



United Nations

FCCC/ARR/2016/DEU



Framework Convention on
Climate Change

Distr.: General
12 April 2017

English only

Report on the individual review of the annual submission of Germany submitted in 2016*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual greenhouse gas (GHG) inventory covering emissions and removals of GHG emissions 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 required under Article 7, paragraph 1, of the Kyoto Protocol, with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2016 annual submission of Germany, 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 19 to 24 September 2016 in Dessau, Germany.

* In the symbol for this document, 2016 refers to the year in which the inventory was submitted, not to the year of publication.

GE.17-05960(E)



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I. Introduction¹

1. This report covers the review of the 2016 annual submission of Germany organized by the UNFCCC secretariat, in accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1, as revised by decision 4/CMP.11) (hereinafter referred to as the Article 8 review guidelines). As indicated in the Article 8 review guidelines, this review process also encompasses the review under the Convention, as described in the “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” (hereinafter referred to as the UNFCCC review guidelines) and particularly part III, “UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention”. The review took place from 19 to 24 September 2016 in Dessau, Germany, and was coordinated by Ms. Lisa Hanle and Ms. Jenny Wong (UNFCCC secretariat). Table 1 provides information on the composition of the expert review team (ERT) that conducted the review of Germany.

Table 1

Composition of the expert review team that conducted the review of Germany

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Mr. Tomas Gustafsson	Sweden
Energy	Mr. Hongwei Yang	China
IPPU	Mr. Menouer Boughedaoui	Algeria
Agriculture	Ms. Baasansuren Jamsranjav	Mongolia
LULUCF	Ms. Marina Vitullo	Italy
Waste	Mr. Mark Hunstone	Australia
Lead reviewers	Mr. Tomas Gustafsson Ms. Baasansuren Jamsranjav	

Abbreviations: IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry.

2. This report contains findings based on the assessment by the ERT of the 2016 annual submission against the Article 8 review guidelines. The ERT has made recommendations to resolve those findings related to issues,² including issues related to problems.³ Other findings, and, if applicable, the ERT’s encouragements to resolve them, are also included.

¹ At the time of publication of this report, Germany had not yet submitted its instrument of ratification of the Doha Amendment, and the amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, paragraph 6, pending the entry into force of the amendment.

² “Issues” are defined in decision 13/CP.20, annex, paragraph 81.

³ “Problems” are defined in decision 22/CMP.1, annex, paragraphs 68 and 69, as revised by decision 4/CMP.11.

3. A draft version of this report was communicated to the Government of Germany, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.
4. Annex I shows annual greenhouse gas emissions for Germany, including totals excluding and including the land use, land-use change and forestry sector, indirect carbon dioxide emissions, and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and additional activities under Article 3, paragraph 4, of the Kyoto Protocol, if elected, by gas, sector and activity for Germany.
5. Information to be included in the compilation and accounting database can be found in annex II.
6. The ERT notes that Germany’s 2015 annual submission was delayed, consistent with decision 6/CMP.9, paragraph 4. As a result, the review of the 2016 annual submission is being held in conjunction with the review of the 2015 annual submission, in accordance with decision 10/CMP.11, paragraph 1. To the extent that identical information is presented in both annual submissions, the ERT has reviewed this information only once, and, as appropriate, has replicated the findings below in both the 2015 and the 2016 annual review reports.

II. Summary and general assessment of the 2016 annual submission

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

Table 2

Summary of review results and general assessment of the inventory of Germany

<i>Assessment</i>	<i>Issue or problem ID #(s) in tables 3 and/or 5^a</i>																				
Dates of submission	Original submission: 15 June 2016 (NIR), 15 June 2016, version 6 (CRF tables), 15 April 2016 (SEF tables “SEF-CP2-2014”, “SEF-CP2-2015”) Revised submissions: 7 November 2016, version 8 (CRF tables), 3 June 2016 (SEF tables “SEF-CP2-2014”, “SEF-CP2-2015”) The values from the latest submission are used in this report																				
Review format	In-country																				
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:																				
	<table border="0"> <tr> <td style="padding-right: 10px;">1.</td> <td style="padding-right: 10px;">Identification of key categories</td> <td style="padding-right: 10px;">No</td> <td></td> </tr> <tr> <td>2.</td> <td>Selection and use of methodologies and assumptions</td> <td>Yes</td> <td>KL.5, KL.7, KL.9</td> </tr> <tr> <td>3.</td> <td>Development and selection of emission factors</td> <td>Yes</td> <td>E.12, L.9</td> </tr> <tr> <td>4.</td> <td>Collection and selection of activity data</td> <td>Yes</td> <td>W.10, KL.12</td> </tr> <tr> <td>5.</td> <td>Reporting of recalculations</td> <td>Yes</td> <td>E.1, E.13, E.17, I.8</td> </tr> </table>	1.	Identification of key categories	No		2.	Selection and use of methodologies and assumptions	Yes	KL.5, KL.7, KL.9	3.	Development and selection of emission factors	Yes	E.12, L.9	4.	Collection and selection of activity data	Yes	W.10, KL.12	5.	Reporting of recalculations	Yes	E.1, E.13, E.17, I.8
1.	Identification of key categories	No																			
2.	Selection and use of methodologies and assumptions	Yes	KL.5, KL.7, KL.9																		
3.	Development and selection of emission factors	Yes	E.12, L.9																		
4.	Collection and selection of activity data	Yes	W.10, KL.12																		
5.	Reporting of recalculations	Yes	E.1, E.13, E.17, I.8																		

<i>Assessment</i>	<i>Issue or problem ID #(s) in tables 3 and/or 5^a</i>		
6. Reporting of a consistent time series	Yes	I.9	
7. Reporting of uncertainties, including methodologies	Yes	G.2	
8. QA/QC	QA/QC procedures were assessed in the context of the national system (see below)		
9. Missing categories/completeness ^b	Yes	L.7, L.8, KL.13	
10. Application of corrections to the inventory	No		
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	No	I.11, I.12
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes	
Supplementary information under the Kyoto Protocol	Have any issues been identified in the following areas:		
	1. National system:		
	(a) The 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	
	2. National registry:		
	(a) Overall functioning of the national registry	No	
	(b) Performance of the functions of the national registry and the technical standards for data exchange	No	
	3. ERUs, CERs, AAUs and RMUs and on information on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, taking into consideration any findings or recommendations contained in the SIAR	No	
	4. Matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, including any changes since the previous annual submission	Yes	G.1
	5. LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol:		
(a) Reporting in accordance with the requirements of decision 2/CMP.8, annex II, paragraphs 1–5	No		

Assessment			Issue or problem ID #(s) in tables 3 and/or 5 ^a
	(b) The Party has demonstrated methodological consistency between the reference level and reporting on forest management in accordance with decision 2/CMP.7, annex, paragraph 14	Yes	KL.9
	(c) The Party has reported information in accordance with decision 6/CMP.9	No	
	(d) Country-specific information has been reported to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34	NA	
	(e) Other issues	No	
CPR	Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18?	No	G.5
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	The ERT accepts that the revised estimate submitted by Germany in its 2016 submission can replace a previously applied adjustment in the compilation and accounting database	NA	
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of 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 a question of implementation?	No	

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, CPR = commitment period reserve, CRF = common reporting format, ERT = expert review team, ERU = emission reduction unit, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, NIR = national inventory report, QA/QC = quality assurance/quality control, RMU = removal unit, SEF = standard electronic format, SIAR = standard independent assessment report, UNFCCC Annex I inventory reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories", Wetlands Supplement = 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands.

^a The ERT identified additional issues in the energy, industrial processes and product use, agriculture, LULUCF and waste sectors and for KP-LULUCF activities that are not specifically listed in table 2 but are included in table 3 and/or 5.

^b Missing categories, for which methods are provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, may affect completeness and are listed in annex III to this document.

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

8. Table 3 compiles all the recommendations made in the previous review report. Owing to the unique circumstances of the 2016 annual submission described in paragraph 6 above, the latest available review report was for the review of the 2014 annual submission, published on 28 April 2015. For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2016 annual submission and provided the rationale for its determination, taking into consideration the publication date of the previous review report and national circumstances.

Table 3

Status of implementation of issues and/or problems raised in the previous review report of Germany

<i>ID#</i>	<i>Issue and/or problem classification^{a,b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	Article 3, paragraph 14, of the Kyoto Protocol (75, 2014) (87, 2013) Transparency*	Report any changes in the information provided under Article 3, paragraph 14, of the Kyoto Protocol	Not resolved. Germany made no changes in the NIR between the 2014 submission and the 2015/2016 submission but it did not provide explicit information confirming that no changes had occurred
Energy			
E.1	1. General (energy sector) – CO ₂ , CH ₄ and N ₂ O (18, 2014) (21, 2013) Transparency*	Provide more detailed information on the most significant recalculations in the energy sector and, to the extent possible, link the qualitative explanations for the major recalculations with the quantitative information reported in CRF table 8(a)	Addressing. Germany conducted substantial recalculations due to updates to the national energy balance from “preliminary” to “final” values. During the review, the Party explained that this process will continue in the future as the final national energy balance becomes available only after the inventory preparation stage. The observed difference between the preliminary and final national energy balance has been declining in recent years (see ID# E.13 in table 5)
E.2	1. General (energy sector) – CO ₂ , CH ₄ and N ₂ O (20, 2014) Accuracy*	Continue improving the inventory of the energy sector in future annual submissions, not only by implementing the recommendations made in the 2014 annual review report but also as a result of the Party’s own quality improvements	Resolved. Germany is making progress in applying national energy balance and EU ETS data, which are the most important components to improve the quality of Germany’s energy inventory

<i>ID#</i>	<i>Issue and/or problem classification^{a,b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
E.3	1. General (energy sector) – CO ₂ , CH ₄ and N ₂ O (21, 2014) (24, 2013) Adherence to the UNFCCC Annex I inventory reporting guidelines	Endeavour to allocate and report the fuel and emissions to the subcategories as provided in the CRF tables	Resolved. Germany is making progress in applying national energy balance and EU ETS data, which are the most important components to improve the quality of Germany's energy inventory
E.4	1. General (energy sector) – CO ₂ , CH ₄ and N ₂ O (23, 2014) Transparency*	Report, at an aggregated level, on the comparison of the EU ETS data with those used for the compilation of the inventory	Resolved. As described in the NIR (table 419, section 10.4.3) Germany continues to work on this issue. Results of a verification exercise comparing fuel-specific CO ₂ EFs in the inventory with those from the EU ETS are provided in the NIR (chapter 18.7). During the review, Germany provided additional explanations on the use of EU ETS plant-specific data
E.5	1. General (energy sector) – CO ₂ , CH ₄ and N ₂ O (24, 2014) Adherence to the UNFCCC Annex I inventory reporting guidelines*	Facilitate or ensure that prompt access is provided to the inventory compiler to allow the performance of the comparison of the EU ETS plant-level data with those used for the compilation of the inventory	Resolved. Germany provided additional information on the use of EU ETS plant-specific data during the review, indicating that sufficient access to relevant data is provided to the inventory compiler (see ID# E.12 in table 5)
E.6	1. General (energy sector) – CO ₂ , CH ₄ and N ₂ O (25, 2014) Accuracy*	Prioritize inventory improvements so as to obtain more reliable AD and/or to reduce the uncertainties for the categories residential and commercial, as well as for road transportation	Resolved. Based on the information provided in the NIR, Germany is making efforts to collect more accurate data on hard coal and natural gas use in the residential and commercial categories, as well as for road transportation
E.7	Comparison with international data – CO ₂ , CH ₄ and N ₂ O (28, 2014) (28, 2013) (41, 2012) (45, 2011) (64, 2010) Not an issue	Ensure as much consistency as possible between the energy data reported in the CRF tables and the data reported internationally and provide explanations in the NIR for any large deviations of, for example, more than 2% in total fossil fuel consumption	No longer relevant. There is no mandatory requirement to describe in the NIR differences between the data reported in the CRF tables and the data reported internationally. The ERT notes that Germany explained the reasons for the

