ERT also noted that the emissions reported by France for this category were not drastically different from those of other Parties, so the ERT cannot conclude that there is an over- or underestimation of SF₆ emissions. During the review, the Party clarified that emissions for this sector are estimated on the basis of a bottom-up approach (using plant data) rather than calculated. Emissions are reported directly by Enedis (the distribution system operator), RTE (the transmission system operator) and EDF (the largest producer and supplier of electricity in France). These organizations have a sophisticated system for monitoring their SF₆ emissions; however, the monitoring of installed volumes is less precise. France plans to conduct a more detailed survey in the next year to verify stocks and ensure consistency with reported emissions. In response to a question raised during the review, the Party also clarified that it is a major exporter of electrical equipment and that, while around 300 t SF₆ is filled into new products by French manufacturers each year, only a small proportion of those products are sold on the French domestic market. For example, for 2013, consumption of SF₆ by French manufacturers for the production of new equipment totalled 391 t, but the products sold in France accounted for only 22.8 t (6 per cent) of that total.</p> <p>The ERT recommends that the Party include in its NIR the clarification provided during the review on the findings of the planned survey to be performed in the near future aimed to verify the stocks of electrical equipment. The ERT also recommends that the Party revise, if necessary, the AD time series, and report transparently any resulting recalculations of SF₆ emissions. Finally, it recommends that the Party conduct a more thorough QC procedure on reported AD for new fillings and stock and related emissions (from manufacturing, operation and end of life) to ensure consistency in the values reported.</p>	
I.21	2.G.1 Electrical equipment – SF ₆	<p>The ERT noted that a drastic decline in SF₆ stocks was reported for 2010–2011 (70 t). During the review, the Party clarified that this was attributable to a change in the source of data used. Data for 1998–2010 were estimated by linear interpolation, whereas data for 2011 onward have been provided by EDF, RTE and Enedis.</p> <p>The ERT recommends that the Party investigate in greater detail the decline in stocks reported for 2010–2011, report the outcome of this investigation in the NIR and revise the SF₆ estimates, if this is necessary, ensuring time-series consistency.</p>	Yes. Consistency
I.22	2.G.4 Other (other product manufacture and use) – HFCs	<p>The Party reported in CRF table 2(II).B-H (sheet 2) HFC operational emissions from stocks of organic Rankine cycle equipment; however, it did not report AD or IEFs in the same CRF table and reported “NO” for all other entries. During the review, the Party clarified that, since organic Rankine cycle equipment has been used for heat recovery in France since only 2012, it is not yet at the end of its lifetime so no emissions from disposal have occurred. While fluorinated gas charging of new equipment is reported under product manufacturing, such emissions do not occur every year as production is sporadic. Emissions from stocks of such equipment are continuous, however. The Party acknowledged its failure to report AD for such emissions and stated that it will rectify this oversight for the next annual submission.</p> <p>The ERT recommends that the Party consistently report information related to HFC emissions for this activity under category 2.G.4 other by including AD and IEFs, including detailed background information in the NIR.</p>	Yes. Comparability

