United Nations FCCC/ARR/2016/ESP

Framework Convention on Climate Change

Distr.: General
14 July 2017

English only

Report on the individual review of the annual submission of Spain 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 Spain, 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 12 to 17 September 2016 in Bonn, 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.17-10391(E)

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Contents

I. Introduction[1]

1. This report covers the review of the 2016 annual submission of Spain 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 12 to 17 September 2016 in Bonn, Germany, and was coordinated by Ms. Claudia do Valle and Mr. Roman Payo (UNFCCC secretariat). Table 1 provides information on the composition of the expert review team (ERT) that conducted the review of Spain.

Table 1
Composition of the expert review team that conducted the review of Spain

Area of expertise	*Name*	*Party*
Generalist	Mr. Newton Paciornik	Brazil
	Ms. Daniela Romano	Italy
Energy	Mr. Alexey Cherednichenko	Kazakhstan
	Mr. Hiroshi Ito	Japan
	Mr. Ole-Kenneth Nielsen	Denmark
	Mr. Shengmin Yu	China
IPPU	Ms. Niculina Mihaela Balanescu	Romania
	Mr. Julien Jabot	Norway
	Ms. Eva Krtkova	Czechia
Agriculture	Mr. Paul Duffy	Ireland
	Mr. Tomas Paulaitis	Lithuania
	Mr. Braulio Pikman	Brazil
LULUCF	Ms. Tracy Johns	United States of America
	Mr. Mattias Lundblad	Sweden
	Ms. Marina Shvangiradze	Georgia
Waste	Ms. Sumaia Elsayed	Sudan

[1] At the time of publication of this report, Spain 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.

Area of expertise	*Name*	*Party*
	Ms. Katja Pazdernik	Austria
Lead reviewers	Mr. Ole-Kenneth Nielsen	
	Mr. Newton Paciornik	

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.

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

4. Annex I shows annual greenhouse gas emissions for Spain, including totals excluding and including the land use, land-use change and forestry sector, indirect CO_2 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 Spain.

5. Information to be included in the compilation and accounting database can be found in annex II.

6. The ERT notes that Spain'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 report.

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.

[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.

Table 2
Summary of review results and general assessment of the inventory of Spain

Assessment			*Issue or problem ID# in tables 3 and/or 5*[a]
Dates of submission	Original submission: 13 June 2016 (NIR), 13 June 2016, version 2 (CRF tables), 25 May 2016 (SEF CP2 tables) Revised submissions: 2 November 2016, version 3 (CRF tables) and 26 November 2016, version 5 (CRF tables) The values from the latest submission are used in this report		
Review format	Centralized		
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:		
	1. Identification of key categories	No	
	2. Selection and use of methodologies and assumptions	Yes	E.4, A.15, W.1, W.13, KL.5
	3. Development and selection of emission factors	Yes	E.13, I.15, W.9
	4. Collection and selection of activity data	Yes	I.12, I.16
	5. Reporting of recalculations	No	
	6. Reporting of a consistent time series	Yes	I.18, W.11
	7. Reporting of uncertainties, including methodologies	No	
	8. QA/QC	QA/QC procedures were assessed in the context of the national system (see below)	
	9. Missing categories/completeness[b]	No	
	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?	The Party did not report "NE" for any insignificant categories	
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	No	E.11, I.10, W.11
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	

Assessment			*Issue or problem ID# in tables 3 and/or 5*[a]
	(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	No	
	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	Yes	KL.8
	(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	No	
	(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?	Yes	
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	The ERT accepts that the revised estimates submitted by Spain in its 2016 submission can replace previously applied adjustments 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	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-	Yes	Please refer to annex III to this

Assessment			*Issue or problem ID# in tables 3 and/or 5*[a]
in-country review	country review?		document for a list of questions and issues to be considered during this in-country review
Question of implementation	Did the ERT list a question of implementation?	No	

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction unit, CPR = commitment period reserve, CP2 = second commitment period, 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, NE = not estimated, 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 general, energy, industrial processes and product use, agriculture, LULUCF, waste and KP-LULUCF sectors 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 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 2015 annual submission described in paragraph 6 above, the latest available review report was for the review of the 2014 annual submission, published on 13 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 Spain

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
General			
G.1	Activity data (table 3, 2014) Completeness	Estimate and report emissions from all mandatory categories for LULUCF: the carbon stock changes in dead organic matter and mineral soils under forest land remaining forest land	Resolved This recommendation is linked to paragraph 70 of the 2014 annual review report (see L.3 below)
G.2	Key category analysis (15, 2014) Adherence to UNFCCC Annex I	Consider as key categories in CRF table 7 and in the key category analysis those categories identified as additional and which were identified through a qualitative assessment, as shown in the	No longer relevant The qualitative assessment is not a mandatory requirement