ID#	Issue and/or problem classification ^{a,b}	Recommendation made in previous review report ^f	ERT assessment and rationale
			inconsistency between the data reported to IEA and the data reported under the Convention when responding to questions raised by the ERT during the review (see ID# E.14 in table 5)
E.8	International bunkers and multilateral operations: liquid fuels – CO ₂ , CH ₄ and N ₂ O (29, 2014) Not an issue	Collect the necessary data, or estimate data to correctly allocate emissions from domestic and international bunkers to the relevant categories in the CRF tables	No longer relevant. The ERT considers that the Party has made every effort in accordance with decision 24/CP.19, annex, paragraph 34, to separately report emissions from domestic and international bunkers and that this is no longer an issue (see ID# E.16 in table 5)
E.9	Feedstocks, reductants and other non-energy use of fuels – CO ₂ (30, 2014) (31, 2013) (46, 2012) Adherence to the UNFCCC Annex I inventory reporting guidelines	Seek ways to gain access to the information required in order to ensure the complete and accurate reporting of feedstocks and non-energy use of fuels in the CRF tables	Resolved. Germany reported emissions from non-energy use of fuels by applying the 2006 IPCC Guidelines (chapter 4.5)
E.10	Feedstocks, reductants and other non-energy use of fuels – CO ₂ (30, 2014) Adherence to the UNFCCC Annex I inventory reporting guidelines	Improve the consistency among CRF tables 1.A(b), 1.A(c) and 1.A(d)	Resolved. Germany provided consistent data for feedstocks, reductants and other non-energy use of fuels in CRF tables 1.A(b), 1.A(c) and 1.A(d)
E.11	1.A.2.a Iron and steel – CO ₂ (31, 2014) Transparency*	Provide transparent information on the calculation method, as well as on the carbon balance for iron and steel	Resolved. Section 3.2.9.1 of the NIR provides sufficient information on the calculation method. During the review, Germany provided additional information on the carbon balance for iron and steel (see ID# E.15 in table 5)
IPPU			
I.1	2.A.2 Lime production – CO ₂ (35, 2014) (43, 2013) (60, 2012)	Provide an explanation of the EU ETS methodology and the EFs used to calculate CO ₂ emissions from lime production in the annual	Resolved. Sufficient information regarding the EU ETS methodology was provided during the review,

<i>ID#</i>	<i>Issue and/or problem classification^{a,b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	Transparency*	submission	complementing the information in the NIR (section 4.2.2.4) (see ID# I.5 in table 5)
I.2	2.B.3 Adipic acid production – N ₂ O (36, 2014) (46, 2013) (65, 2012) Transparency*	Improve the description of the methodological issues related to the calculation of N ₂ O emissions for the years for which the IPCC default EFs were used, and the methods used to calculate N ₂ O emissions at each plant	Resolved. An explanation is provided in the 2016 submission (page 318), but further information is needed on the methodology used to estimate emissions from one of the plants for the period 2002–2012 (see ID# I.9 in table 5)
I.3	2.B.9 Fluorochemical production – HFCs (38, 2014) (48, 2013) Comparability*	Report the notation key “NO” instead of “NA” for HFC-23 emissions	Resolved. The notation key has been changed to “NO” in the CRF tables
I.4	2.C.1 Iron and steel production – CO ₂ (37, 2014) Transparency*	Explain in the NIR that the inter-annual changes in the CO ₂ IEF are caused by the reallocation of fuel provided from the blast furnace from the category iron and steel in the energy sector to the category iron and steel production in the industrial processes sector, and by changes in production. Also explain that because the allocation methods are different, the aggregation of steel, pig iron and sinter production for the determination of the IEF could lead to incorrect conclusions	Resolved. The required information and explanations are reported in the NIR (page 336)
Agriculture			
A.1	3. General (agriculture) – CH ₄ and N ₂ O (41, 2014) Transparency*	Include in the NIR additional information regarding the comparison of data published in the statistical database of the Food and Agriculture Organization of the United Nations with the national background data on goats, horses, sheep, pigs and poultry, and information that justifies the differences (e.g. meat production in Germany)	Resolved. The required information is provided in chapter 5.1.3.2.4 of the NIR (pages 455 and 456)
A.2	3. General (agriculture) – CH ₄ and N ₂ O (41, 2014) Accuracy*	Explore the possibility of having animal numbers for the latest year available for the reporting of the GHG inventory	Resolved. Information is provided in chapter 5.1.3.2.1 of the NIR (pages 451–453)
A.3	3.B Manure management – N ₂ O (45, 2014) (56, 2013) Transparency*	Include a detailed and transparent justification for the use of the country-specific EF for solid manure	Resolved. An explanation is provided in chapter 5.3.4.2.2 (page 499) and chapter 10.4.1 (page 711) of the NIR

<i>ID#</i>	<i>Issue and/or problem classification^{a,b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
LULUCF			
L.1	4.A.1 Forest land remaining forest land – CO ₂ (49, 2014) Adherence to the UNFCCC Annex I inventory reporting guidelines	Undertake a verification of the outputs of the NFI, particularly with respect to forest harvesting/production	Addressing. Although the Party informed the ERT during the review week about the verification of the NFI data for forest harvesting/production, specific information on the results of the verification activities is not available (see ID#s L.5 and KL.4 in table 5)
L.2	4.A.2 Land converted to forest land – CO ₂ (50, 2014) Transparency*	More transparently describe the land classification system	Resolved. The land classification system was sufficiently transparently described in the NIR (section 6.2) (see ID#s L.3 and L.4 in table 5)
Waste			
W.1	5.A Solid waste disposal on land – CH ₄ (53, 2014) Transparency*	Include information in the NIR explaining that, as a result of regulations in force since June 2005, the landfilling of biodegradable waste is no longer permitted in Germany. The outcome of this is that municipal waste and other biodegradable waste must be pre-treated via thermal or mechanical biological processes and therefore the fraction of MSW disposed has been zero since that time	Resolved. This information is now included in the NIR (page 140)
W.2	5.A Solid waste disposal on land – CH ₄ (53, 2014) Not an issue	Based on the information described in ID# W.1, change the notation key reported in the CRF tables accordingly	No longer relevant. The fraction of MSW disposed to SWDS is no longer required in the CRF tables
W.3	5.B.1 Composting – CH ₄ and N ₂ O (56, 2014) Transparency*	Report in the NIR information on the research projects under way relating to the CH ₄ and N ₂ O EFs for waste composting	Resolved. This information is now included in the NIR (page 665)
W.4	5.D Wastewater treatment and discharge – CH ₄ and N ₂ O (54, 2014) Transparency*	Correctly report the AD values in the NIR	Not resolved. There are still issues related to the reporting of the AD (and, in addition, of the methods and assumptions) used for this source in the NIR (see ID# W.13 in table 5)
KP-LULUCF			
KL.1	Deforestation – CO ₂ (61, 2014)	Provide more detail on the individual effects of new data and methodologies on the time series	Addressing. Information on the effects of updated AD and EFs, mainly due to the most

ID#	Issue and/or problem classification ^{a,b}	Recommendation made in previous review report ^c	ERT assessment and rationale
Transparency*			recent NFI, was provided during the review but was not included in the NIR (see ID# KL.4 in table 5)
KL.2	Deforestation – CO ₂ (62, 2014) Comparability*	Report deforested land in the relevant CRF table only if it is concurrently included in an activity under Article 3, paragraph 4, of the Kyoto Protocol	Resolved. Land subject to deforestation activity is reported in CRF table 4(KP-I)A.2, while no deforested land that is otherwise subject to forest management or elected activities under Article 3, paragraph 4, of the Kyoto Protocol has been reported in CRF table 4(KP-I)A.2.1

Abbreviations: AD = activity data, CRF = common reporting format, EF = emission factor, ERT = expert review team, EU ETS = European Union Emissions Trading System, GHG = greenhouse gas, IEA = International Energy Agency, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, MSW = municipal solid waste, NA = not applicable, NFI = national forest inventory, NIR = national inventory report, NO = not occurring, SWDS = solid waste disposal site, 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”, 2006 IPCC Guidelines = 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

^a References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) where the issue was raised. Issues are further classified as defined in decision 13/CP.20, annex, paragraph 81. In the review of the supplementary information reported in accordance with Article 7, paragraph 1, of the Kyoto Protocol, the ERT has applied the classification in decision 22/CMP.1, annex, paragraph 69, in conjunction with decision 4/CMP.11.

^b An asterisk is included next to each issue type for all issues that are also problems, as defined in decision 22/CMP.1, annex, paragraphs 68 and 69, including those that lead to an adjustment or a question of implementation.

^c The review of the 2016 annual submission is being held in conjunction with the review of the 2015 annual submission, and as such, the 2015 annual review report was not available at the time of this review. Therefore, the recommendations reflected in table 3 are from the 2014 annual review report. For the same reason, the year 2015 is excluded from the list of years in which the issue has been identified.

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

9. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues included in table 4 have been identified in three successive reviews, including the review of the 2016 annual submission of Germany, and have not been addressed by the Party.

Table 4

Issues identified in three successive reviews and not addressed by Germany

<i>ID#^a</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed^b</i>
General		
G.1	Report any changes in the information provided under Article 3, paragraph 14, of the Kyoto Protocol	3 (2013–2015/2016)
Energy	No such issues for the energy sector were identified	
IPPU	No such issues for the IPPU sector were identified	
Agriculture	No such issues for the agriculture sector were identified	
LULUCF	No such issues for the LULUCF sector were identified	
Waste	No such issues for the waste sector were identified	
KP-LULUCF	No such issues for KP-LULUCF activities were identified	

Abbreviations: IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry.

^a An asterisk is included after any issue ID# where the underlying issue is related to accuracy or completeness of a key category, a missing category or a potential key category, as indicated in decision 13/CP.20, annex, paragraph 83.

^b The review of the 2016 annual submission is being held in conjunction with the review of the 2015 annual submission. As the reviews of the 2015 and 2016 annual submissions are not “successive” reviews, but are rather being held in conjunction, for the purpose of counting successive years in table 4, 2015/2016 is considered as one year. The ERT noted that this table 4 is the same as that in the 2015 annual review report for Germany, modified to reflect the combined 2015/2016 review.

V. Additional findings made during the 2016 technical review

10. Table 5 contains findings made by the ERT during the technical review of the 2016 annual submission of Germany that are additional to those identified in table 3 above.

Table 5
Additional findings made during the 2016 technical review of the annual submission of Germany