<i>ID#</i>	<i>Finding classification</i>	<i>Description of finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?^a</i>
Agriculture			
A.8	3.A.1 Cattle – CH ₄	<p>The Party reports CH₄ emissions from enteric fermentation for cattle on the basis of French feeding system data on feed consumption for different categories of livestock from different areas in France (Devun et al., 2015). These data are available in kg dm/head/year and combined within a French model for CH₄ emissions from enteric fermentation (Sauvant et al., 2011). In NIR tables 97, 98 and 99 (pp.492–493), France reported energy intake and emissions for the different categories of livestock accounted for in the French model. The 2006 IPCC Guidelines are based on the United States National Research Council model, which is based on the net energy intake of ruminants, whereas the French feeding system is based on feeding units and metabolized energy. In general, the French modelling approach shows a 10–15 per cent lower energy intake than when using the 2006 IPCC Guidelines methodology. The rationale for this difference is not analysed and discussed in the NIR.</p> <p>The ERT recommends that the Party in its NIR analyse and discuss in detail the low energy intake values in the French model and justify the variation in the data collected by Devun et al. (2015), their representativeness for French cattle farming conditions, and the quality of feed and its conversion into metabolized energy.</p>	Yes. Transparency
LULUCF			
No findings for the LULUCF sector additional to those included in table 3 were made by the ERT during the review.			
Waste			
W.14	5.A.1 Managed waste disposal sites – CH ₄	<p>The Party reported in its NIR (pp.682–683) its procedure for quantifying CH₄ recovery via data available from GEREPE platform (the French electronic register for pollutant emissions) but did not provide specific information on how individual SWDS do so. During the review, the Party indicated that SWDS operators must declare the method used to calculate recovery: measurement, calculation or estimate. In the French inventory, only the quantities of CH₄ measured and calculated are considered. In CRF table 5.A for 2019, 43 per cent of the CH₄ flared and 42 per cent of the CH₄ utilized are based on calculations. The ERT noted that it is unclear how individual SWDS calculate CH₄ recovery and what assumptions are made in order to do so. The 2006 IPCC Guidelines (vol. 5, chap. 6, p.3.19) indicate that CH₄ recovery should be based on metering of all gas recovered for energy and flaring or monitoring of the amount of electricity generated from the recovered gas. Estimating the amount of CH₄ recovered using more indirect methods should be done with great care, using substantiated assumptions. The ERT also noted that the 2006 IPCC Guidelines (vol. 5, chap. 6, p.3.28) indicate that if CH₄ recovery is reported, an inventory of known recovery facilities is desirable.</p> <p>The ERT recommends that the Party improve its overall monitoring of data on CH₄ recovery from SWDS to ensure that the requirements on quantification of energy recovery in the 2006 IPCC Guidelines (vol. 5, chap. 6, p.3.19) are met, and report in the NIR the improvements made. The ERT also recommends that the Party carry out the following short-term consolidation or improvement activities and report in the NIR on its progress in carrying out each of these short-term activities:</p> <p>(a) Survey SWDS declaring biogas recovery to consolidate the data declared on the GEREPE platform;</p> <p>(b) Clarify and document the calculation method used by each SWDS, including, for example, a list of SWDS whose CH₄ recovery is reported to be calculated, along with the related calculation methods and a justification for the inclusion of these calculations in the quantification of CH₄ recovery at SWDS;</p>	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
		(c) Identify those SWDS whose calculation approach is not based on relevant methods consistent with the 2006 IPCC Guidelines and remove their recovery data from the national inventory or justify the inclusion of these data, demonstrating the use of substantiated assumptions.	
W.15	5.A.1 Managed waste disposal sites – CH ₄	<p>The Party reported in its NIR (pp.682–683) its procedure for quantifying CH₄ recovery. The ERT noted that the values reported by the Party on CH₄ recovery in CRF table 5.A do not match the likely values of landfill gas used for energy generation reported to Eurostat. The ERT also noted that it might be helpful to use Eurostat data on energy generation from landfill gas to validate the reported amount of gas used for energy recovery in the CRF tables.</p> <p>The ERT recommends that the Party report in its NIR on the results of a comparison of CH₄ for energy recovery estimates reported in CRF table 5.A and Eurostat data (or data from another independent source) as a verification procedure, including any consequent improvement measures that may be necessary to ensure the accuracy of the inventory.</p>	Yes. Transparency
W.16	5.B.1 Composting – CH ₄ and N ₂ O	<p>The Party reported in CRF table 5.B IEFs for composting of municipal solid waste for 2019 of 8.27 g CH₄/kg waste (dm) and 0.14 g N₂O/kg waste (dm). The NIR (pp.686–687) provides information on the methodology for quantifying CH₄ and N₂O emissions. AD are based on the quantities of waste composted and EFs for each category of waste (green and organic waste, mixed household waste, sludge and others) are based on literature review. The ventilation mode of the installations (closed versus open-air composting) is also taken into account. The ERT noted that the IEFs are higher than expected when compared with the source literature and assuming a moisture content of 60 per cent in wet waste. When attempting to assess the implications of this for total emissions, the ERT noted that the NIR does not provide sufficient information to reproduce the reported CH₄ and N₂O emissions. During the review, the Party clarified that it assumed a moisture content of 60 per cent for green waste, 37 per cent for household waste, 63 per cent for biowaste and 70 per cent for sludge. It specified that, for wet waste, the EFs used for actively aerated installations are 2,500 g CH₄/t and 77 g N₂O/t. For passively aerated sites, different EFs are used for green waste (4,300 g CH₄/t; 31 g N₂O/t) and other types of waste (2,700 g CH₄/t; 79 g N₂O/t). In addition, each of these EFs by category of waste is averaged in proportion to the percentage of actively aerated installations (49 per cent) and passively aerated installations (51 per cent). For home composting, the EFs for passively aerated installations are used. The EFs are applied to all the waste taken into account in industrial composting (9,251,496 t for 2019), where 61 per cent of composted waste is considered to be green waste, 10 per cent is mixed household waste, 7 per cent is biowaste and 22 per cent is sludge and others. The amount of composted waste in domestic management is estimated on the basis of a national survey on the domestic management of organic waste carried out by ADEME (for 2019, this represented 2,518,586 t). For 2019, 89 per cent of waste composted at home was considered to be green waste and 11 per cent to be biowaste.</p> <p>The ERT recommends that the Party specify in the NIR all EFs, parameters (noting that while the assumption for moisture content does not affect emissions, it does affect the IEFs, and to facilitate comparisons with other Parties, it is important to specify in the NIR the assumptions used for moisture content in the various types of waste), AD and assumptions used to quantify emissions from composting. The ERT also recommends that the Party clearly specify which data are taken from national statistics (total amount of waste composted) and what is assumed or considered (e.g. percentage of actively and passively aerated installations; composition of waste composted; amount and composition of waste composted at home).</p>	Yes. Transparency