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	inventory reporting guidelines	NIR (section 1.5.1, pages 1.39 and 1.40)	under decision 24/CP.19
G.3	Commitment period reserve (114, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	Use the correct calculation process for the commitment period reserve	Resolved Spain has presented its commitment period reserve for the second commitment period correctly
Energy			
E.1	1. General (energy sector) – All fuels (25, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	Enhance the QA/QC procedures in order to detect and correct inconsistencies between the CRF tables and the NIR	Resolved No inconsistencies were identified during the 2016 review. According to the NIR (section 1.6), QA/QC procedures are being further developed
E.2	1. General (energy sector) – All fuels (27, 2014) Transparency*	Include the additional information provided during the review, containing disaggregated information on the EFs and plant-specific net calorific values, in the corresponding chapters of the NIR or include the address of the website where this information can be consulted	Not resolved Spain answered that the amount of information is very extensive and cannot be included in the NIR, and that no additional document with the information or website has been created. A possibility would be to include this information as an additional document to the submissions
E.3	International bunkers and multilateral operations – All fuels (31, 2014) (22, 2013) Transparency	Include information on international maritime AD and emissions, disaggregated by Selected Nomenclature for Air Pollution (better known as "SNAP") in the NIR	Resolved Disaggregated information on AD and emissions are included in the NIR (section 3.1.3, table 3.1.7)
E.4	1.A.3.a Domestic aviation – Gas, liquid – all gases (33, 2014) Comparability*	Report the emissions from military aviation in the category mobile under other (fuel combustion) and exclude them from the category civil aviation; and explain any recalculation or reallocation	Not resolved Spain informed the ERT that its inventory team is exploring options to report military aviation data under category 1.A.5, mobile. However, these data are subject to confidentiality and need to be treated accordingly. The ERT is of

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
			the view that Spain should make efforts to implement this recommendation
E.5	1.A.3.a Domestic aviation – gas, liquid – all gases (33, 2014) Transparency	Include information provided to the ERT during the review on how emissions from military aviation are distinguished from civil aviation	Resolved Information has been included in the NIR (section 3.6.1)
E.6	1.A.3.b Road transportation – liquid – all gases (34, 2014) Transparency	Provide a more transparent explanation of the allocation of fuel consumption for off-road machinery between different subcategories in the NIR	Resolved Explanation of the allocation of fuel consumption for off-road machinery is included in the NIR (section 3.7.2.1.i)
E.7	1.B Fugitive emissions from fuels – Solid – CH_4 (35, 2014), (28, 2013) (58, 2012) Accuracy	Complete the study to determine the extent of CH_4 recovery and flaring in coal mining and assess the possible impacts of these activities on the emission estimates for fugitive emissions; and review the estimates of CH_4 fugitive emissions from solid fuels to improve accuracy	Resolved Spain has provided the results of the study in the NIR (pages 3.140–3.143) and reviewed the estimates of CH_4 fugitive emissions (based on the study). See also E.14 in table 5
E.8	1.B Fugitive emissions from fuels – Solid – CH_4 (36, 2014) Transparency	Include the web link to the reference used to determine the CH_4 EFs for underground coal mining	No longer relevant Spain has not provided the web link; however, the ERT finds that this issue is no longer relevant considering that a new study covering this topic has been released (see E.7 above)
IPPU			
I.1	2. General (IPPU) – Gen (40, 2014), (33, 2013) (69, 2012), (107, 2011) Transparency*	The transparency of the reporting is limited in a number of categories owing to confidentiality reasons. In order to increase the transparency, consider providing more information in the NIR without violating confidentiality, including qualitative data	Not resolved The transparency of the reporting is still limited in a number of categories. No qualitative data have been provided for the confidential activity in the NIR. See follow-up in I.7 in table 5
I.2	2.A.1 Cement production – CO_2 (41, 2014), (37, 2013) (68, 2012)	Provide a qualitative assessment of the IEFs, and include the information on cement kiln dust provided during the review in the NIR	Not resolved The ERT considers that there is still a lack of transparency in the description of the cement industry available in

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	Transparency*		the NIR (section 4.3). See follow-up in I.8 in table 5
I.3	2.B.2 Nitric acid production – N_2O (42, 2014) Transparency	Include a qualitative assessment of the N_2O EFs in the NIR, considering that Spain used an N_2O EF of 7 kg N_2O/t nitric acid and that according to the Revised 1996 IPCC Guidelines, the default EFs for modern plants are in the range 2–9 kg N_2O/t nitric acid	Resolved No qualitative analysis was provided in the NIR. However, Spain provided in NIR section 4.7.1 information on the type of process used in the plants available. This information allowed the ERT to use a new approach for this issue. See I.15 in table 5
I.4	2.C.1 Iron and steel production – CO_2, CH_4 , N_2O (43, 2014), (42, 2013) Transparency*	Consider how the information on the coke production carbon balance and on all carbon balances related to steel-making processes can be included in the NIR without violating confidentiality	Not resolved Spain has many concerns in providing these confidential data and considers that an adequate balance between transparency and confidentiality data was provided, without impairing the principles of confidentiality. See I.7 in table 5
I.5	2.B.9 Fluorochemical production – HFCs (45, 2014) Transparency*	Clarify, in the methodological description provided in the NIR, that measured HFC-23 emissions were used for the entire time series for two of the three plants and that the IPCC default EF for HFC-23 was used for only one plant, which closed after 1991	Addressing Spain informed the ERT that the recommendation is included in its inventory improvement plan and will be implemented for the 2017 submission
I.6	2.B.9 Fluorochemical production – HFCs (45, 2014) Transparency*	Consider whether it would be possible to publish the AD and HFC-23 EFs per plant, given that production in all plants has ceased	Not resolved Spain has many concerns in providing these confidential data and will not impair the principle of confidentiality. However, considering that production has ceased, the ERT is of the view that Spain could consider whether it would be possible to publish the AD and HFC-23 EFs per plant
Agriculture			
A.1	3. General (agriculture) –	Develop a summary table providing details of the references used in developing the country-specific	Not resolved