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue^a and/or a problem^b? If yes, classify by type</i>
General			
G.2	Uncertainty analysis	<p>The ERT noted that table 542 of the NIR (annex 7) does not follow the outline of table 3.2 provided in the 2006 IPCC Guidelines (volume 1, chapter 3). In particular, the ERT noted that the uncertainty estimates for the AD and EFs, as well as the trend uncertainty, were reported as “0” for several categories in the energy sector (e.g. CH₄ and N₂O emissions from category 1.A.1.a (public electricity and heat production)). During the review, Germany explained that the uncertainty estimates for the AD and EFs were included in the combined uncertainty of the emissions, without providing supporting documentation, and provided no clarification on whether the trend uncertainty was correctly estimated</p> <p>The ERT recommends that Germany include the contribution from each category in the trend uncertainties and encourages the Party to present the results in the NIR as outlined in the 2006 IPCC Guidelines, table 3.2. In addition, if Germany continues to include uncertainty estimates for AD and EFs in the combined uncertainty of the emissions, the ERT recommends that Germany provide clear documentation of this in the NIR</p>	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines
G.3	QA/QC and verification	<p>The ERT noted that the total national emissions excluding LULUCF (901 914 kt CO₂ eq) reported in NIR table 516 (which presents sources and sinks for which emissions have not been estimated), were not the same as the emissions reported in the original submission of CRF summary table 2 for 2014 (900 202.15 kt CO₂ eq). Consequently, the estimates of the national thresholds of 0.05% and 0.1% of the total national emissions reported in the NIR were incorrect. The ERT notes that these latest estimates from 2014 were also included for the purposes of the analysis of the significance threshold for the 2015 NIR. During the review, Germany confirmed that the calculation of the thresholds for emissions reported as “NE” was related to the total national GHG emissions including CH₄ and N₂O emissions from LULUCF, instead of the total national emissions excluding LULUCF. The ERT noted that Germany’s use of an incorrect amount of total national emissions for the estimation of the national threshold did not change the outcome of its analysis of categories reported as “NE”</p> <p>The ERT recommends that Germany use the total national emissions excluding LULUCF for the latest reported inventory year when estimating the thresholds for determining insignificant sources</p>	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines
G.4	CRF	The ERT noted that Germany reports emissions under CRF sector 6 (other) (14.02 kt CO ₂ eq for 2014), but that the NIR (page 696) states that no emissions are reported under this sector. There	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
G.5	Commitment period reserve	<p>is no information in the NIR on the origin of these emissions or the methods applied to estimate them. During the review, Germany explained that the emissions are N₂O emissions from category 2.C.1 (iron and steel production), which, owing to shortcomings in the CRF Reporter software, could not be reported under category 2.C.1 (iron and steel production). As the emissions reported under sector 6 are not included in the sources included under Annex A to the Kyoto Protocol, there is a risk of potential underestimation of emissions for 2013 and 2014 unless the emissions are reallocated to a category under the energy, IPPU, agriculture or waste sectors. Therefore, the ERT included this issue in the list of potential problems and further questions raised by the ERT</p> <p>In response to this list, Germany provided revised estimates, reallocating N₂O emissions from iron and steel production reported under sector 6 to category 2.C.7 other (metal industry). In addition, Germany provided information on the origin of these N₂O emissions (N₂O emissions from the on-site combustion of blast furnace gas), as well as the methods applied to estimate them</p> <p>The ERT recommends that the Party improve the transparency of the NIR and CRF table 2(I).A-H by including explanations of the allocation of and information on the origin of the N₂O emissions from other (metal industry), as well as the methods applied to estimate these emissions</p> <p>In the NIR (page 768) Germany calculates its commitment period reserve (CPR) to be 4 381 287 024 t CO₂ eq. This value has not been updated from the 2014 NIR (page 721) and is not calculated based on the current calculated assigned amount for Germany (3 592 699 888 t CO₂ eq). Based on the assigned amount for the second commitment period of the Kyoto Protocol, the ERT calculates the CPR to be 3 233 429 900 t CO₂ eq</p> <p>The ERT recommends that the Party annually review, and if necessary, update the information in the NIR with respect to the calculation of the commitment period reserve, ensuring that it is calculated based on the most recent information</p>	Yes. Accuracy
Energy			
E.12	1. General (energy sector): all fuels – CO ₂	<p>During the review, Germany provided the ERT with additional information regarding its activities related to the use of EU ETS data in the preparation of the inventory for the energy sector (see ID# E.5 in table 3)</p> <p>The ERT recommends that the Party clarify the use of the following EU ETS data in the inventory for the energy sector: (i) CO₂ EFs for fuel combustion (category 1.A); (ii) fuel data for compressor stations (subcategory 1.A.3.e); (iii) CO₂ emissions from catalyst regeneration (subcategory 1.A.1.b); (iv) CO₂ emissions from calcination (subcategory 1.B.2.a); and (v) CO₂ emissions from the lignite coking plant (subcategory 1.B.1.b) by including this information in</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
E.13	1. General (energy sector): all fuels – CO ₂ , CH ₄ and N ₂ O	<p>NIR chapter 1.4.1.1.1 (data sources energy) in order to give an overview of all ETS data in the energy sector</p> <p>The ERT commends Germany for the progress made in reducing the timing gap in the national energy balance from four years behind the inventory reporting to only one year behind (see ID# E.1 in table 3)</p> <p>The ERT recommends that Germany provide clear explanations in NIR chapter 10 (recalculations and improvements) where there are recalculations in the energy sector resulting from the changes due to the update of the national energy balance</p>	Yes. Transparency*
E.14	Comparison with international data: all fuels – CO ₂ , CH ₄ and N ₂ O	<p>The ERT noted that there continue to be inconsistencies between the Party's reporting to IEA and the reporting in the CRF tables in relation to several areas: fuel consumption for international aviation (data reported in the CRF tables were lower than those reported to IEA by about 1 per cent); trade of liquid fuels (about 1 per cent lower in the CRF tables) and natural gas (with 10.6% lower in the CRF tables in 2014); production and export of peat (0% difference between the data reported to the IEA and those reported in the CRF tables in 2013 and 2014, although the data in the CRF tables were 100% lower in the early part of the time series); and production and trade of coking coal and anthracite (these fuels are reported as "IE" in the CRF tables while values are reported to IEA). The information provided in the NIR is not sufficient to enable an understanding of the reasons for the differences. Germany provided additional information during the review, explaining that the inconsistencies resulted from differences between the preliminary and final national energy balance, different uses of additional data sources between the national energy balance and the inventory, recalculations carried out in only one of the two data sets, and a different allocation of fuels in the inventory from that provided in the national energy balance</p> <p>The ERT encourages Germany to improve the transparency of the NIR by providing explicit information on the differences between the reporting to IEA and the reporting under the Convention, referencing, as appropriate, inconsistencies resulting from the use of preliminary versus final data and other differences owing to the timing of the availability of data, and, if possible, quantify the various contributions to the differences</p>	Not an issue
E.15	1.A.2.a Iron and steel: all fuels – CO ₂ and CH ₄	<p>Germany reported CO₂ and CH₄ emissions from six integrated iron and steel works (including electric arc furnaces) allocated between the energy and IPPU sectors. During the review, Germany provided additional information on the carbon balance, including a summary chart demonstrating carbon flows and allocations of emissions between the energy and IPPU sectors</p> <p>The ERT encourages Germany to provide clear information in the NIR on the allocation of CO₂ and CH₄ emissions from this category between the energy and IPPU sectors to improve transparency, for example by including a chart on the allocation of emissions from the different</p>	Not an issue

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		pollutants	
E.16	1.A.3.d Domestic navigation: liquid fuels – CO ₂ , CH ₄ and N ₂ O	<p>As noted in previous review reports, some fuel consumed for international inland navigation was reported as domestic navigation owing to a lack of data to differentiate between the international and domestic inland navigation on the Rhine and Danube Rivers. Specifically, Germany is not able to disaggregate fuel purchased in Germany, but which is ultimately used for an international journey (e.g. a boat starts its journey in the Netherlands, refuels in Germany and then travels to Switzerland). During the review, Germany provided additional information based on an expert judgement from the Central Commission for the Navigation of the Rhine, which states that the ships travelling on the Rhine use mainly bunker fuel in the Netherlands and the ships are generally sized so that they can complete at least one trip from Rotterdam to Basel and back to Rotterdam without having to refuel in between. The ERT notes that the expert judgement does not exclude the possibility of refuelling in Germany; however, the ERT also notes that in accordance with paragraph 34 of the UNFCCC Annex I inventory reporting guidelines, Parties should make every effort to both apply, and report according to, the method contained in the 2006 IPCC Guidelines for separating domestic and international emissions</p> <p>Therefore, the ERT encourages Germany to conduct an expert elicitation in accordance with the 2006 IPCC Guidelines and develop an updated methodology to separate domestic and international fuel consumption on inland waterways</p>	Not an issue
E.17	1.B.2 Oil and natural gas and other: liquid and gaseous fuels – CH ₄	<p>Fugitive CH₄ emissions from oil and natural gas for 2013 declined significantly as a result of recalculations (–2 564.38 kt CO₂ eq), but the information provided in the NIR to explain the decrease was not sufficient. During the review, Germany explained that there are three reasons for the decrease: (i) the length of the gas distribution system was revised; (ii) new information from a study about the pipeline’s material was adopted; and (iii) a correction to a double counting of emissions from compressor stations between subcategories 1.B.2.b.4 (natural gas transmission and storage) and 1.B.2.b.5 (natural gas distribution) was applied</p> <p>The ERT recommends that Germany provide information on the procedures used for performing the recalculations, any changes in the calculation methods, EFs and AD used, and the quantitative impact of the recalculations, for the sake of improving the transparency of the information provided</p>	Yes. Transparency*
E.18	1.C.2 CO ₂ transport and storage: gaseous fuels – CO ₂	<p>In CRF table 1s2, the cells for reporting CO₂ captured for domestic storage and for storage in other countries were left blank. During the review, Germany clarified that this should be reported as “NO”</p> <p>The ERT recommends that Germany complete the blank cell for CO₂ captured for domestic storage and for storage in other countries using the appropriate notation key</p>	Yes. Comparability*

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IPPU			
I.5	2.A.2 Lime production – CO ₂	<p>The ERT noted that there were some specific references in section 4.2.2.4 of the NIR that resulted in a lack of clarity regarding the method used by Germany to estimate CO₂ emissions from lime production. Specifically, references in the NIR to the approach used being in line with the tier 1 method, as well as the use of the phrase “IPCC default factors” (page 300) as opposed to “default values” or “parameters” suggested to the ERT that the method used was not a tier 2 method</p> <p>The ERT encourages Germany to change the reference in section 4.2.2.4 of the NIR from “IPCC default factors” to “IPCC default values” or “IPCC default parameters” and either clarify or correct the reference to tier 1 on page 300</p>	Not an issue
I.6	2.B.1 Ammonia production – CO ₂	<p>The Party reported in the introductory part of the NIR that ammonia is produced in four locations and explained in the methodological part that there are five plants in operation. During the review, the Party informed the ERT that there are only four plants in operation and one plant shut down years ago</p> <p>The ERT encourages the Party to report the year when the fifth plant shut down, in order to increase the transparency of the reporting</p>	Not an issue
I.7	2.B.1 Ammonia production – CO ₂	<p>The ERT noted that the CO₂ IEF fluctuates between 1990 and 2012 (ranging from an interannual variation of –4.6% to 4.6%) and decreases between 2012 and 2013 (–2.8%) and 2013 and 2014 (–14.2%). The ERT further noted that production in 2014 (2 899.43 kt ammonia) reached a similar level as in previous years (e.g. 2 746.69 kt ammonia for 2009), but the resulting IEFs were very different (e.g. 2.49 t/t for 2009 and 2.02 t/t for 2014). Lastly, the ERT also noted that the amount of CO₂ recovery increased between 2013 (787.00 kt) and 2014 (1 058.81 kt) compared with 2012 (706.00 kt). There is no explanation in the NIR for the observed trends. During the review, the Party explained the reasons for the decrease in the value of the IEF in the latest submission, which are related to the fuel switch of one plant from use of heavy fuel oil to use of mainly natural gas, and the increase in the recovery level of CO₂ for further use as fertilizer</p> <p>The ERT recommends that Germany explain the drivers for the trends in the CO₂ IEF and CO₂ recovery in the NIR</p>	Yes. Transparency*
I.8	2.B.1 Ammonia production – CO ₂	<p>As alluded to in the NIR (page 314) and as further explained during the review, one plant for which CO₂ emissions were previously estimated using the IPCC default carbon content factor is conducting measurements to determine the carbon content of the natural gas used for ammonia production, and recalculations have been already made in the 2015 submission for the entire time series</p>	Yes. Transparency*