<i>ID#</i>	<i>Finding classification</i>	<i>Description of finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?^a</i>
W.17	5.B.2 Anaerobic digestion at biogas facilities – CH ₄	<p>The Party reported in its NIR (p.686) that CH₄ emissions from anaerobic digestion are based on a biogas generation rate of 320 m³ per t raw material, a CH₄ concentration of 60 per cent in the biogas produced and a leakage rate of 5 per cent. The ERT noted that this IEF is much lower than expected on the basis of the description in the NIR (according to which the IEF should be 17.1 CH₄/kg dry waste). During the review, the Party clarified that the biogas generation rate in the NIR of 320 m³/t raw material was misreported. France uses a different biogas generation rate for each type of waste: 73 m³/t for slurry, 125 m³/t for household waste, 140 m³/t for biowaste and 19.5 m³/t for sludge. These values are taken from a study by ADEME.</p> <p>The ERT recommends that the Party clearly report in the NIR all assumptions and data used to quantify CH₄ emissions from anaerobic digestion at biogas facilities, in particular AD, biogas generation for each type of waste, CH₄ concentration in biogas, density of CH₄ and leakage rate.</p>	Yes. Transparency
W.18	5.D.2 Industrial wastewater – CH ₄	<p>The Party reported in its NIR (pp.704–705) its methodology for quantifying CH₄ emissions from treatment of industrial wastewater. The ERT noted that CH₄ emissions could not be reproduced from the information provided. The Party reported that emissions from treatment of sludge from industrial wastewater are calculated assuming 5 per cent leakage loss upon anaerobic digestion. However, the ratio of CH₄ emissions and CH₄ recovery for energy use for category 5.D.2 industrial wastewater in CRF table 5.D (value for 2019) suggested that a much higher leakage rate was assumed. During the review, the Party provided the ERT with the AD for the amount of sludge treated by the industries themselves and the amount of COD discharged by lagoons receiving industrial wastewater. Using this information, the ERT was able to reproduce the Party’s reported emissions. The relatively high CH₄ leakage loss calculated on the basis of the ratio in CRF table 5.D was attributable to the reported amount of CH₄ recovered for energy use, which did not contain CH₄ recovered during the treatment of sludge by the companies themselves.</p> <p>The ERT recommends that the Party clearly specify in the NIR all assumptions and underlying data used to quantify CH₄ emissions from industrial wastewater, in particular AD, the amount of sludge treated by the industries themselves and the amount of COD from industries received by lagoons and the methane correction factor assumed for treatment of industrial wastewater in lagoons. The ERT also recommends that the Party include in CRF table 5.D the amount of CH₄ recovered for energy production from sludge treated by the industries themselves.</p>	Yes. Transparency
W.19	5.D.2 Industrial wastewater – CH ₄	<p>The Party reported in its NIR (p.704) its methodology for quantifying CH₄ emissions from treatment of industrial wastewater in lagoons (referred to in the NIR as in situ stations). The ERT noted that, in the absence of data on wastewater entering the lagoons (COD generated by industrial processes), the data used concern the COD leaving the lagoons. Since lagoons remove part of the COD generated by the industrial process, this results in an underestimation of emissions. During the review, the Party agreed with this observation but indicated that the underestimation of CH₄ emissions was unlikely to be significant. On the basis of the assumption of a 90 per cent removal of COD in a lagoon, AD and emissions would increase by a factor of 10. Emissions from lagoons were highest in 2007, when they were estimated to be 0.076 Mg CH₄. Corrected emissions for 2007 would be 0.762 kt CH₄ or 19.4 kt CO₂ eq, which is well below the threshold of significance.</p> <p>The ERT encourages the Party to improve its calculation of CH₄ emissions from lagoons under category 2.D.2 industrial wastewater by estimating the amount of COD generated by industrial processes on the basis of the amount of COD discharged from open lagoons and an appropriate assumption for COD reduction in the lagoon.</p>	Not an issue/problem