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	Gen (51, 2014), (50, 2013) Transparency*	methodologies and parameters used for the tier 2 approaches and also provide a table in the NIR detailing the main parameters used in the tier 2 methodologies	As indicated in the NIR (chapter10, annex 10.2), this recommendation has not yet been implemented. The Spanish inventory team is currently carrying out an in-depth update of the agriculture chapter. This recommendation will be implemented once the whole update is finalized
A.2	3.A Enteric fermentation – CH_4 (53, 2014), (53, 2013) Transparency*	Incorporate in the NIR detailed explanations of the AD, assumptions, parameters and EFs used for the country-specific emission estimates to improve transparency	Not resolved Rationale as above, see A.1
A.3	3.B Manure management – Gen (55, 2014), (56, 2013) Transparency*	Provide explanatory information in relation to AWMS in the NIR and in the documentation box to CRF table 4.B(b)	Not resolved Rationale as above, see A.1
A.4	3.B Manure management – CO_2, CH_4 (56, 2014) Transparency*	Provide information with regard to the use of liquid system AWMSs for horses in Spain in the NIR	Not resolved Rationale as above, see A.1
A.5	3.B Manure management – CO_2, CH_4 (57, 2014) Transparency*	Provide information with regard to the use of liquid system AWMS for mules and asses in Spain in the NIR	Not resolved Rationale as above, see A.1
A.6	3.B Manure management – CO_2, CH_4 (58, 2014) Transparency*	Omit the AWMS “Other” from NIR table A3.2.3 to improve the transparency of the emission estimates	Not resolved Rationale as above, see A.1
A.7	3.F Field burning of agricultural residues – CH_4, N_2O (61, 2014), (62, 2013) Transparency*	Include a separate section in the NIR with complete information regarding CH_4 and N_2O emissions from field burning of agricultural residues	Not resolved Rationale as above, see A.1
A.8	3.F Field burning of agricultural residues – CH_4, N_2O (62, 2014), (62, 2013) (98, 2012)	Include references to appropriate legislation governing the field burning of agricultural residues in the NIR	Not resolved Rationale as above, see A.1

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	Transparency*		
A.9	3.C Rice cultivation – CH_4 (63, 2014), (63, 2013) Transparency*	Include a separate section in the NIR with complete information and documentation pertaining to the estimation of emissions from rice cultivation	Not resolved Rationale as above, see A.1
LULUCF			
L.1	4. General (LULUCF) Gen (67, 2014), (68, 2013) (102, 2012) Accuracy*	Explore the methods provided in chapter 5 of the IPCC good practice guidance for LULUCF in order to consider pre-1990 land uses and land-use changes in the reporting of GHG emissions/removals to improve the accuracy of the LULUCF sector inventory	Not resolved Spain informed the ERT that this issue is included in its inventory improvement plan (NIR, page 6.30) and will be included in future submissions. See follow-up in L.7 in table 5
L.2	4.A.1 Forest land remaining forest land CO_2 (68 and 69, 2014) (71, 2013) Consistency	Explore ways of reconciling the data sources and improve the time-series consistency, to avoid unusual trends in the estimates of emissions, by considering the effect of pre-1990 forest transitions	Resolved The decreasing trend from 1990 to 2009 and the increasing one from 2010 onwards do not exist in the 2016 submission
L.3	4.A.1 Forest land remaining forest land CO_2 (table 3 and 70, 2014) (72, 2013), (111, 2012) Accuracy	Estimate net carbon stock changes in dead organic matter and mineral soils in order to move to a higher-tier method for the estimation of emissions from those pools under this key category and/or provide justification for the method used for the estimates	Resolved Spain has provided sufficient information in its NIR, specifically in chapter 6, sections 6.2.4.1.2 and 6.2.4.1.3, and in annex 3, sections 3.3.11 and 3.3.12, to demonstrate that these categories may be assumed to be in balance
L.4	4.A.1 Forest land remaining forest land CO_2 (71, 2014), (74, 2013) (107, 2012) Transparency	Include information to clarify the country-specific BEF values in the NIR	Resolved Spain has included this information in its NIR (annex A.3.3.1, page A.3.21)
L.5	4.A.2 Land converted to forest land – CO_2 (74, 2014) Transparency	Include information on the source of information used to estimate the annual variation for the land area converted to forest land, particularly for those resulting from afforestation and reforestation carried out before 1990	Resolved Spain has included this information in its NIR (section 6.1.2, page 6.6, and footnote 12)
L.6	4.E.2 Land converted to settlements – CO_2	Include the methodology used to obtain data on surface transitions from land to settlements in the	Resolved Spain has included this

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	(78, 2014) Transparency	NIR	information in its NIR (annex 6.2, page 6.108)
Waste			
W.1	5.A Solid waste disposal on land – CH_4 (84, 2014), (91, 2013) Accuracy*	Improve the accuracy of the emission estimates by using more country-specific parameters on degradable organic carbon, methane conversion factor and methane generation rate constant (k)	Not resolved Spain continues to apply default parameters, and informed the ERT that possible ways of improving the emission estimates are under assessment by its inventory team. See W.8 in table 5
W.2	5.A Solid waste disposal on land – CH_4 (86, 2014), (93, 2013) Transparency	Include in the NIR information on management practices for recycling and composting, including the method and parameters used for data collection to estimate the amount of waste entering the composting process	Resolved Spain included basic information on waste management in Spain in section 7.1 of its NIR as well as information on composted amounts and methodological issues (including data sources) in section 7.3.1.1
W.3	5.A Solid waste disposal on land – CH_4 (87, 2014), (96, 2013) Accuracy*	Continue the efforts to reduce the uncertainties of the AD and EFs	Addressing Spain plans to continue its efforts to reduce the uncertainty of its estimates by using more country-specific factors (NIR, section 7.2.6)
W.4	5.D Wastewater treatment and discharge – CH_4 (89, 2014), (98, 2013) Transparency*	Provide information in the NIR on the QA/QC procedures applied to ensure the quality of information, including information on how EFs are obtained and on population covered by different treatment systems applied to both wastewater and sludge	Addressing Spain reports on basic QA/QC procedures in NIR section 7.4.4, but QA/QC activities should be enhanced and more clearly described
W.5	5.E Other (waste) – CH_4 (90, 2014) Transparency	Enhance the transparency of the reporting regarding the fractions of sludge and the treatment pathways by including the information on the amounts of sludge generated and their destination (e.g. incineration, landfill, agricultural and other uses) for the entire time series (1990–2012) in the NIR	Resolved Table 7.5.7 in section 7.5.2.1 of the NIR shows the information on treatment paths of sludge over the whole time series
KP-LULUCF			
KL.1	Cropland management CO_2	Include the documented expert judgement on the assumption that all woody crops were under	Resolved Information on the expert