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I.9	2.B.3 Adipic acid production – N ₂ O	<p>The ERT commends Germany for using a higher-tier method to estimate emissions from the one plant previously using an IPCC default carbon content factor and recommends that the Party report on the updated methodology in the NIR</p> <p>The 2014 review report contained a recommendation on the methodology used to estimate N₂O emissions from adipic acid production (see table 3, ID# I.2). In the 2016 submission, Germany improved the transparency of its reporting on the methodology used to estimate N₂O emissions from the three plants in operation (page 318). It is reported that one of the three plants, which started operation in 2002, has been conducting measurements continuously since 2013. However, Germany did not report how the emissions for that plant were estimated during the period 2002–2012, prior to when the measurements started</p> <p>The ERT recommends that, for the third plant, which started operation in 2002 but began conducting measurements only in 2013, Germany report on how the N₂O emissions were estimated for the period 2002–2012. The ERT further recommends that Germany report on how time-series consistency was ensured, given the use of different methods in the time series</p>	Yes. Consistency*
I.10	2.B.4 Caprolactam, glyoxal and glyoxylic acid production – N ₂ O	<p>In the 2016 annual submission, Germany reported N₂O emissions under category 2.B.2 (nitric acid production) from one plant that was first identified in 2015. During the review, Germany explained that the plant is classified as nitric acid production under the EU ETS and that the data became available to the GHG inventory team for the 2016 submission. Furthermore, Germany explained that the identification of the additional plant was the result of the QA/QC system and that the plant is producing nitric acid as an intermediate, but the final product is caprolactam. The ERT considers that as the plant is producing caprolactam as final product, emissions from the plant should be reported under category 2.B.4 (caprolactam, glyoxal and glyoxylic acid production) in order to be in line with the 2006 IPCC Guidelines. Germany explained that reporting the emissions under category 2.B.4 is not possible at the moment for data confidentiality reasons</p> <p>The ERT recommends that Germany report N₂O emissions from the plant producing caprolactam under category 2.B.4 (caprolactam, glyoxal and glyoxylic acid production) as “C”, explain where these emissions are reported and improve the transparency of its NIR by providing explanations for including emissions from the plant in category 2.B.2 (nitric acid production) instead of category 2.B.4 (caprolactam, glyoxal and glyoxylic acid production)</p>	Yes. Comparability*
I.11	2.B.4 Caprolactam, glyoxal and glyoxylic acid production –	<p>In the NIR (section 4.3.4.1, page 319), Germany reported N₂O emissions from caprolactam acid as zero, assuming a 100% efficiency of the abatement system (the ERT notes that these N₂O emissions are reported as “NA” and the AD are reported as “C” in CRF table 2(I)A-H)). According to the NIR (page 320), there are two plants producing caprolactam in Germany, but the N₂O emissions are assumed to be negligible. However, the 2006 IPCC Guidelines (volume 3,</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
N ₂ O		<p>chapter 3.5.2) provide methods and EFs for the estimation of these emissions (see the EFs in table 3.5 for caprolactam production). Germany provided additional information to the ERT during the review explaining that the two plants operating in Germany are equipped with redundant high thermal destruction systems. It was the Party's view that this destruction process results in no N₂O emissions. The ERT noted that the 2006 IPCC Guidelines provide default destruction and utilization factors for a thermal destruction system of up to 99% (chapter 3, volume 3, page 3.30, table 3.4). The ERT further noted that Germany did not provide any documentation to justify the assumption of 100% destruction of N₂O emissions (including information on the abatement efficiency and system utilization), in line with good practice as provided in section 3.5.2.3 of the 2006 IPCC Guidelines. The ERT concluded that this represented a possible underestimation of N₂O emissions from caprolactam production for the 2016 submission and included this issue in the list of potential problems and further questions raised</p> <p>In response to this list, Germany decided to report these emissions as insignificant, in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. Germany provided data demonstrating that the maximum emissions for this category for 2014 were 17.90 kt CO₂ eq and that the total of all excluded emissions remained below 0.1% of the total national GHG emissions</p> <p>The ERT considered that the information and additional literature^{c,d,e} provided on the AD and the methodology used for the estimation of emissions determined a likely level of emissions for caprolactam production. The ERT therefore considers that the potential problem is resolved. Further, the ERT recommends that the Party provide documentation in the NIR, in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, to demonstrate that emissions from caprolactam production are insignificant</p>	
I.12	2.B.6 Titanium dioxide production – CO ₂	<p>Germany reported CO₂ emissions from this category as “NE” in CRF table 2(I).A-H, but no information is provided in CRF table 9 to explain the reporting of the notation key “NE”. The ERT noted that the NIR (page 322) states that there is one facility for the production of titanium dioxide. However, according to the literature,^f there are two plants in Germany, one in Leverkusen and the second in Nordenham, belonging to the same company. During the review, Germany clarified that there are three plants producing titanium dioxide. However, only one produces titanium dioxide with the emissive chloride process; the others use the sulphate process, which does not lead to CO₂ process emissions. Germany explained that it includes titanium dioxide in table 516 of the NIR as a category labelled as insignificant. The ERT accepts the reporting of CO₂ emissions from titanium dioxide as being insignificant but notes that the methodology used to derive the emission estimates is not included in the NIR</p> <p>The ERT recommends that the Party provide in the NIR information on the plants in operation in</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		Germany and the types of processes used. The ERT further recommends that Germany include a description of the methodology used to estimate emissions in support of the assumption of insignificance, including reporting in the NIR the AD and EFs used, if these are not confidential, to derive the likely level of emissions, in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines	
I.13	2.G.2 SF ₆ and PFCs from other product use – SF ₆	<p>The ERT noted that the assumptions used by Germany to estimate SF₆ emissions from AWACS are not documented in the NIR. The ERT requested the Party to provide a study or research report supporting the assumptions used. During the review, the Party explained that for military uses it has information only on the amount of SF₆ purchased. German experts provided a report published in 2004 covering fluorinated gas emissions for the period 1995–2002.^g The Party assumes that 50% of the SF₆ purchased every year is emitted over German territory</p> <p>The ERT considers the survey outdated and encourages Germany to make plans to update the 2004 survey as many changes occurred between 2002 and 2011 (military activities, North Atlantic Treaty Organization strategies, use of AWACS in different countries), taking into consideration the mass balance of SF₆ (stock, import, export to other military bases abroad, etc.)</p>	Not an issue
I.14	2.G.2 SF ₆ and PFCs from other product use – SF ₆	<p>The ERT noted that the estimates of SF₆ emissions from particle accelerators are based on intermittent studies (2004, 2011).^{h, i} However, the ERT noted that there is no information in the NIR on the number of accelerators in place or the assumptions used by Germany to estimate SF₆ emissions from particle accelerators. During the review, Germany provided information on the methodologies used to estimate the SF₆ emissions from particle accelerators</p> <p>The ERT recommends that the Party include in the NIR descriptions of the methodological assumptions used to estimate SF₆ emissions from particle accelerators and the number of accelerators occurring in Germany in accordance with the 2006 IPCC Guidelines</p>	Yes. Transparency*
Agriculture			
A.4	3.A.2 Sheep – CH ₄	<p>The Party applies the IPCC tier 1 method for the estimation of CH₄ emissions from enteric fermentation for sheep, goats and horses. For lambs, 40% of the default value for sheep is assumed, based on the ratio of N excretion by lambs and adult sheep. However, no information to support the appropriateness of the assumption used is provided in the NIR. In response to questions raised by the ERT on the Party's assessment of the value used for lambs (3.2 kg CH₄/head/year), the Party provided, informally, a revised estimate of the EF for lambs (3.57 kg CH₄/head/year) using the approach provided in the 2006 IPCC Guidelines, taking into account the performance difference for lambs. This revised estimate was higher than the official estimate provided in the annual submission. As the Party was underestimating CH₄ emissions from sheep, the ERT included this issue in the list of potential problems and further questions raised by the</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		<p>ERT. In response to this list, the Party provided revised estimates for the category enteric fermentation for the entire time series using a new CH₄ EF for lambs (3.6 kg CH₄/head) and documentation on the method used to derive the new EF</p> <p>The ERT recommends that the Party describe the method used to derive the revised CH₄ EF for lambs in the NIR</p>	
A.5	3.A Enteric fermentation – CH ₄	<p>In the NIR (page 457), Germany reported a methodological change in the calculation of the dry matter intake for calves. However, no information on the new value of dry matter intake or on how this value is calculated is provided in the NIR. During the review, the Party provided additional information and a reference (Dämmgen et al., 2013^j), explaining that the dry matter intake value is calculated using the data and information on typical diet composition and dry matter feed content provided in Dämmgen et al</p> <p>The ERT recommends that Germany provide in the NIR a transparent explanation of the methodology used to develop the applied dry matter intake value for calves</p>	Yes. Transparency*
A.6	3.B Manure management – N ₂ O	<p>Germany used the default value provided in the 2006 IPCC Guidelines of 0.01 kg N₂O-N/kg N for deep bedding. According to the 2006 IPCC Guidelines, the default EFs for deep bedding without mixing and with active mixing are 0.01 and 0.07 kg N₂O-N/kg N excreted, respectively. However, the NIR does not provide information on deep bedding practices in Germany to justify the use of the lower value. In response to the questions from the ERT, the Party explained that the default value chosen was based on a personal communication with experts, but no documentation of the expert judgement is provided in the NIR. During the review, the Party provided documentation on the personal communication and a rationale for using the default value for deep bedding without mixing (0.01 kg N₂O-N/kg N excreted)</p> <p>The ERT recommends that Germany provide in the NIR clear information, including the rationale derived from the personal communication with experts, to justify the appropriateness of the EF used for deep bedding</p>	Yes. Transparency*
A.7	3.D.a.6 Cultivation of organic soils (histosols) – N ₂ O	<p>The NIR states that N₂O emissions from cultivation of organic soils are calculated using country-specific EFs: 10.7 kg N₂O-N/ha/year for cropland and 2.7 kg N₂O-N/ha/year for grassland. The ERT noted that the EF for grassland is lower than the default value for temperate organic crop and grassland soils provided in the 2006 IPCC Guidelines of 8 kg N₂O-N ha⁻¹ year⁻¹ (volume 4, chapter 11, table 11.1), and the default values for drained grassland provided in the Wetlands Supplement of 1.6–9.5 kg N₂O-N ha⁻¹ year⁻¹ (table 2.5, page 2.34). However, the NIR does not provide information to support the appropriateness of the value used for drained grassland, such as drainage depth and the nutrient status of the drained grassland. During the review, the Party explained that the EF of 2.7 kg N₂O-N ha⁻¹ year⁻¹ is applied for drained grassland only and</p>	Yes. Transparency*

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A.8	3.D.b.2 Nitrogen leaching and run-off – N ₂ O	<p>represents the mean value of all known German measurements (with a mean annual water table of 0.1 m below surface) used in a European study by Leppelt et al. (2014).^k The Party also provided additional information on the value used for drained grassland including national N₂O measurements (Tiemeyer et al., 2016)^l to support the appropriateness of the EF used</p> <p>The ERT recommends that Germany provide a clear explanation of the derivation and application of the country-specific EF used for drained grassland in its NIR to justify the appropriateness of the EF used</p> <p>The NIR (pages 473 and 474) states that the amount of N quantity available in the soil for leaching/run-off is obtained by subtracting N losses (via NH₃, NO, N₂ and direct N₂O emissions) from N inputs to soil. The default value from the 2006 IPCC Guidelines for the fraction of N that is lost through leaching and run-off (Frac_{LEACH-(H)}=0.30 kg/kg N additions) is applied to estimate indirect N₂O emissions from N leaching and run-off from managed soils. However, according to the 2006 IPCC Guidelines (volume 4, chapter 11), Frac_{LEACH-(H)} is applied to N inputs to the soil without adjusting it for N lost. The ERT concluded that the subtraction of N losses from the N inputs to the soil led to a potential underestimation of N₂O emissions from managed soils and included this issue in the list of potential problems and further questions raised by the ERT. In response to this list, the Party provided revised estimates for indirect N₂O emissions from N leaching and run-off from managed soils for the entire time series without subtracting any losses, in accordance with the 2006 IPCC Guidelines. The ERT considered that the potential problem was resolved. However, the ERT notes that the AD for N leaching and run-off reported in the official revised CRF table 3.D (1 143 803.01 kg N/year for 2014) are different (a thousand times smaller) from the figures provided by the Party in its textual response to the list of potential problems (1 143 803 012.44 kg N/year for 2014). The ERT finds that the AD in CRF table 3.D are incorrect, although it accepts the emissions reported</p> <p>The ERT recommends that the Party revise its description in the NIR of the methodology used to estimate indirect N₂O emissions from managed soils, noting that Frac_{LEACH-(H)} is applied to N inputs to the soil without adjusting it for N lost, and the recalculations in the NIR. The ERT also recommends that the Party correct the AD in CRF table 3.D for the amount of N from fertilizers and other agricultural inputs that is lost through leaching and run-off</p>	Yes. Transparency*
A.9	3.G Liming – CO ₂	<p>Germany reports CO₂ emissions from dolomite application using the notation key “IE” (CRF table 3.G-I). The Party explained that the data cannot be differentiated and therefore dolomite use is included in limestone use. The ERT noted that the default CO₂ EF for limestone only (0.12 t C/t lime) is used in the estimation. However, according to the 2006 IPCC Guidelines, the default EFs for limestone and dolomite are 0.12 t C/t limestone and 0.13 t C/t dolomite, respectively (volume 4, chapter 11). During the review, Germany informed the ERT that there will be a</p>	Yes. Transparency*