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
KP-LULUCF			
KL.21	General (KP-LULUCF) – CO ₂	<p>The Party reported in its NIR (table 182, pp.634–634) that, for land-use conversion to annual crops, the final carbon stock in living biomass of the previous land use is considered to be zero on the basis of the assumption that, by definition, annual crops contain no vegetation other than the herbaceous layer and the carbon stock of this layer is considered to be zero. The same assumption is made for land-use conversion to grass meadows (table 190, p.644), because grass meadows contain no vegetation other than the herbaceous layer and the carbon stock of this stratum is considered to be zero. It also reported that the values of 4.7 t C/ha and 5 t C/ha recommended in the 2006 IPCC Guidelines (vol. 4, chap. 6, p.6.27, and vol. 5, table 5.9, respectively) are not used owing to a lack of data regarding their relevance to France. The ERT noted that this is not in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 1, table 1.1, p.1.9), which state that, for estimating carbon stock for living biomass, Parties should include foliage. For land-use conversions to cropland and grassland, the biomass expansion factor values for forest land include foliage, so when France assesses above-ground biomass it includes carbon in leaves but does not take into account the loss of carbon stock from the land from which the above-ground biomass grew. Therefore, the Party should account for this loss as well as any gains where a conversion occurs from land to cropland or grassland. During the review, the Party confirmed that it did not use the default value of 10 t dm/ha, converted to 5 t C/ha, in the 2006 IPCC Guidelines. This is primarily because only woody biomass is estimated in the current inventory (although the 2006 IPCC Guidelines (chap. 1, vol. 4, table 1.1, p.1.9) define biomass as containing other elements). The Party made the methodological choice to focus on the biomass that can be monitored and estimated without using too many assumptions. In addition, the Party considers 10 t dm/ha rather high for a mean biomass carbon stock for the majority of French annual crops or herbaceous grasslands.</p> <p>The ERT recommends that the Party revise its estimates by adhering to the 2006 IPCC Guidelines for its estimates of land-use conversions to annual crops or grass meadows, in particular regarding the assumption that carbon stock in living biomass for these subcategories is zero before conversion or provide country-specific quantitative data and documentation in the NIR to support its current approach and assumptions.</p>	Yes. Accuracy

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

VI. Application of adjustments

11. The ERT did not identify the need to apply any adjustments for the 2021 annual submission of France.

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

12. France elected commitment period accounting and therefore the issuance and cancellation of units for KP-LULUCF is not applicable to the 2021 review.

VIII. Questions of implementation

13. No questions of implementation were identified by the ERT during the individual review of the Party's 2021 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 France in its 2021 annual submission

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

Table I.1

Total greenhouse gas emissions and removals for France, base year–2019

(kt CO₂ eq)