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	(101, 2014) Transparency	"conventional tillage" in 1990	judgement has been included in the 2016 NIR (annex 8)
KL.2	Cropland management CO_2 (105, 2014) Transparency	Include in the NIR the information provided during the review on the expert judgement applied to the estimation of net emissions/removals for the carbon stock changes in mineral soils for all woody crops for cropland management for 1990	Resolved Information has been included in the 2016 NIR (annex 8)

Abbreviations: AD = activity data, AWMS = animal waste management system, BEF = biomass expansion factor, CRF = common reporting format, EF = emission factor, ERT = expert review team, GHG = greenhouse gas, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance for LULUCF = *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, 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, NIR = national inventory report, QA/QC = quality assurance/quality control, Revised 1996 IPCC Guidelines = *Revised 1996 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 Spain, and have not been addressed by the Party.

Table 4
Issues identified in three successive reviews and not addressed by Spain

ID#[a]	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[b]
General		
	No such general issues were identified	
Energy		
	No such issues for the energy sector were identified	
IPPU		
I.1	The transparency of the reporting is limited in a number of categories owing to confidentiality reasons. In order to increase the transparency, consider providing more	5 (2011–2015/2016)

ID#[a]	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[b]
	information in the NIR without violating confidentiality, including qualitative data	
I.2	Provide a qualitative assessment of the IEFs and include the information on cement kiln dust in the NIR	4 (2012–2015/2016)
I.4	Consider how the information on the coke production carbon balance and on all carbon balances related to steel-making processes can be included in the NIR without violating confidentiality	3 (2013–2015/2016)
Agriculture		
A.1	Develop a summary table providing details of the references used in developing the country-specific methodologies and parameters used for the tier 2 approaches and also provide a table in the NIR detailing the main parameters used in the tier 2 methodologies	3 (2013–2015/2016)
A.2	Incorporate in the NIR detailed explanations of the AD, assumptions, parameters and EFs used for the country-specific emission estimates to improve transparency	3 (2013–2015/2016)
A.3	Provide explanatory information in relation to AWMS in the NIR and in the documentation box to CRF table 4.B(b)	3 (2013–2015/2016)
A.7	Include a separate section in the NIR with complete information regarding CH_4 and N_2O emissions from field burning of agricultural residues	3 (2013–2015/2016)
A.8	Include references to appropriate legislation governing the field burning of agricultural residues in the NIR	4 (2012–2015/2016)
A.9	Include a separate section in the NIR with complete information and documentation pertaining to the estimation of emissions from rice cultivation	3 (2013–2015/2016)
LULUCF		
L.1*	Explore the methods provided in chapter 5 of the IPCC good practice guidance for LULUCF in order to consider pre-1990 land uses and land-use changes in the reporting of GHG emissions/removals to improve the accuracy of the LULUCF sector inventory	3 (2013–2015/2016)
Waste		
W.1*	Improve the accuracy of the emission estimates by using more country-specific parameters on degradable organic carbon, methane conversion factor and methane generation rate constant (k)	3 (2013–2015/2016)
W.3*	Continue the efforts to reduce the uncertainties of the AD and EFs	3 (2013–2015/2016)
W.4	Provide information in the NIR on the QA/QC procedures	3 (2013–2015/2016)

ID#[a]	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[b]
	applied to ensure the quality of information, including information on how EFs are obtained and on population covered by different treatment systems applied to both wastewater and sludge	
KP-LULUCF		
	No such issues for KP-LULUCF activities were identified	

Abbreviations: AD = activity data, AWMS = animal waste management system, CRF = common reporting format, EF = emission factor, GHG = greenhouse gas, IEF = implied emission factor, IPCC good practice guidance for LULUCF = *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, 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, NIR = national inventory report, QA/QC = quality assurance/quality control.