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<p>differentiation between dolomite and limestone application in its 2017 submission. The ERT concluded that Germany was underestimating CO₂ emissions from liming due to the use of the EF for limestone for all limestone and dolomite application and included this issue in the list of potential problems and further questions raised by the ERT. In response to this list, the Party provided revised estimates of CO₂ emissions from liming by differentiating dolomite and limestone application and recalculated the emissions for the entire time series using the respective default EFs from the 2006 IPCC Guidelines for limestone and dolomite. In addition, the Party included in its revised estimates the previously missing AD for liming for 1990–1993</p> <p>The ERT recommends that the Party explain the updated AD used to differentiate dolomite and limestone application for liming in the NIR</p>			
LULUCF			
L.3	4. General (LULUCF)	<p>Germany carried out land classification, identifying land use and land-use changes, on the basis of a sampling grid (based on the NFI network), further stratified into two subgrids (organic and mineral soils). During the review, the Party provided detailed information in relation to the sampling carried out in the different contexts</p> <p>The ERT encourages Germany to include, in tabular format, the information provided to the ERT during the review (e.g. grids, number of plots, coverage, representativeness, etc.), and to report on the status of surveys, and/or monitoring projects on forestry activities (e.g. NFIs, national forest soil inventories) carried out in the country, detailing if and how the outcomes have been used for reporting purposes</p>	Not an issue
L.4	Land representation	<p>Germany used several data sources in the land classification process to identify land use and land-use changes. During the review, the Party clarified how land classification was carried out for 1990, on the basis of existing data sources, providing an explanation of the classification system, the hierarchical structure and the harmonization process applied</p> <p>The ERT encourages the Party to improve the description of the land classification system in the NIR by including a table specifying the data sources used (including their main content and the land-use category (if any) for which the data have been used)</p>	Not an issue
L.5	4.A Forest land – CO ₂	<p>Germany applied the stock-difference method to assess the CSCs in biomass for the forest land category. During the review, the Party provided detailed information in relation to the activities carried out to verify the outcomes of the stock-difference method, taking into account the available data on harvesting</p> <p>The ERT encourages Germany to increase the transparency and comparability of its reporting by</p>	Not an issue

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue^a and/or a problem^b? If yes, classify by type</i>
		including in the NIR an improved description of the stock-difference method applied to estimate the CSCs in forest land and the consequent main results (e.g. a table with the carbon stock/carbon stock change factors used, and validation of the applied allometric equations)	
L.6	4.B Cropland – CO ₂ and CH ₄	<p>The ERT noted that organic soils reported under cropland for 2014 (379.32 kha) are remarkably different from the equivalent information included in the FAO database (649.72 kha).^m During the review, Germany clarified that a new map of organic soils was used for the 2015 and 2016 submissions, resulting in a recalculation of the organic soils area for cropland and grassland; Germany further specified that data have not yet been updated in the FAO database</p> <p>The ERT encourages Germany to increase the transparency of the NIR by including quantitative information on recalculations performed as a result of updated AD</p>	Not an issue
L.7	4.B.1 Cropland remaining cropland – CO ₂	<p>Germany reports the notation key “NO” for the CSCs for all pools, except organic soils, in the cropland remaining cropland category. During the review, the Party provided the AD (i.e. perennial woody crops stratified by crop type) and draft estimates of woody biomass changes in perennial crops</p> <p>The ERT recommends that Germany estimate and report the CSCs for woody biomass in accordance with the 2006 IPCC Guidelines, taking into consideration the biomass accumulation from growth and the losses associated with harvest, gathering or disturbance</p>	Yes. Completeness*
L.8	4.B.1 Cropland remaining cropland – CO ₂	<p>Germany did not report the CSCs in mineral soils in the cropland remaining cropland category, explaining that the soil pool is not a net source. During the review, the Party clarified that no changes in management practices have occurred in Germany since 1990, and, on the basis of national studies and research, the soil pool is not a net source</p> <p>The ERT recommends that Germany improve the transparency of the reporting by including in the NIR transparent and verifiable information to demonstrate that the cropland soil pool is not a net source, on the basis of the documentation on management practices provided during the review, referring to national studies and research. The ERT further recommends that the Party use the notation key “NE” to report carbon stock change when a tier 1 zero stock change method is used</p>	Yes. Completeness*
L.9	4.E.2 Land converted to settlements – CO ₂	<p>The ERT noted that the mean value of carbon stocks in mineral soils reported for settlements for 2014 (58.67 t C ha⁻¹) is almost comparable with the value for cropland (60.03 t C ha⁻¹) and not based on direct measurements (NIR, table 310). During the review, the Party clarified that the SOC value was derived from the typical soil profile representative of grassland, taking into consideration German legislation on soils. In the view of the ERT, the SOC assessment is not in line with the 2006 IPCC Guidelines, as it does not take into account the proportion of the</p>	Yes. Accuracy*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		<p>settlement area that is paved over. In response to the provisional main findings, the Party disagreed that the SOC assessment was not in line with the 2006 IPCC Guidelines and stated that it would provide further evidence to support its approach in the 2017 annual submission</p> <p>The ERT recommends that Germany reassess the SOC value used to estimate soil CSCs for land converted to settlements, taking into consideration the 2006 IPCC Guidelines, or provide transparent and verifiable evidence, based on national studies and research, to support the use of the country-specific SOC value</p>	
L.10	4.G Harvested wood products	<p>The ERT noted that the factors used to convert product units to carbon have not been provided in CRF table 4.G (additional information). During the review, the Party clarified that the factors used were the IPCC default factors as provided in the Kyoto Protocol Supplement</p> <p>The ERT encourages Germany to report the additional information on the factors used to convert product units to carbon in CRF table 4.G</p>	Not an issue
Waste			
W.5	5. General (waste)	<p>There are a number of instances where Germany uses the notation key “IE” in the CRF tables (e.g. flaring of CH₄ from municipal solid waste, N in industrial effluent and the amount of CH₄ for energy recovery in industrial wastewater), but no explanations are provided in CRF table 9</p> <p>The ERT recommends that Germany ensure that all instances of the use of the notation key “IE” (including flaring of CH₄ from municipal solid waste, N in industrial effluent and the amount of CH₄ for energy recovery in industrial wastewater) are explained in CRF table 9</p>	Yes. Transparency*
W.6	5.A.1 Managed waste disposal sites – CH ₄	<p>Germany uses measured values for the fraction of methane in landfill gas (F) (49%) based on data reported by the Federal Statistical Office. The ERT noted that it is good practice to adjust for the CO₂ absorption in seepage water, if the fraction of CH₄ in landfill gas is based on CH₄ concentrations measured in landfill gas emitted from SWDS (see the 2006 IPCC Guidelines, volume 5, page 3.15). The Party confirmed during the review that this adjustment has not been performed in Germany to date. Furthermore, the ERT learned that German experts, as part of a broad internal review of the solid waste estimation method, have recommended the use of the IPCC default value for F of 50%, instead of the measured value. The ERT concluded that Germany’s CH₄ emission estimates for managed waste disposal were not in line with the 2006 IPCC Guidelines and were potentially underestimated, and therefore included this issue in the list of potential problems and further questions raised by the ERT. In response to this list, Germany submitted revised estimates applying the IPCC default value for F of 50%, as recommended by the ERT. The ERT accepts the Party’s response</p> <p>The ERT recommends that Germany revise the NIR to describe the updated methodology used to</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		estimate CH ₄ emissions from managed waste disposal sites, in particular the application of the IPCC default value for F of 50%	
W.7	5.A.1 Managed waste disposal sites – CH ₄	<p>During the review, Germany outlined plans for future improvement to the estimates of solid waste disposal through research into the decay profiles of individual waste types and decay rates (DOC_f and k). According to the information provided during the review, when completed, this work will enable Germany to more accurately report its landfill emissions</p> <p>The ERT commends Germany for its efforts to further improve the solid waste emission estimates in the inventory, especially given their diminishing significance in terms of the contribution to overall national emissions. The ERT encourages Germany to continue the work to develop DOC_f values for specific waste types and to apply these as soon as is practicable once the research is concluded and assessed as appropriate for use. Furthermore, the ERT encourages Germany to investigate the possibility of calibrating the decay rate constants to German conditions based on detailed and representative landfill operational data</p>	Not an issue
W.8	5.A.1 Managed waste disposal sites – CH ₄	<p>Germany has reported the notation key “NA” for “long-term storage of C in waste disposal sites”, the “annual change in total long-term C storage” and the “annual change in total long-term C storage in HWP waste” in CRF table 5</p> <p>Since Germany already calculates this information as part of the solid waste estimation model, the ERT encourages Germany to report the memo items in CRF table 5</p>	Not an issue
W.9	5.A.1 Managed waste disposal sites – CH ₄	<p>Germany describes its assumptions underpinning the selection of country-specific DOC values for different waste fractions in table 397 of the NIR. However, no references to the literature to support the selected values are provided. During the review, Germany provided a list of references used to derive the country-specific DOC value for food waste (provided in annex IV.B to this document)</p> <p>The ERT recommends that Germany include all references supporting the use of country-specific values as a footnote to table 397 of the NIR</p>	Yes. Transparency*
W.10	5.B.2 Anaerobic digestion at biogas facilities – N ₂ O	<p>The ERT noted that there is a probable double counting occurring in Germany’s estimates of N₂O emissions from biological treatment of solid waste, which include a quantity of emissions from the treatment of animal manure. N₂O from animal manure is also reported in the agriculture sector under category 3.B (manure management). This double counting potentially exists from 1998 onwards, when anaerobic digestion commenced in Germany</p> <p>The ERT recommends that Germany fully investigate the probable double counting between categories 3.B and 5.B.2 for the relevant inventory years (1998 onwards) and correct the AD for anaerobic digestion, as appropriate, by subtracting the amount of manure processed under</p>	Yes. Accuracy*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		category 5.B.2	
W.11	5.B.2 Anaerobic digestion at biogas facilities – N ₂ O	<p>During the review, in response to questions raised by the ERT regarding ID# W.10 above and the agricultural application of compost/digestate to agricultural land (as referred to on page 665 of the NIR), the Party explained that the AD for composting/digestion may include quantities of manure/crop digestate. During subsequent discussions, Germany confirmed that digestate and compost from the treatment of kitchen and garden waste are used in agricultural applications (category 3.D (agricultural soils)) but that no N₂O emissions are included from this material under category 3.D on the basis that the Party is of the view that these materials contain negligible N</p> <p>The ERT accepts this explanation and recommends that Germany document the reporting of the agricultural application of compost/digestate to agricultural land in the NIR, confirming that the biological processing of kitchen and garden waste removes any N and therefore no N₂O emissions result from the application of residues to agricultural land in the agriculture sector</p>	Yes. Transparency*
W.12	5.D.1 Domestic wastewater – CH ₄	<p>Germany applies an MCF of 0 (zero) for domestic wastewater treatment on the assumptions that all domestic wastewater treatment is considered aerobic, and that all CH₄ from anaerobic sludge digestion is recovered for energy production. However, research referred to in the NIR (page 670) and summarized in two documents provided during the review week (Gärtner, 2014;⁷ Becker et al., 2012⁹) indicates that CH₄ emissions from wastewater treatment plants occur from both wastewater and anaerobic sludge digestion elements of the wastewater treatment system. Therefore, the ERT concludes that Germany is not justified in the use of the MCF value of 0 for this category as the available research contradicts these assumptions. As a result of this finding, the ERT further concludes that Germany may be underestimating CH₄ emissions from domestic wastewater for all years of the time series as a result of the application of an MCF value of 0 and the assumption that all CH₄ generated from anaerobic sludge digestion is recovered for energy. Accordingly, this issue was included in the list of potential problems and further questions raised by the ERT</p> <p>In response to this list, Germany submitted revised estimates that used a per-capita value for CH₄ emissions from domestic and commercial wastewater treatment taken from Becker et al. (2012).⁹ The use of a per-capita emissions value implicitly applies an appropriate non-zero MCF to organic matter treated in Germany's wastewater treatment plants, which is appropriately underpinned by country-specific empirical research. The ERT agrees with the approach taken to varying the per-capita value throughout the times series, which is also supported by appropriate documentation</p> <p>The ERT recommends that the Party describe the updated methodology used in the NIR, in particular the derivation of the MCF value for domestic wastewater treatment. The ERT</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		encourages Germany to continue with its planned research project to more fully investigate emissions from its domestic wastewater treatment plants and report on these findings as soon as is practicable	
W.13	5.D Wastewater treatment and discharge – CH ₄ and N ₂ O	<p>The method, assumptions and AD underpinning Germany's estimates of CH₄ and N₂O emissions from wastewater treatment and discharge are not transparently documented in the NIR. For example, it was confirmed during the review that an adjustment (1.25) to account for co-discharged industrial wastewater was made to the BOD calculation for domestic wastewater but this is not documented in the NIR. Additionally, the number of people connected to cesspools and septic systems is also not documented and should be included in the NIR. There are other examples of AD and assumptions that were published in the 2015 NIR but not included in the 2016 NIR that were discussed with the Party during the review and documented</p> <p>The ERT recommends that Germany ensure that sufficient information is provided in the NIR (including a description of the methods, relevant AD that include the number of people connected to cesspools and septic systems, and all underlying assumptions used) that would enable the replication of the emission estimates and AD reported in CRF table 5.D</p>	Yes. Transparency*
W.14	5.D.2 Industrial wastewater – CH ₄	<p>Germany reports the same derived value for total organic product for industrial wastewater for the years 2010–2014 in CRF table 5.D (1,480 kt DC/year). This value is not the same as the value used to calculate the emissions of CH₄ from this category. During the review, Germany provided a reference^p showing the value of total organic product used to derive the actual estimates of emissions from industrial wastewater for 2013 (1,653 kt DC/year)</p> <p>The ERT recommends that Germany provide the actual AD underpinning its CH₄ emission estimates from industrial wastewater in CRF table 5.D, as referenced in the document by Austermann-Haun (2014).^p This will enable a more complete and accurate assessment of the IEFs used and enhance the QA/QC of the estimates for this category</p>	Yes. Transparency*
KP-LULUCF			
KL.3	General (KP-LULUCF)	<p>Germany used several data sources (GSE Forest Monitoring (part of the Global Monitoring for Environment and Security (GMES) Services Element (GSE)) for 2003, 2006, 2007 and 2009; and colour infrared images) to classify land subject to forest management and conversion to and from forest land. During the review, the Party provided additional information to clarify how the 1990 assessment was carried out, on the basis of existing data sources</p> <p>The ERT encourages the Party to improve the transparency of the reporting by including in the NIR a clear description of the system implemented to classify land subject to forest management and conversion to and from forest land</p>	Not a problem