	<i>Total GHG emissions excluding indirect CO₂ emissions</i>		<i>Total GHG emissions and removals including indirect CO₂ emissions^a</i>		<i>Land-use change (Article 3.7 bis as contained in the Doha Amendment)^b</i>	<i>KP-LULUCF (Article 3.3 of the Kyoto Protocol)^c</i>	<i>KP-LULUCF (Article 3.4 of the Kyoto Protocol)</i>	
	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>			<i>CM, GM, RV, WDR</i>	<i>FM</i>
FMRL								–67 410.00
Base year ^d	522 117.86	544 035.35	NA	NA	NA		NO	
1990	522 128.08	544 045.57	NA	NA				
1995	513 835.16	536 558.30	NA	NA				
2000	530 950.23	548 440.14	NA	NA				
2010	472 295.33	508 178.99	NA	NA				
2011	447 779.87	483 414.77	NA	NA				
2012	447 012.18	484 800.61	NA	NA				
2013	444 726.02	485 780.18	NA	NA		–2 188.94	NE	–53 391.21
2014	419 719.28	454 622.82	NA	NA		–2 191.79	NE	–46 882.66
2015	426 500.43	457 650.57	NA	NA		–1 507.84	NE	–43 139.86
2016	426 197.42	460 024.71	NA	NA		–2 799.01	NE	–43 810.31
2017	431 256.87	463 454.09	NA	NA		–3 071.59	NE	–41 232.81
2018	413 856.55	444 589.88	NA	NA		–3 534.87	NE	–38 934.22
2019	405 260.11	435 998.62	NA	NA		–3 737.37	NE	–38 684.96

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

^a The Party did not report indirect CO₂ emissions in CRF table 6.

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

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

^d "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases except for NF₃, for which the base year is 1995. France has not elected any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

Table I.2

Greenhouse gas emissions and removals by gas for France, excluding land use, land-use change and forestry, 1990–2019(kt CO₂ eq)

	<i>CO₂^a</i>	<i>CH₄</i>	<i>N₂O</i>	<i>HFCs</i>	<i>PFCs</i>	<i>Unspecified mix of HFCs and PFCs</i>	<i>SF₆</i>	<i>NF₃</i>
1990	397 663.89	69 191.80	65 413.99	4 402.20	5 202.47	NO, NA	2 154.74	16.48
1995	392 243.49	70 394.99	66 570.95	1 811.45	3 064.56	NO, NA	2 466.60	6.26
2000	413 470.26	68 614.26	54 327.02	6 830.90	2 997.49	NO, NA	2 180.33	19.89
2010	386 589.41	61 720.39	41 037.39	17 307.20	617.37	NO, NA	875.10	32.13
2011	363 788.60	60 531.61	39 470.85	18 167.35	774.04	NO, NA	650.96	31.36
2012	365 860.45	59 293.15	39 740.53	18 440.47	790.35	NO, NA	655.26	20.40
2013	367 259.35	59 153.01	39 686.37	18 416.76	670.50	NO, NA	583.57	10.63
2014	335 611.31	58 916.18	40 607.81	18 391.01	615.88	NO, NA	474.26	6.37
2015	339 787.38	58 037.73	40 470.35	18 314.21	536.57	NO, NA	498.11	6.23
2016	343 692.60	57 635.31	39 351.18	18 167.20	666.01	NO, NA	506.58	5.84
2017	346 923.24	57 209.50	40 737.54	17 407.45	707.68	NO, NA	461.05	7.64
2018	332 201.95	56 422.39	39 084.50	15 756.19	679.84	NO, NA	432.76	12.25
2019	326 201.53	55 981.38	38 651.22	14 154.05	619.76	NO, NA	380.40	10.29
Percentage change 1990–2019	-18.0	-19.1	-40.9	221.5	-88.1	0.0	-82.3	-37.6

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

^a France did not report indirect CO₂ emissions in CRF table 6.

Table I.3

Greenhouse gas emissions and removals by sector for France, 1990–2019(kt CO₂ eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1990	366 521.18	78 664.54	81 391.82	-21 917.49	17 468.04	NO
1995	365 342.31	72 052.67	78 870.83	-22 723.14	20 292.49	NO
2000	380 653.69	64 706.49	81 873.60	-17 489.92	21 206.37	NO
2010	357 436.10	54 129.96	75 763.35	-35 883.66	20 849.56	NO
2011	334 191.51	53 720.52	75 085.71	-35 634.90	20 417.03	NO
2012	338 401.20	51 641.79	75 008.42	-37 788.43	19 749.20	NO
2013	338 327.06	53 227.73	74 546.47	-41 054.16	19 678.91	NO
2014	305 815.63	52 915.89	76 527.39	-34 903.54	19 363.92	NO
2015	311 755.16	51 384.36	76 371.52	-31 150.14	18 139.52	NO