[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 Spain, 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 Spain 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 Spain

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*
General			
G.4	Follow-up to previous reviews	The ERT noted that Spain has addressed some of the recommendations of the previous reviews and provided additional information in the NIR that has improved the transparency in the description and the information for some relevant sectors/categories in its submission (e.g. in the LULUCF sector on matrices of changes in land use on surface transition from land to settlements, in the IPPU sector related to the iron and steel category and to a lesser extent in the waste sector on solid waste disposal on the management practices for recycling, composting, etc.). However, there are still areas where improvement is necessary. See sectoral issues on transparency in table 3 (not resolved or addressing) and in this table 5 Therefore, the ERT recommends that Spain continue to address the transparency issue identified in the previous and current annual review report and provide information on the implementation of the recommendations on transparency in the NIR	Yes. Transparency*
G.5	Inventory planning	The ERT has identified that for a number of categories, the implementation of the use of the 2006 IPCC Guidelines was not complete (see G.6, E.13, I.15, W.9 and W.13 below) The ERT recommends that Spain fully implement the 2006 IPCC Guidelines for all sectors of the inventory in a consistent manner and report on the progress made in the NIR	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
G.6	Key category analysis	The ERT noted that the level of disaggregation to assess key categories used by Spain mostly corresponds to the IPCC good practice guidance and the IPCC good practice guidance for LULUCF, with some national consideration to identify other relevant country specificities. The level of disaggregation does not always correspond to that in the 2006 IPCC Guidelines. Following a request by the ERT, Spain explained that a comparison analysis was made with the suggested aggregation level of the 2006 IPCC Guidelines and variations are limited to fluorinated gases and new categories. The ERT encourages Spain to be in line with the disaggregation reported in table 4.1 of the 2006 IPCC Guidelines (volume 1, page 4.8), and recommends that it provide justification on the level of category disaggregation used and the rationale for its use if any deviation from the suggested level occurs	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*
G.7	Key category analysis	For some categories of the Spanish inventory, the uncertainty figures are very high. Responding to a question raised by the ERT, Spain indicated the formula used to estimate the uncertainty for EFs The ERT acknowledges the approach followed but encourages Spain to pay attention to the results of the key category analysis using approach 2. Whenever the uncertainty level of a category is very high, the category itself may become key, following approach 2, and a more accurate method, as well as evaluation of uncertainty, would be requested (e.g. N_2O emissions from wastewater treatment)	Not an issue
G.8	National registry	The ERT notes that the national registry complies with the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. No recommendations were identified from the SIAR	Not an issue
Energy			
E.9	1.A.1.a Public electricity and heat production – solid fuels, gaseous fuels, biomass – CO_2, CH_4 and N_2O	During the review, the ERT noted that Spain reported "NE" for AD and emissions under the information item "waste incineration with energy recovery" in CRF table 1.A(a)s4; and the memo box indicates that the estimation of these items is currently being assessed by the inventory team and planned to be implemented in future submissions. In section 7.5.1.2.b, the Party reported AD from waste incineration plants (table 7.5.3) and informed the ERT that after 2004 all incineration plants are recovering energy and that emissions are reported under category 1.A.1a In response to a question raised by the ERT, Spain explained that waste biogenic and non-biogenic fractions are burned simultaneously in the incineration plants in Spain. The fossil part factor is specific for each facility and year and the Party made calculations based on the gross composition of the incinerated waste declared by the plants in their individualized questionnaires. In those cases where these data are not available, a mean value of 297 kg of fossil CO_2/tonne of waste has been taken. As can be observed in table 7.5.4 of the NIR, values of 33% for carbon of fossil origin and 67% of biogenic origin are obtained, allowing the determination of the global CO_2 EF as 900 kg (fossil+ biogenic) per tonne of waste. Nevertheless, the inventory team is carrying out efforts to provide values under this information item instead of using the notation key "NE" The ERT encourages Spain to continue its work to increase completeness and present the progress in the next submission	Not an issue
E.10	1.A.2 Manufacturing industries and	The ERT noted that in its NIR (table 3.5.6), Spain presented information about the decrease in consumption of LPG. In 2013, LPG consumption decreased by 72% (from 280 TJ to 79 TJ) and then	Yes. Adherence to UNFCCC Annex I