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
KL.4	Deforestation – CO ₂	<p>The ERT noted that no quantitative information has been included in the NIR on the recalculations performed for deforestation activities as a result of the use of the most recent NFI (BWI III). During the review, Germany provided an explanation of the impact of the updated data on the methodologies and related estimates</p> <p>The ERT encourages Germany to increase the transparency of the NIR by including quantitative information on any recalculations that have occurred on the basis of updated AD</p>	Not a problem
KL.5	Deforestation – CO ₂	<p>Germany reported in CRF table 4(KP-I)A.2 gains included in the CSCs for the above-ground (80.22 kt C for 2014) and below-ground biomass pools (31.05 kt C for 2014). During the review, the Party clarified that the areas subject to deforestation activities have not been replanted and the reported gains result from the estimation process. The Party further clarified that regrowth of deforested areas to areas with forest cover does not happen on a significant basis and thus is considered as not occurring</p> <p>The ERT recommends that Germany increase the transparency of the reporting by including in the NIR an explanation for the gain in carbon stock in above-ground and below-ground biomass on areas subject to deforestation. The ERT further recommends that the Party use the notation key “NE” when a tier 1 zero stock change method is used</p>	Yes. Accuracy*
KL.6	Deforestation – CO ₂	<p>Germany did not report data for the information items (land areas under deforestation by land-use category in the reporting year) in CRF table 4(KP-I)A.2, but instead reported the notation key “NA”. During the review, the Party provided a complete time series of land areas under deforestation by land-use category</p> <p>The ERT recommends that Germany increase the transparency of its reporting by including in CRF table 4(KP-I)A.2 the land areas under deforestation by land-use category in the reporting year and by including in the NIR a table with the complete time series of land areas under deforestation for the reporting period</p>	Yes. Transparency*
KL.7	Deforestation – CO ₂	<p>In the estimation of soil stock changes in deforested areas, Germany applied an SOC value of 58.67 t C ha⁻¹ for the entire time series, which is almost comparable with the value used for the entire time series for cropland (60.03 t C ha⁻¹) and not based on direct measurements (NIR, table 310). During the review, the Party clarified that the SOC value used for the estimates was derived from the typical soil profile representative of grassland, taking into consideration German legislation on soils. In the view of the ERT, the SOC assessment is not in line with the 2006 IPCC Guidelines, as it does not take into account the proportion of the settlement area that is paved over; consequently, its application to the estimation process for the calculation of deforestation activities leads to an underestimation of emissions for the whole time series due to the land-use changes (forest land to other land uses)</p>	Yes. Accuracy*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		The ERT recommends that Germany revise the estimates of soil CSCs for deforestation, on the basis of the reassessment of the SOC value, or provide transparent and verifiable evidence, based on national studies and research, to support the use of the country-specific SOC value	
KL.8	Forest management	<p>The ERT noted some discrepancies between the CRF tables and the NIR data (e.g. the value reported in section 2.5 of the NIR for forest management removals (-55 357.16 kt CO₂ eq) is different from the value reported in CRF table 4(KP) (-55 069.68 kt CO₂ eq for 2014). During the review, Germany explained that the discrepancies are due to errors in the NIR</p> <p>The ERT encourages the Party to ensure the consistency of the reported data by enhancing the QA/QC procedures</p>	Not a problem
KL.9	Forest management – CO ₂	<p>Germany did not apply a technical correction to the FMRL in the 2016 submission. During the review, Germany provided information on the main methodological inconsistencies between the FMRL and forest management reporting, and the consequent need for a technical correction</p> <p>The ERT recommends that Germany include in the NIR an exhaustive list of methodological inconsistencies, on the basis of the checklist provided in table 2.7.1 of the Kyoto Protocol Supplement, and apply a technical correction well before the end of the commitment period</p>	Yes. Accuracy*
KL.10	Forest management – CO ₂	<p>The ERT noted that the FMRL value reported in the report to facilitate the calculation of the assigned amount and in Germany's CRF accounting table (-22.410 kt CO₂ eq/year) is different from the value included in the appendix to decision 2/CMP.7 (-22.418 Mt CO₂ eq/year, applying a first-order decay function for HWP). During the review, the Party confirmed that the value for the FMRL to be included in the report to facilitate the calculation of the assigned amount and in Germany's CRF accounting table is -22.418 Mt CO₂ eq/year</p> <p>The ERT recommends that the Party correct the error and report in its CRF accounting table the FMRL contained in the appendix to decision 2/CMP.7 (-22.418 Mt CO₂ eq)</p>	Yes. Accuracy*
KL.11	Forest management – CO ₂	<p>The ERT noted that Germany submitted revised estimates for the time series in response to the list of potential problems and further questions raised by the ERT (in particular, see ID#s A.4, A.8, A.9, W.6 and W.12 above). The revised estimates resulted in a revision of the base-year emission estimates, as calculated by the ERT, from 1 249 845 614 t CO₂ eq in the original submission to 1 253 599 336 t CO₂ eq in the revised submission. The ERT noted that the original base-year emissions as reported by Germany in its report to facilitate the calculation of the assigned amount for the second commitment period (1 249 872 163 t CO₂ eq) were not correct. As the forest management cap is calculated as 3.5% of the base-year emissions, multiplied by the duration of the commitment period, the forest management cap reported in the CRF accounting table should have been revised in the submission of the revised estimates. However, Germany did not revise the forest management cap. Based on the submission of revised estimates, the ERT</p>	Yes. Accuracy*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		<p>calculates that the revised forest management cap is equal to 351 007 813 t CO₂ eq. During the review, in the process of communicating with the Party on the list of potential problems and further questions raised by the ERT, Germany agreed with this figure</p> <p>The ERT recommends that Germany correct its reporting of the forest management cap in the CRF accounting table, and report a value of 351 007 813 t CO₂ eq. The ERT notes that this value is fixed for the duration of the commitment period, in accordance with decision 6/CMP.9, paragraph 12</p>	
KL.12	Cropland management – CO ₂	<p>Germany included SRCs under cropland management activity, since, according to the forest definition provided in the German NFI, they are explicitly not forests and are not covered by German forest law. During the review, the Party clarified that no spatially explicit data for SRCs are available. The ERT notes that, according to the Kyoto Protocol Supplement, it is good practice to continuously follow the management of land subject to cropland management by tracking lands, or through statistical sampling techniques, ensuring that double counting with forest management is avoided. The ERT further notes that it is good practice to document how consistency is achieved with Kyoto Protocol activities</p> <p>The ERT recommends that Germany stratify the cropland management estimates, taking into account the SRCs, on the basis of the methodology provided in the Kyoto Protocol Supplement. The ERT further recommends that the Party include in the NIR detailed information on SRCs, including information on the fertilization occurring in the SRCs and HWP originating from the SRCs, to increase transparency</p>	Yes. Accuracy*
KL.13	Cropland management – CO ₂	<p>Germany reports the CSCs under cropland management as “NO” (see ID# L.6 above)</p> <p>The ERT recommends that Germany estimate and report the CSCs for woody biomass in accordance with the 2006 IPCC Guidelines and the Kyoto Protocol Supplement, taking into consideration the biomass accumulation from growth and the losses associated with harvest, gathering or disturbance. The ERT further recommends that Germany improve the transparency of its reporting by including in the NIR transparent and verifiable information to demonstrate that the cropland management soil pool is not a net source</p>	Yes. Accuracy*
KL.14	Harvested wood products – CO ₂	<p>Germany reported emissions and removals from HWP and related AD for forest management only, reporting the notation key “NA” for activities under Article 3, paragraph 3. During the review, the Party clarified that the HWP originating from deforestation activities are taken into account on the basis of instantaneous oxidation, while the HWP originating from afforestation/reforestation activities have been included in the HWP from forest management. The ERT further notes that there is no need to exclude from the reporting HWP emissions already accounted for during the first commitment period on the basis of instantaneous oxidation (as</p>	Yes. Comparability*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		<p>required by decision 2/CMP.7, annex, para. 16) since Germany did not report and/or account for any emissions from HWP in the first commitment period of the Kyoto Protocol</p> <p>The ERT recommends that the Party increase the transparency of the reporting by including in the NIR information on the assumptions used in the estimation process (i.e. that all HWP entering the accounting framework originate from forest management). The ERT recommends that Germany use the correct notation keys (i.e. “IE” for afforestation and reforestation activities and “NO” for deforestation activities)</p>	

Abbreviations: AD = activity data, AWACS = airborne warning and control system, BOD = biochemical oxygen demand, C = confidential, CRF = common reporting format, CSC = carbon stock change, DC = degradable organic component, DOC = degradable organic carbon, DOC_f = fraction of DOC dissimilated, EF = emission factor, ERT = expert review team, EU ETS = European Union Emissions Trading System, FAO = Food and Agriculture Organization of the United Nations, FMRL = forest management reference level, Frac_{LEACH} = fraction of fertilizer and manure N applied to soils lost through leaching and run-off, GHG = greenhouse gas, HWP = harvested wood products, IE = included elsewhere, IEA = International Energy Agency, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol Supplement = *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*, LULUCF = land use, land-use change and forestry, MCF = methane conversion factor, NA = not applicable, NE = not estimated, NFI = national forest inventory, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control, SOC = soil organic carbon, SRC = short rotation coppice, SWDS = solid waste disposal site, 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”, Wetlands Supplement = *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*, 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

^a Recommendations are related to issues as defined in decision 13/CP.20, annex, paragraph 81, or problems as identified in decision 22/CMP.1, annex, paragraph 69, identified by the ERT during the review. Encouragements are made to the Party to address all findings not related to such issues.

^b An asterisk is included next to each issue type that is also a problem, as defined in decision 22/CMP.1, annex, paragraphs 68 and 69, including those that lead to an adjustment or a question of implementation.

^c BASF. 2016. *BASF Richtet Caprolactam-Produktion in Europa Neu Aus* (“BASF is realigning caprolactam production in Europe”). Press release. Available at <https://www.basf.com/de/company/news-and-media/news-releases/2016/09/p-16-293.html>.

^d Leuna Echo. 2012. *70 Jahre Caprolactam-Produktion in Leuna: Traditionsreiche Produktion Wurde Restrukturiert* (“70 years of caprolactam production in Leuna: traditional production has been restructured”). Available at <http://www.leuna-echo.de/leuna-aktuell/einzelansicht/artikel/70-jahre-caprolactam-produktion-in-leuna.html>.

^e Germany Trade and Invest. 2013. *Chemieindustrie Investiert Erheblich in Produktionsanlagen in Deutschland* (“Chemical industry invests heavily in production facilities in Germany”). Available at <http://docplayer.org/14058431-Chemieindustrie-investiert-erheblich-in-produktionsanlagen.html>.

^f See <http://kronostio2.com/en/about-tio2#>.