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
2016	315 564.82	51 299.05	75 131.35	-33 827.29	18 029.49	NO
2017	316 987.65	52 661.08	75 452.73	-32 197.23	18 352.63	NO
2018	302 649.17	49 919.94	74 130.64	-30 733.34	17 890.12	NO
2019	296 997.66	47 676.72	73 189.89	-30 738.51	18 134.36	NO
Percentage change 1990–2019	-19.0	-39.4	-10.1	40.2	3.8	NA

Notes: (1) Emissions and removals reported in the sector other (sector 6) are not included in the total GHG emissions; (2) France did not report indirect CO₂ emissions 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–2019, for France
(kt CO₂ eq)

	<i>Article 3.7 bis as contained in the Doha Amendment^a</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				-67 410.00				
Technical correction				21 795.00				
Base year ^b					NO	NO	NO	NO
2013		-13 875.80	11 686.86	-53 391.21	NE, IE	NE, IE	NE	NO, NE
2014		-13 979.30	11 787.51	-46 882.66	NE, IE	NE, IE	NE	NO, NE
2015		-13 396.03	11 888.19	-43 139.86	NE, IE	NE, IE	NE	NO, NE
2016		-14 787.91	11 988.90	-43 810.31	NE, IE	NE, IE	NE	NO, NE
2017		-15 161.24	12 089.65	-41 232.81	NE, IE	NE, IE	NE	NO, NE
2018		-15 725.30	12 190.43	-38 934.22	NE, IE	NE, IE	NE	NO, NE
2019		-16 028.61	12 291.24	-38 684.96	NE, IE	NE, IE	NE	NO, NE
Percentage change base year–2019					NA	NA	NA	NA

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

^a The value reported in this column relates to 1990.

^b France has not elected to report on any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

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

Table I.5
Key relevant data for France under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2021 annual submission

<i>Parameter</i>	<i>Data values</i>
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: not elected (g) WDR: not elected
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	None
Election of application of provisions for natural disturbances	Yes, for AR and FM
3.5% of total base-year GHG emissions, excluding LULUCF and including indirect CO ₂ emissions	19 181.951 kt CO ₂ eq (153 455.612 kt CO ₂ eq for the duration of the commitment period)
Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for:	
1. AR	NA
2. Deforestation	NA
3. FM	NA

Annex II

Information to be included in the compilation and accounting database

Tables II.1–II.7 include the information to be included in the compilation and accounting database for France. Data shown are from the Party's annual submission, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table II.1

Information to be included in the compilation and accounting database for 2019, including on the commitment period reserve, for France (t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
CPR	2 713 243 349	–	–	2 713 243 349
Annex A emissions				
CO ₂	326 201 526	–	–	326 201 526
CH ₄	55 981 375	–	–	55 981 375
N ₂ O	38 651 222	–	–	38 651 222
HFCs	14 154 048	–	–	14 154 048
PFCs	619 762	–	–	619 762
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF ₆	380 400	–	–	380 400
NF ₃	10 291	–	–	10 291
Total Annex A sources	435 998 624	–	–	435 998 624
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–16 028 608	–	–	–16 028 608
Deforestation	12 291 241	–	–	12 291 241
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–38 684 960	–	–	–38 684 960

Table II.2

Information to be included in the compilation and accounting database for 2018 for France (t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	332 201 953	–	–	332 201 953
CH ₄	56 422 391	–	–	56 422 391
N ₂ O	39 084 500	–	–	39 084 500
HFCs	15 756 194	–	–	15 756 194
PFCs	679 839	–	–	679 839
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF ₆	432 755	–	–	432 755
NF ₃	12 251	–	–	12 251
Total Annex A sources	444 589 883	–	–	444 589 883
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–15 725 298	–	–	–15 725 298
Deforestation	12 190 431	–	–	12 190 431
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–38 934 214	–	–	–38 934 214