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*
	construction – liquid fuels – CO_2, CH_4 and N_2O	doubled in 2014 (to 136 TJ). In response to a request of the ERT to provide information on the trends and the underlying drivers, Spain stated that NIR table 3.5.6 is incorrect and will be corrected in the next submission The ERT recommends that Spain improve its QA/QC procedures and include in its next NIR the correct information in table 3.5.6	inventory reporting guidelines
E.11	1.A.3.a Domestic aviation – liquid fuels – CO_2, CH_4 and N_2O	During the review, the ERT noted that the consumption of aviation gasoline was identical for several years (e.g. 1997, 1999, 2000, 2004, 2005, 2006 and 2009 all contain the same amount of 433.6 TJ) and that no explanation for this is provided in the NIR. In response to a question raised by the ERT, Spain explained that the fuel consumption is tallied against the marginal consumption (sales) of aviation gasoline published in the official national energy statistics as included in the annual oil statistics of the International Energy Agency and elaborated on by the Spanish Ministry of Energy and Industry. The values taken from the annual oil statistics are rather low all along the time series. For the years mentioned above, the value provided for aviation gasoline consumption was 10 ktoe and therefore the number remains constant in the CRF tables In order to increase transparency with regard to time-series consistency, the ERT recommends that Spain include a qualitative assessment of aviation gasoline consumption in the NIR	Yes. Transparency*
E.12	1.A.3.b Road transportation – gaseous fuels – CO_2, CH_4 and N_2O	During the review, the ERT noted that Spain presented information in the CRF tables on gas fuel consumption based on linear progression from 2005 to 2014 instead of official statistical data. In response to a question raised by the ERT, Spain explained that gas used for transport started in 1996 and the first official available data of gas consumption were provided for 2006. Fuel consumption from 1997 to 2005 was estimated using a linear interpolation In order to increase transparency with regard to time-series consistency, the ERT recommends that Spain provide information on the applied assumption and estimates for gas consumption in road transportation for the 1997–2005 period in the NIR	Yes. Transparency*
E.13	1.A.4 Other sectors – gaseous, solid, liquid fuels – CO_2	The ERT noted that Spain used CO_2 default EFs from the IPCC good practice guidance, instead of updating methodology according to the 2006 IPCC Guidelines for the categories 1.A.4.a (commercial/institutional), 1.A.4.b (residential) and 1.A.4.c (agriculture/forestry/fishing) In response to a question raised by the ERT during the review, Spain replied that CH_4 and N_2O EFs have been updated in category 1.A.4, but the default CO_2 EFs currently applied in the Spanish	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*
		inventory will be reviewed and updated following the 2006 IPCC Guidelines in the next submission The ERT recommends that Spain continue its work on implementing the 2006 IPCC Guidelines by applying the default CO_2 EF for the sector and report transparently on the recalculations in the next NIR	
E.14	1.B Fugitive emissions from fuels – gaseous fuels – CO_2	In the previous review report (see E.7 in table 3), Spain was recommended to complete a study to determine the extent of CH_4 recovery and flaring in coal mining, and to assess the possible impacts of these activities on the emission estimates for fugitive emissions. This recommendation was made because Spain has considered that all of the CH_4 released from mining activities was emitted, given that no information was available regarding the installation of recovery systems in underground mining or on the amount of CH_4 recovered to be used later for energy or flaring. During the 2015/2016 review cycle, Spain presented the results of the study in the NIR (section 3.10.2.1, page 3.143), and in CRF table the Party continues to report as "NO". The ERT considers that it is still missing a transparent explanation on how CH_4 recovery and flaring is treated in the study and in the estimates of fugitive emissions The ERT recommends that Spain explain more clearly the results of the study related to CH_4 recovery and flaring and how CH_4 recovery and flaring is treated in the estimates of fugitive emissions. The ERT also recommends that Spain either provide a web link or submit the aforementioned study as an additional file to the next submission	Yes. Transparency*
E.15	1.B.2.c Venting and flaring – liquid fuels – CO_2	During the review, the ERT noted that Spain still uses the methodology from the IPCC good practice guidance rather than the 2006 IPCC Guidelines for estimating emissions from oil flaring In response to a question raised by the ERT, Spain explained that as stated, in the NIR (section 3.12.2.1.f), CO_2 emissions from oil flaring are calculated by combining two procedures: measured data provided by the refineries through individualized questionnaires; and default emission factors when information is not available. An EF from the EMEP/CORINAIR guidebook[c] (specifically from table 2, section 8, in chapter 9.2.3) has been applied in Spain's 2016 submission. This approach is considered as a tier 1 method according to the IPCC good practice guidance, as stated in the NIR. Implementation of the 2006 IPCC Guidelines in this concrete subcategory has been considered as not possible as table 4.2.4. in chapter 4 (Fugitive emissions) in the 2006 IPCC Guidelines does not provide a default emission factor for CO_2 emissions from oil refining ("ND" notation is indicated). Therefore, the Spanish inventory team considers the EMEP EFs as the best option in order to estimate	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*
		CO_2 emissions from oil flaring	
		The ERT recommends that Spain provide more information in the NIR on the methodology for estimating fugitive emissions for this category and to include in the next submission an overview of the methodologies used, including references for all subcategories within fugitive emissions from oil and gas	
E.16	1.B.2.c Venting and flaring – gaseous fuels – CO_2	During the review, the ERT noted that the CO_2 IEF for gas flaring in the 2016 submission increased by approximately 50% (from 56 151 t CO_2/unit in 2013 to 81 597 t CO_2/unit in 2014) and that the Party has not provide an explanation in the NIR	Yes. Accuracy*
		In response to a question raised by the ERT, Spain explained that it was an error in the estimations. For 2014, AD from one of the data suppliers were wrongly used. In CRF category 1.B.2.c.2.ii (gas flaring), new AD for 2014 are 5.68 PJ gas consumption, and the corrected emissions for 2014 are 319.33 kt CO_2 (instead of 427.75 kt CO_2 as erroneously reported). The corrected IEF is 56.19 kt/PJ, consistent with the rest of the IEFs in this category time series	
		The ERT recommends that Spain enhance its QA/QC and correct the calculations related to the CO_2 IEF for gas flaring in its next NIR	
IPPU			
I.7	IPPU general – CO_2, CH_4 and N_2O	The transparency of the reporting is limited in a number of categories, as mentioned in the previous review report (see I.1 and I.4 in table 3). In the 2016 submission, the ERT noted transparency issues related to carbide production, caprolactam production, soda ash production, petrochemical and carbon black production, pig iron production, sinter production and aluminium production, as the AD and/or EFs were not included in the NIR or in the CRF tables for confidentiality reasons	Yes. Transparency*
		The ERT commends Spain for having provided all confidential data to the ERT during the review process. Nevertheless, in order to increase the transparency of the NIR, the ERT, being aware of findings in I.1 and I.4, recommends that Spain provide more information on AD in the NIR without violating confidentiality, by providing AD in 100 base indexed on 1990 or presenting AD trends as graphics without any number, which might be a suitable compromise that would improve the transparency of the report	
I.8	2.A.1 Cement	The ERT noted that Spain estimates CO_2 emissions using plant-specific EFs provided annually by	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*
	production – CO_2	the plant, and that CKD has been taken into account in the estimations of the CO_2 EFs. However, no information has been provided in the NIR (section 4.3) on the methodology used by the plants to estimate the CO_2 EFs. During the review, Spain provided the ERT with two additional documents,[d] with all the necessary information about the methodology used by the plants to estimate the CO_2 EFs, including the CKD parameter The ERT recommends that Spain improve the transparency of its reporting by including a full description of the methodology used to estimate the CO_2 emissions from cement production in its next submission	
I.9	2.A.1 Cement production – CO_2	The ERT noted that in the NIR (section 4.3) Spain reported QC only for clinker production in the QC and verification section of the cement production chapter. During the review, Spain provided the ERT with a detailed description of the QA/QC procedures implemented in the inventory of CO_2 emissions from cement production. According to this information, the ERT confirms that the methodology used by the plants to estimate CO_2 emissions is consistent with the 2006 IPCC Guidelines and that accurate QA/QC procedures are implemented in the sector The ERT commends the Party for the explanation and recommends that Spain complete the description of the QA/QC procedures in the NIR with the provided information about QA/QC procedures	Yes. Transparency*
I.10	2.A.2 Lime production– CO_2	The ERT noted that in CRF table 2(I).A-Hs1 the IEF for CO_2 emissions for the year 2011 is the lowest of the time series. It amounts to a value of 0.69 t CO_2/t lime produced, while for the other years, the IEF values range between 0.71 and 0.75 t CO_2/t lime produced, with an average IEF of 0.72 t CO_2/t lime produced for the period 1990–2014 In response to a question raised by the ERT, Spain explained that variations of the IEFs in the years 2010 and 2011 are related to changes in the production of *cal viva* (lime) of some of the installations of the sector during the hardest years of the economic downturn in Spain. In particular, according to ANCADE[e] data in 2011, 4 plants out of the 21 produced lime with lower purity levels (65–75%), generating lower levels of emissions (not all raw products were decarbonized completely), therefore forcing the IEFs to decrease The ERT commends Spain for the explanation provided during the review and recommends that the Party include information on the lower CO_2 IEF for lime production in 2011 in its next NIR	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*
I.11	2.A.3 Glass production – CO_2 2.C.5 Lead production – CO_2	The ERT noted that the numbers reported in CRF table 2(I).A-Hs1 (for category 2.A.3) and CRF table 2(I).A-Hs2 (for category 2.C.5) in the 2016 submission for glass production and lead production have been divided by 1 000 and the IEFs have been multiplied by 1 000 for the whole period In response to a request made by the ERT, Spain explained that the glass production and lead production values have been reported in the aforementioned CRF tables in megatonnes instead of kilotonnes in the 2016 submission as requested by the CRF reporter but emission estimates are correctly reported The ERT recommends that Spain improve its QA/QC procedures and correct the reported values in CRF tables 2(I).A-Hs1 and 2(I).A-Hs2 in its next submission	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
I.12	2.A.4 Other process uses of carbonates – CO_2	The ERT noted that in the 2016 submission the IEF for CO_2 emissions strongly decreases during the period 1990–2014 (–85%). During the review, Spain explained that category 2.A.4.a includes CO_2 emissions from the use of carbonates in the production of ceramic tiles, as well as in the production of bricks and clay roof tiles. The AD used to estimate CO_2 emissions for ceramic tiles production are the surface of tiles produced, which is expressed in mass units using a conversion factor. However, the AD for bricks and clay roof tiles are the total amount of carbonates used; this quantity cannot currently be expressed in terms of mass of bricks and roof tiles produced. For this reason, only the mass of ceramic tiles produced is reported as AD in the CRF Reporter, while emissions reported include those from the production of ceramic tiles, as well as the production of bricks and roof tiles. This is the cause of the variation of the IEF The ERT recommends that the Party include the detailed description and justification of the trends in AD and the IEF. The ERT also encourages Spain to include bricks and clay roof tiles production in the reported AD	Yes. Consistency*
I.13	2.A.4 Other process uses of carbonates – CO_2	The ERT noted that for the category 2.A.4.b (other uses of soda ash), the trend of CO_2 emissions includes several sharp increases and decreases, while the trend of the AD (soda ash used) is stable, leading to increases and decreases in the IEF trend. In addition, the ERT also noted that Spain specifies in its 2016 NIR (page 4.74) that a CO_2 EF extracted from the 2006 IPCC Guidelines has been used (415 kg CO_2/t carbonate) In response to a question raised by the ERT, Spain explained that AD reported under category 2.A.4.b in CRF table 2(I).A-Hs1 include not only the subcategory “other uses of soda ash” but also	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines

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 use of soda ash in glass production. However emissions are correctly reported and correspond only to "other uses of soda ash"	
		The ERT recommends that Spain improve its QA/QC procedures and correct the data on consumption of soda ash for other uses in CRF table 2(I).A-Hs1	
I.14	2.B.2 Nitric acid production – N_2O	Spain reported emissions of N_2O in units of Gg CO_2 eq in tables 4.7.1 and 4.7.2 of the NIR (section 4.7.1). Nevertheless, the ERT noted that emission values are different (e.g. for 1990: 9 032 Gg CO_2 eq reported in table 4.7.1 and 2 692 Gg CO_2 eq reported in table 4.7.2). During the review, Spain explained that an error was made in the units presented in table 4.7.1 and that it will be corrected in the next submission	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
		The ERT recommends that Spain correct the units presented in NIR table 4.7.1 in its next submission	
I.15	2.B.2 Nitric acid production – N_2O	Spain reported in its NIR (section 4.7.2) that a country-specific EF of 7 kg N_2O/t nitric acid has been used to estimate N_2O emissions from the plants that were decommissioned. Upon a request of the ERT, Spain explained that before the 2010 inventory submission (period 1990–2008), the best national EF available was 7 kg N_2O/t nitric acid, which had been provided by FEIQUE. From the 2010 submission onward, direct emission data from plants started to be provided, enabling a plant- and process-specific EF to be obtained for 2008 for some plants. Such specific EFs were applied for the period 1990–2006 for the corresponding plants. However, for those plants no longer existing in 2008, the EF of 7 kg N_2O/t nitric acid remained unchanged	Yes. Accuracy*
		The ERT noted that, as stated in the NIR (page 4.55, section 4.7.1), production of nitric acid is available per type of process for the whole period (1990–2014). According to the 2006 IPCC Guidelines (chapter 3, page 3.23), an EF of 7 kg N_2O/t nitric acid should be applied only to medium pressure plants. During the review, as requested by the ERT, Spain provided a comparative analysis of N_2O emissions applying the FEIQUE EFs and the default EFs of the 2006 IPCC Guidelines. The comparison showed an underestimation of N_2O emissions for the period 1990–2006	
		The sector is a key category regarding trend and level of N_2O emissions in 1990. Therefore, to avoid underestimation of emissions, the ERT recommends that Spain use the N_2O default process-specific EFs available in the 2006 IPCC Guidelines to estimate N_2O emissions from nitric acid production for the period 1990–2006	