^g Winfried Schwarz. 2005. *Emissions, Activity Data, and Emission Factors of Fluorinated Greenhouse Gases (F-Gases) in Germany 1995–2002*. Research report 201 41 261/01 UBA-FB 000811/e. Frankfurt: Öko-recherche. Available at www.umweltbundesamt.de.

^h ÖKO-RECHERCHE. 2005. *Emissionen und Emissionsprognose von H-FKW, FKW und SF₆ in Deutschland – Aktueller Stand und Entwicklung eines Systems zur jährlichen Ermittlung (Emissionsdaten bis 2003 und Emissionsprognosen für die Jahre 2010 und 2020)*, (Emissions and emission forecast of HFC, PFC and SF₆ in Germany – Current status and development of an annual assessment system (emission data up to 2003 and emission projections for 2010 and 2020)). Gutachten

im Auftrag des Umweltbundesamtes, Dessau, FKZ 202 41 356. Available at <http://www.umweltbundesamt.de/publikationen/emissionen-emissionsprognose-von-h-fkw-fkw-sf6-in>.

ⁱ ÖKO-RECHERCHE. 2015. *Implementierung der ab dem Berichtsjahr 2013 gültigen IPCC Guidelines for National Greenhouse Gas Inventories 2006 in the Inventurerhebung fluorierter Treibhausgase (HFKW, FKW, SF₆, NF₃)* (Implementation of the IPCC Guidelines for National Greenhouse Gas Inventories valid from the year of 2013 onwards in the inventory survey of fluorinated greenhouse gases (HFC, PFC, SF₆, NF₃)), Studie im Auftrag des Umweltbundesamtes, FKZ 3712 41 103 1, 2013. Available at <http://oekorecherche.de/de/implementierung-der-ab-dem-berichts-jahr-2013-gueltigen-ipcc-guidelines-national-greenhouse-gas>.

^j Dämmgen, Ulrich., U. Meyer, C. Rösemann, H. Haenel and N. Hutchings. 2013. Methane emissions from enteric fermentation as well as nitrogen and volatile solids excretions of German calves – a national approach. *Applied Agriculture Forestry Research Journal*. 2013 (63)37-46. Available at http://literatur.thuenen.de/digbib_extern/bitv/dn051734.pdf.

^k T. Leppelt, R. Dechow, S. Gebbert, A. Freibauer, A. Lohila, J. Augustin, M. Drösler, S. Fiedler, S. Glatzel, H. Höper, J. Järveoja, P. E. Lærke, M. Maljanen, Ü. Mander, P. Mäkiranta, K. Minkinen, P. Ojanen, K. Regina, and M. Strömngren. 2014. Nitrous oxide emission hotspots from organic soils in Europe. *Biogosciences Discussions*. 11, 9135–9182, 2014. Available at <http://adsabs.harvard.edu/abs/2014BGD....11.9135L>.

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^m Statistics Division of the Food and Agriculture Organization of the United Nations. 2016. Data are available at <http://www.fao.org/faostat/en/#data/GV>.

ⁿ Gärtner, Andrea. 2014. *Einfluss der Wetterverhältnisse auf das Emissionsverhalten von Kläranlagen* (Influence of weather conditions on emissions from sewage treatment plants). Available at http://www.lanuv.nrw.de/fileadmin/lanuv/luft/emissionen/pdf/110107_Kurzfassung_Klaeranlagenbericht.pdf.

^o Becker, Anne, D. Düputell, A. Gärtner, R. Hirschberger and M. Oberdörfer. 2012. *Emissionen klimarelevanter Gase aus Kläranlagen* (Greenhouse gas emissions from sewage treatment plants). Immissionsschutz. Available at <https://www.immissionsschutzdigital.de/ce/emissionen-klimarelevanter-gase-aus-kläranlagen/detail.html>.

^p Austermann-Haun, Ute and H. Witte. 2014. *Vervollständigung der Datengrundlage der Emissionsberichterstattung: CH₄-Emissionsfaktoren und CSB-Werte aus der Abwasserreinigung der relevantesten Industriebereiche*. (Completion of the data base of the emissions reporting: CH₄ emission factors and COD values from wastewater treatment the most relevant industrial sectors). Contract to the Federal Environment Agency. Available at <http://www.hs-owl.de/fb1/forschung/publikationen/publikationsdetails/news/vervollstaendigung-der-datengrundlage-der-emissionsberichterstattung-ch4-emissionsfaktoren-und-csb/4567.html>.

VI. Application of adjustments

11. The ERT has not identified the need to apply any adjustments to the 2016 annual submission of Germany.

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

12. Germany has elected commitment period accounting and therefore the issuance and cancellation of units for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol are not applicable for the 2016 review.

VIII. Questions of implementation

13. No questions of implementation were identified by the ERT during the review.

Annex I

Overview of greenhouse gas emissions and removals for Germany for submission year 2016 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

1. Tables 6–9 provide an overview of total greenhouse gas emissions and removals, as submitted by Germany.

Table 6
Total greenhouse gas emissions for Germany, Base year^a–2014^b
 (kt CO₂ eq)

	<i>Total GHG emissions excluding indirect CO₂ emissions</i>		<i>Total GHG emissions including indirect CO₂ emissions^c</i>		<i>Land-use change (Article 3.7 bis as contained in the Doha Amendment)^d</i>	<i>KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)^e</i>	<i>KP-LULUCF activities (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								–22 418.00 ^f
Base year	1 222 319.97	1 253 599.34	1 222 319.97	1 253 599.34	NA		38 468.67	
1990	1 218 549.29	1 249 828.65	1 218 549.29	1 249 828.65				
1995	1 087 884.38	1 120 943.90	1 087 884.38	1 120 943.90				
2000	1 005 342.14	1 043 294.43	1 005 342.14	1 043 294.43				
2010	924 715.25	941 038.69	924 715.25	941 038.69				
2011	906 162.92	921 829.74	906 162.92	921 829.74				
2012	911 863.16	926 338.36	911 863.16	926 338.36				
2013	930 833.71	945 150.95	930 833.71	945 150.95		–4 258.84	36 991.69	–54 371.21
2014	886 787.30	901 763.94	886 787.30	901 763.94		–4 452.74	36 833.87	–55 069.68

Abbreviations: CM = cropland management, FM = forest management, FMRL = forest management reference level, GHG = greenhouse gas, GM = grazing land management, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, RV = revegetation, WDR = wetland drainage and rewetting.

^a Base year refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs, SF₆ and NF₃. The base year for cropland management and grazing land management under Article 3, paragraph 4, of the Kyoto Protocol is 1990. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

^b Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions.

^c The Party has not reported indirect CO₂ emissions in common reporting format table 6.

^d The value reported in this column refers to 1990.

^e Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

^f Germany reported an incorrect value for the FMRL in its accounting table (see table 5, ID# KL.10). The value contained in this table is as included in the appendix to decision 2/CMP.7.

Table 7

Greenhouse gas emissions by gas for Germany, excluding land use, land-use change and forestry, 1990–2014^a(kt CO₂ eq)

	<i>CO₂^b</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	1 052 238.23	119 234.77	65 188.85	50.32	3 060.23	5 705.72	4 343.64	6.88
1995	938 148.09	104 722.35	61 135.98	2 606.07	2 085.72	5 773.25	6 467.15	5.29
2000	899 284.99	87 647.83	43 274.08	5 972.05	956.32	2 077.74	4 072.50	8.92
2010	832 259.20	58 092.17	36 952.51	9 914.69	345.37	366.27	3 047.04	61.43
2011	812 483.22	56 966.47	38 347.32	10 353.26	278.51	176.68	3 163.07	61.21
2012	817 031.44	57 647.41	37 497.49	10 547.63	242.20	182.08	3 154.89	35.21
2013	835 792.63	56 975.08	38 084.92	10 569.43	258.24	193.40	3 261.20	16.03
2014	792 902.79	55 527.86	38 780.29	10 750.37	234.23	151.95	3 396.17	20.28
Per cent change 1990–2014	–24.6	–53.4	–40.5	21 264.0	–92.3	–97.3	–21.8	194.8

^a Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.

^b Germany did not report indirect CO₂ emissions in common reporting format table 6.

Table 8
Greenhouse gas emissions by sector for Germany, 1990–2014^{a,b}
 (kt CO₂ eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1990	1 035 683.81	96 408.35	79 770.01	–31 279.36	37 966.47	NA
1995	917 311.00	97 496.38	68 139.09	–33 059.53	37 997.44	NA
2000	869 840.27	77 133.42	67 748.02	–37 952.30	28 572.72	NA
2010	801 420.48	61 965.58	63 014.53	–16 323.44	14 638.10	NA
2011	781 217.04	62 073.82	64 705.31	–15 666.82	13 833.58	NA
2012	787 897.17	61 092.44	64 240.27	–14 475.20	13 108.48	NA
2013	806 408.27	61 009.59	65 425.01	–14 317.24	12 308.08	NA
2014	762 338.40	60 989.34	66 863.21	–14 976.64	11 572.99	NA
Per cent change						
1990–2014	–26.4	–36.7	–16.2	–52.1	–69.5	NA

Abbreviations: IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry, NA = not applicable.

^a Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.

^b Germany did not report indirect CO₂ emissions in common reporting format table 6.

Table 9
Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year^{a,b} – 2014, for Germany
 (kt CO₂ eq)

	<i>Article 3.7 bis as contained in the Doha Amendment</i>			<i>Article 3.3 of the Kyoto Protocol</i>				<i>Forest management and elected Article 3.4 activities of the Kyoto Protocol</i>			
	<i>Land-use change</i>	<i>Afforestation and reforestation</i>	<i>Deforestation</i>	<i>Forest management</i>	<i>Cropland management</i>	<i>Grazing land management</i>	<i>Revegetation</i>	<i>Wetland drainage and rewetting</i>			
FMRL				-22 418.00 ^d							
Technical correction				NE							
Base year	NA				12 702.32	25 766.35	NA	NA			
2013		-6 228.31	1 969.47	-54 371.21	14 629.39	22 362.30	NA	NA			
2014		-6 449.29	1 996.54	-55 069.68	14 519.86	22 314.01	NA	NA			
Per cent change Base year– 2014					14.3	-13.4	NA	NA			

Abbreviations: FMRL = forest management reference level, NA = not applicable, NE = not estimated.

^a Base year refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs, SF₆ and NF₃. The base year for cropland management and grazing land management under Article 3, paragraph 4, of the Kyoto Protocol is 1990. For activities under Article 3, paragraph 3, of the Kyoto Protocol, and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

^b Values in this table include emissions on lands subject to natural disturbances, if applicable.

^c The value reported in this column refers to 1990.

^d Germany reported an incorrect value for the FMRL in its accounting table (see table 5, ID# KL.10). The value contained in this table is as included in the appendix to decision 2/CMP.7.

2. Table 10 provides an overview of relevant key data for Germany's reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 10

Key relevant data for Germany under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

<i>Key parameters</i>	<i>Values</i>
Periodicity of accounting	(a) Afforestation/reforestation: commitment period accounting (b) Deforestation: commitment period accounting (c) Forest management: commitment period accounting (d) Cropland management: commitment period accounting (e) Grazing land management: commitment period accounting (f) Revegetation: not elected (g) Wetland drainage and rewetting: not elected
Election of activities under Article 3, paragraph 4	Cropland management and grazing land management
Election of application of provisions for natural disturbances	No
3.5% of total base-year GHG emissions, excluding LULUCF and including indirect CO ₂ emissions	43 875.976 kt CO ₂ eq (351 007.813 kt CO ₂ eq for the duration of the commitment period)
Cancellation of AAUs, ERUs, CERs and/or issuance of RMUs in the national registry for:	
1. Afforestation and reforestation in 2014	NA
2. Deforestation in 2014	NA
3. Forest management in 2014	NA
4. Cropland management in 2014	NA
5. Grazing land management in 2014	NA
6. Revegetation in 2014	NA
7. Wetland drainage and rewetting in 2014	NA

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, ERU = emission reduction unit, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not applicable, RMU = removal unit.

Annex II

Information to be included in the compilation and accounting database

Tables 11 and 12 include the information to be included in the compilation and accounting database for Germany. Data shown are from the original annual submission of the Party, including the latest revised estimates submitted, adjustments (if applicable), as well as the final data to be included in the compilation and accounting database.