Table II.3

Information to be included in the compilation and accounting database for 2017 for France(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	346 923 237	–	–	346 923 237
CH ₄	57 209 498	–	–	57 209 498
N ₂ O	40 737 537	–	–	40 737 537
HFCs	17 407 453	–	–	17 407 453
PFCs	707 679	–	–	707 679
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF ₆	461 052	–	–	461 052
NF ₃	7 637	–	–	7 637
Total Annex A sources	463 454 094	–	–	463 454 094
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–15 161 239	–	–	–15 161 239
Deforestation	12 089 651	–	–	12 089 651
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–41 232 813	–	–	–41 232 813

Table II.4

Information to be included in the compilation and accounting database for 2016 for France(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	343 692 598	–	–	343 692 598
CH ₄	57 635 310	–	–	57 635 310
N ₂ O	39 351 182	–	–	39 351 182
HFCs	18 167 199	–	–	18 167 199
PFCs	666 008	–	–	666 008
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF ₆	506 579	–	–	506 579
NF ₃	5 838	–	–	5 838
Total Annex A sources	460 024 714	–	–	460 024 714
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–14 787 913	–	–	–14 787 913
Deforestation	11 988 902	–	–	11 988 902
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–43 810 313	–	–	–43 810 313

Table II.5

Information to be included in the compilation and accounting database for 2015 for France(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	339 787 378	–	–	339 787 378
CH ₄	58 037 726	–	–	58 037 726
N ₂ O	40 470 349	–	–	40 470 349
HFCs	18 314 207	–	–	18 314 207
PFCs	536 565	–	–	536 565
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
SF ₆	498 109	–	–	498 109
NF ₃	6 234	–	–	6 234
Total Annex A sources	457 650 568	–	–	457 650 568
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–13 396 029	–	–	–13 396 029
Deforestation	11 888 187	–	–	11 888 187
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–43 139 855	–	–	–43 139 855

Table II.6

Information to be included in the compilation and accounting database for 2014 for France(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	335 611 313	–	–	335 611 313
CH ₄	58 916 176	–	–	58 916 176
N ₂ O	40 607 813	–	–	40 607 813
HFCs	18 391 007	–	–	18 391 007
PFCs	615 881	–	–	615 881
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF ₆	474 265	–	–	474 265
NF ₃	6 371	–	–	6 371
Total Annex A sources	454 622 825	–	–	454 622 825
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–13 979 296	–	–	–13 979 296
Deforestation	11 787 508	–	–	11 787 508
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–46 882 661	–	–	–46 882 661

Table II.7

Information to be included in the compilation and accounting database for 2013 for France(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	367 259 351			367 259 351
CH ₄	59 153 006			59 153 006
N ₂ O	39 686 368			39 686 368
HFCs	18 416 756			18 416 756
PFCs	670 495	–	–	670 495
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF ₆	583 573			583 573
NF ₃	10 630	–	–	10 630
Total Annex A sources	485 780 178	–	–	485 780 178
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–13 875 799	–	–	–13 875 799
Deforestation	11 686 865	–	–	11 686 865
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–53 391 208	–	–	–53 391 208

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) 4.B.2 land converted to cropland (perennial crops) (CO₂) (see ID# L.15 in table 3);
- (b) Cropland converted to other land uses (biomass losses from the conversion of perennial crops to other land uses) (CO₂) (see ID# L.17 in table 3);
- (c) 4.C.2 land converted to grassland (DOM for all types of land converted to grassland except forest land converted to grassland; living biomass for wetlands and other land converted to grassland) (CO₂) (see ID# L.20 in table 3);
- (d) 4.F.2 soil carbon conversions of cropland, grassland, wetlands and settlements to other land (CO₂ and N₂O) (see ID# L.23 in table 3);
- (e) 4(I) nitrogen fertilization in forest land (N₂O) (see ID# L.25 in table 3);
- (f) 4(III) nitrogen mineralization/immobilization associated with loss/gain of soil organic matter on grassland remaining grassland (N₂O) (see ID# L.26 in table 3);
- (g) Biomass net carbon stock changes for FM and AR land in overseas territories (see ID# KL.6 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 2013, 2014, 2015, 2016, 2017 and 2019 annual submissions of France, contained in documents FCCC/ARR/2013/FRA, FCCC/ARR/2014/FRA, FCCC/ARR/2015/FRA, FCCC/ARR/2016/FRA, FCCC/ARR/2017/FRA and FCCC/ARR/2019/FRA, 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.

Annual status report for France for 2021. Available at https://unfccc.int/sites/default/files/resource/asr2021_FRA.pdf.