Table 11

Information to be included in the compilation and accounting database for 2014, including the commitment period reserve, for Germany

(t CO₂ eq)

	<i>Original submission</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Commitment period reserve	4 381 287 024	3 233 429 900		3 233 429 900
Annex A emissions for 2014				
CO ₂	792 858 580	792 902 788		792 902 788
CH ₄	54 752 438	55 527 863		55 527 863
N ₂ O	38 024 115	38 780 290		38 780 290
HFCs	10 750 368			10 750 368
PFCs	234 230			234 230
Unspecified mix of HFCs and PFCs	151 949			151 949
SF ₆	3 396 172			3 396 172
NF ₃	20 279			20 279
Total Annex A sources	900 188 130	901 763 939		901 763 939
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014				
3.3 Afforestation and reforestation	-6 449 287			-6 449 287
3.3 Deforestation	1 996 544			1 996 544
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014				
3.4 Forest management	-55 069 681			-55 069 681
3.4 Cropland management	14 519 856			14 519 856
3.4 Cropland management for the base year	12 702 324			12 702 324
3.4 Grazing land management	22 314 010			22 314 010
3.4 Grazing land management for the base year	25 766 347			25 766 347

Abbreviation: Annex A sources = sources included in Annex A to the Kyoto Protocol.

^a "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

^b "Final" includes revised estimates, if any, and/or adjustments, if any.

Table 12
Information to be included in the compilation and accounting database for 2013, for Germany
(t CO₂ eq)

	<i>Original submission</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Annex A emissions for 2013				
CO ₂	835 745 597	835 792 632		835 792 632
CH ₄	56 112 027	56 975 084		56 975 084
N ₂ O	37 350 654	38 084 919		38 084 919
HFCs	10 569 434			10 569 434
PFCs	258 242			258 242
Unspecified mix of HFCs and PFCs	193 404			193 404
SF ₆	3 261 202			3 261 202
NF ₃	16 030			16 030
Total Annex A sources	943 506 591	945 150 948		945 150 948
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013				
3.3 Afforestation and reforestation		-6 228 309		-6 228 309
3.3 Deforestation	1 969 467			1 969 467
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013				
3.4 Forest management		-54 371 210		-54 371 210
3.4 Cropland management	14 629 388			14 629 388
3.4 Cropland management for the base year	12 702 324			12 702 324
3.4 Grazing land management	22 362 303			22 362 303
3.4 Grazing land management for the base year	25 766 347			25 766 347

Abbreviation: Annex A sources = sources included in Annex A to the Kyoto Protocol.

^a "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

^b "Final" includes revised estimates, if any, and/or adjustments, if any.

Annex III

Additional information to support findings in table 2

Missing categories that may affect completeness

The categories for which methods are included in the Intergovernmental Panel on Climate Change 2006 *IPCC Guidelines for National Greenhouse Gas Inventories* were reported as “NE” (not estimated) or for which the expert review team otherwise determined that there may be an issue with the completeness of reporting in the Party’s inventory are the following:

- (a) Cropland remaining cropland, all pools except organic soils (see table 5, ID#s L.7 and L.8);
- (b) Carbon stock changes from woody biomass in cropland management (see table 5, ID# KL.13).

Annex IV

Documents and information used during the review

A. Reference documents

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 <http://unfccc.int/resource/webdocs/agi/2015.pdf>.

Status report of the annual inventory of Germany. Available at <http://unfccc.int/resource/docs/2016/asr/deu.pdf>.

FCCC/ARR/2014/DEU. Report on the individual review of the annual submission of Germany submitted in 2014. Available at <http://unfccc.int/resource/docs/2015/arr/deu.pdf>.

FCCC/ARR/2013/DEU. Report of the individual review of the annual submission of Germany submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/deu.pdf>.

FCCC/ARR/2012/DEU. Report of the individual review of the annual submission of Germany submitted in 2012. Available at <http://unfccc.int/resource/docs/2013/arr/deu.pdf>.

FCCC/ARR/2011/DEU. Report of the individual review of the annual submission of Germany submitted in 2011. Available at <http://unfccc.int/resource/docs/2012/arr/deu.pdf>.

FCCC/ARR/2010/DEU. Report of the individual review of the annual submission of Germany submitted in 2010. Available at <http://unfccc.int/resource/docs/2011/arr/deu.pdf>.

“Guidelines for national systems for the estimation of anthropogenic greenhouse gas emissions by sources and removals by sinks under Article 5, paragraph 1, of the Kyoto Protocol”. Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>.

“Guidelines for review under Article 8 of the Kyoto Protocol”. Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

“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”. Annex to decision 24/CP.19. Available at <http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=4>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

“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”. Annex to decision 13/CP.20. Available at <http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf#page=6>.

“Implications of the implementation of decisions 2/CMP.7 to 4/CMP.7 and 1/CMP.8 on the previous decisions on methodological issues related to the Kyoto Protocol, including those relating to Articles 5, 7 and 8 of the Kyoto Protocol, part I: implications related to

accounting and reporting and other related issues”. Decision 3/CMP.11. Available at <http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf#page=5>.

“Implications of the implementation of decisions 2/CMP.7 to 4/CMP.7 and 1/CMP.8 on the previous decisions on methodological issues related to the Kyoto Protocol, including those relating to Articles 5, 7 and 8 of the Kyoto Protocol, part II: implications related to review and adjustments and other related issues”. Decision 4/CMP.11. Available at <http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf#page=30>.

Intergovernmental Panel on Climate Change. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>.

Intergovernmental Panel on Climate Change. 2014. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. Available at <http://www.ipcc-nggip.iges.or.jp/public/kpsg>.

Intergovernmental Panel on Climate Change. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. Available at <http://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html>.

Standard independent assessment report, part 1, for Germany for 2016. Available at http://unfccc.int/files/kyoto_protocol/registry_systems/independent_assessment_reports/application/pdf/siar_2016_deu_1_2.pdf.

Standard independent assessment report, part 2, for Germany for 2016. Available at http://unfccc.int/files/kyoto_protocol/registry_systems/independent_assessment_reports/application/pdf/siar_2016_deu_2_2.pdf.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Michael Strogies (Federal Environment Agency), including additional material on the methodology and assumptions used. The following documents¹ were also provided by Germany:

Bayerisches Landesamt für Umweltschutz. 2003. *Zusammensetzung und Schadstoffgehalt von Siedlungsabfällen (Composition and pollutant content of municipal waste)*. Augsburg. Available at http://digital.bib-bvb.de/view/action/singleViewer.do?dvs=1486065527431~176&locale=en_IE&VIEWER_URL=/view/action/singleViewer.do?&DELIVERY_RULE_ID=31&frameId=1&usePid1=true&usePid2=true.

Bilitewski, B. et al. 2008: *Nutzung der Potenziale des biogenen Anteils im Abfall zur Energieerzeugung (Use of the potentials of the biogenic share in waste for energy generation)*. Institut für Abfallwirtschaft und Altlasten der Technischen Universität Dresden und INTECUS GmbH; UFO-Plan FKZ 206 33 303.

Dämmgen, Ulrich, Meyer, C. Rösemann, H.-D. Haenel, N. J. Hutchings. 2013. *Methane emissions from enteric fermentation as well as nitrogen and volatile solids excretions of German calves – a national approach*. *Landbauforsch Appl Agric Forestry Res* 1 2013(63) 37-46; DOI:10.3220/LBF_2013_37-46. Available at http://literatur.thuenen.de/digbib_extern/bitv/dn051734.pdf.

Dechow, Rene and A. Freibauer. 2011. *Assessment of German nitrous oxide emissions using empirical modelling approaches*. *Nutrient cycle Agroecosystem* (2011) 91:235-254.

¹ Reproduced as received from the Party.

- Federal Environment Agency of Austria. 2003 Rolland, C., Scheibengraf, M. Biologisch abbaubarer Kohlenstoff im Restmüll (Biodegradable carbon in residual waste). Umweltbundesamt, Berichte BE-236. Available at <http://www.umweltbundesamt.at/fileadmin/site/publikationen/BE236.pdf>.
- Federal Environment Agency of Germany. 2015. Ermittlung der Emissionsituation bei der Verwertung von Bioabfällen (Determination of the emissions situation in the recycling of biowaste). Text 39/2015. Available at <http://www.umweltbundesamt.de/publikationen/ermittlung-der-emissions-situation-bei-der>
- Federal Environment Agency of Germany. 2016. QualitätsSystem EmissionsinventareHandbuch -zur Qualitätskontrolle und Qualitätssicherung bei der Erstellung von Emissionsinventaren und der Berichterstattung unter der Klimarahmenkonvention der Vereinten Nationen sowie der EU-Verordnung 525/2013/EG (Quality System Emissions Inventory Handbook -for quality control and quality assurance in the preparation of emissions inventories and reporting under the United Nations Framework Convention on Climate Change and the EU Regulation 525/2013/EG). Version 5.
- German Cement Association. Certificate of an undertaking of a quality management system. Validity from June 2015 – June 2018.
- Grün, Emanuel, K.G Schmelz, L. Schild. 2013. Klimarelevante Emissionen des Emschersystems (Climate-relevant emissions of the Emscher system). KA Korrespondenz Abwasser, Abfall. Available at <https://www.baufachinformation.de/zeitschrift/Klimarelevante-Emissionen-des-Emschersystems/2013039008232>.
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- Juhrich, Kristina. June 2016. CO₂ Emission Factors for Fossil Fuels. Emissions Situation (section I 2.6). Federal Environment Agency.
- Kern 2001 Kern, M., Sprick, W.: Abschätzung des Potenzials an regenerativen Energieträgern im Restmüll. In: Bio- und Restabfallbehandlung (Estimation of the potential of renewable energy sources in residual waste). V. Wiemer/Kern (Hrsg.). Witzenhausen-Institut -Neues aus Forschung und Praxis. Witzenhausen.
- Kirchgessner, Manfred, Roth, F.X., Schwartz, F.J. and Stangle, G.I (2008). Tierernährung (Animal Nutrition). 12. Auflage. DLG-Verlag, Frankfurt a.M., 635 pages. Chapter 8.2. Aufzucht von Lämmern (Breeding Lambs).
- Kuratorium für Technik und Bauwesen in der Landwirtschaft. 2004. Betriebsplanung Landwirtschaft 2004/2005. Datensammlung: Daten für die Betriebsplanung in der Landwirtschaft (Data Collection: Data for farm planning in agriculture).
- Leppelt, T. *et al.* 2014. Nitrous oxide emission hotspots from organic soils in Europe, Biogeosciences Discuss., 11, 9135–9182. Available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.641.3493&rep=rep1&type=pdf>.
- Öko-Institut/ifeu: Klimaschutzpotenziale der Abfallwirtschaft am Beispiel von Siedlungsabfällen und Altholz (Climate protection potentials of waste management, an example from settlements and waste wood). Umweltbundesamt Texte 06/2010. Available at <https://www.umweltbundesamt.de/sites/default/files/medien/461/publikationen/3907.pdf>.
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Annex V

Acronyms and abbreviations

AD	activity data
AAU	assigned amount unit
BOD	biochemical oxygen demand
C	carbon
C	confidential
CER	certified emission reduction
CH ₄	methane
CM	cropland management
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
CSC	carbon stock change
DC	degradable organic component
DOC	degradable organic carbon
DOC _f	fraction of degradable organic carbon dissimilated
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU ETS	European Union Emissions Trading System
FAO	Food and Agriculture Organization of the United Nations
FM	forest management
FMRL	forest management reference level
Frac _{LEACH}	fraction of fertilizer and manure N applied to soils lost through leaching and run-off
Gg	gigagram
GHG	greenhouse gas
GM	grazing land management
ha	hectare
HFCs	hydrofluorocarbons
HWP	harvested wood products
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
kg	kilogram (1 kg = 1,000 grams)
kha	kilohectare (1 kha = 1,000 ha)
KP-LULUCF	LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
kt	kilotonne
LULUCF	land use, land-use change and forestry
MCF	methane conversion factor
MSW	municipal solid waste
Mt	million tonnes
N	nitrogen
N ₂ O	nitrous oxide
NA	not applicable
NE	not estimated

NF ₃	nitrogen trifluoride
NFI	national forest inventory
NH ₃	ammonia
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF ₆	sulphur hexafluoride
SIAR	standard independent assessment report
SOC	soil organic carbon
SRC	short rotation coppice
SWDS	solid waste disposal site
t	tonne (1 t = 1,000 kg)
UNFCCC	United Nations Framework Convention on Climate Change
WDR	wetland drainage and rewetting