Report of the technical assessment of the forest management reference level submission of France submitted in 2011. Available at <https://unfccc.int/sites/default/files/resource/docs/2011/tar/fra01.pdf>.

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 France. Available at <https://unfccc.int/sites/default/files/resource/docs/2017/irr/fra.pdf>.

C. Other documents used during the review

Responses to questions during the review were received from Jonathan Hess (Ministry of Ecological Transition of France), including additional material on the methodology and assumptions used. The following references may not conform to UNFCCC editorial style as some have been reproduced as received:

C. Kouridis et al., 2010 Uncertainty Estimates and Guidance for Road Transport Emission Calculations. European Commission, Joint Research Centre, Institute for Environment and Sustainability. EUR 24296 EN - 2010. PG 94.

J. Klein et al., 2016 Methods for calculating the emissions of transport in the Netherlands. PBL Netherlands Environmental Assessment Agency.

Estimation des flux d'azote, de phosphore et de potassium associés aux vaches laitières et à leur système fourrager - Influence de l'alimentation et du niveau de production. COMITE D'ORIENTATION POUR DES PRATIQUES AGRICOLES RESPECTUEUSES DE L'ENVIRONNEMENT – Groupe “Alimentation Animale” “Sous groupe Vaches laitières” Novembre 1999.

Estimation des flux d'azote, de phosphore et de potassium associés aux bovins allaitants et aux bovins en croissance ou à l'engrais, issus des troupeaux allaitants et laitiers, et à leur système fourrager. COMITE D'ORIENTATION POUR DES PRATIQUES AGRICOLES RESPECTUEUSES DE L'ENVIRONNEMENT – Groupe “laquo;Alimentation animale” Sous groupe “bovins” Juin 2001.

Estimation des rejets d'azote - phosphore - potassium - cuivre et zinc des porcs. Influence de la conduite alimentaire et du mode de logement des animaux sur la nature et la gestion des déjections produites. COMITE D'ORIENTATION POUR DES PRATIQUES AGRICOLES RESPECTUEUSES DE L'ENVIRONNEMENT – GROUPE PORC – JUIN 2003.

Estimation des rejets de PHOSPHORE, POTTASSIUM, CALLCIUM, CUIIVRE, ZINC par les élevages avicoles. Influence de la conduite alimentaire et du mode de logement des animaux sur la nature et la gestion des déjections – COMITE D'ORIENTATION POUR DES PRATIQUES AGRICOLES RESPECTUEUSES DE L'ENVIRONNEMENT – GROUPE VOLAILLES – 2006.

Jean Devun (Institut de l'Élevage), Philippe Brunshwig (Institut de l'Élevage), Caroline Guinot (Centre d'Information des Viandes). ALIMENTATION DES BOVINS: Rations moyennes et niveaux d'autonomie alimentaire. Centre d'Information des Viandes, Tour Mattei, 207, rue de Bercy 75012 PARIS. Publication: Décembre 2012 / Réédition : Juillet 2015.

Dourmad J.Y. (coord.), Levasseur P.(coord.), Daumer M., Hassouna M., Landrain B., Lemaire N., Loussouarn A., Salaiïn Y., Espagnol S., 2015. Évaluation des rejets d'azote, phosphore, potassium, cuivre et zinc des porcs. RMT Elevages et Environnement, Paris, 26 pages.

J.-C. Hervé. The French National Forest Inventory. Springer International Publishing Switzerland 2016. C. Vidal et al. (eds.), National Forest Inventories, DOI 10.1007/978-3-319-44015-6_20.

IMPACTS ENVIRONNEMENTAUX DE LA GESTION BIOLOGIQUE DES DECHETS. BILAN DES CONNAISSANCES. Rapport final de l'étude répondant au Marché n° 0375C0081 entre l'ADEME et le Groupement Cemagref – INRA – CReeD – Anjou Recherche – Ecobilan – Orval. 2005.

SAUVANT D., GIGER-REVERDIN S., SERMENT A., BROUDISCOU L. – « Influences des régimes et de leur fermentation dans le rumen sur la production de méthane par les ruminants » – INRA Prod. Anim., 24, 2011, 429-442.

OECD, IEA, Eurostat 2022. Monthly Oil and Gas questionnaire Ver 2020.1.