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*
I.16	2.B.4 Caprolactam, glyoxal and glyoxylic acid production – N_2O	Spain reported in the NIR (page 4.76) that for the period 1990–2000, N_2O emissions from the production of caprolactam were estimated with an extrapolation of the AD for the period 2000–2013, using GDP as a driver. However, no justification of the choice of the driver was provided in the NIR. In response to a question raised by the ERT, Spain explained that a correlation analysis was carried out between data on caprolactam production and some representative indicators: GDP, indices of industrial production and indices of industrial production for the chemical industry for the years 2000–2013. The assessment showed the higher correlation between caprolactam production and GDP	Yes. Transparency*
		The ERT commends Spain for the explanation provided and recommends that the Party include in its next NIR the correlation analysis and the justification of the choice of the driver for the N_2O emissions from production of caprolactam	
I.17	2.B.6 Titanium dioxide production – CO_2	The ERT noted that in the NIR, section 4.11.6 (page 4.77), that a default EF from the 2006 IPCC Guidelines (1.43 kg CO_2/t TiO_2) has been used for the calculation of the CO_2 emissions (for the entire time-series) but in CRF table 2(I).A-Hs1, the Party reported an IEF of 1.34 t CO_2/t TiO_2. In response, Spain explained that in relation to the EF, the value reported in the NIR is a typographical error and that the value reported in the CRF table is correct	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
		The ERT recommends that Spain improve its QA/QC procedures and report the correct CO_2 EF in its next NIR	
I.18	2.B.9 Fluorochemical production – HFCs	The ERT noted that for category 2.B.9.A, (by-product emissions), the emissions of HFC-23 as a by-product of the manufacture of HFC-22 have been estimated using different methods between 1990 and 1998 and after 1998 (see NIR, page 4.59). The ERT also noted that HFC-23 emissions increased from 1993 to 2000 (from 2 856.4 to 7 997.92 t CO_2 eq), with a decrease observed for the year 1998 (6 423.20 t CO_2 eq)	Yes. Transparency*
		During the review, the Party provided the ERT with detailed information about EFs and AD for the three plants that produced HFC-22 in Spain. Analysing the information and documents provided, the ERT noted that the methodology used to estimate HFC-23 emissions is not consistent with the methodology described in the NIR. The ERT also noted that in the data provided, most of the HFC-23 emissions were emitted by one single plant (named plant 1), which was clearly responsible for the trend between 1997 and 1999 and the outlier observed in 1998. While the IEF does not change significantly in 1998 compared with the period 1990 to 1997, it has been reduced by 20% between	

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*
		1997 and 1998 and has increased by 29% between 1998 and 1999. During the review process, Spain explained that the plant changed ownership in 1996 and that the anomaly of 1998 with a low emission ratio may be due to the implementation of new production systems in the plant Therefore, the ERT recommends that Spain provide the necessary explanations on the time-series consistency in the NIR	
I.19	2.C.2 Ferroalloys production – CO_2	The ERT noted that in the 2016 submission, the production of ferroalloys between 2012 (338.79 kt) and 2014 (406.03 kt) increased by 19.8%, leading to a decrease in the CO_2 IEF of 16.9% In response to a question raised by the ERT Spain explained that emission estimates are based on a carbon balance taking into account all the input and output products containing carbon. Data are provided directly by the only company operating in Spain. The decrease observed in the CO_2 IEF is mainly due to the change in the share of the production of ferrosilicon between the two plants producing this type of ferroalloy in Spain. The plant which produces ferrosilicon with a greater carbon content has increased its share in the total production between 2012 and 2014. This leads to an increase in the carbon output in the form of ferrosilicon in this plant, resulting in a decrease in the overall CO_2 IEF of this type of ferroalloy. The second reason for this decrease is the greater proportion of wood as a carbon input in the balance, leading to biogenic CO_2, which is not included in the emissions reported The ERT commends Spain for the explanation and recommends that the Party include the detailed descriptions and justification of emission trends in its next NIR	Yes. Transparency*
I.20	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2	The ERT noted that in CRF table 1.A(d) (Feedstock, reductants and other energy use of fuels), under column J, "Reported under: select category (ies) from the category tree", consumption of bitumen for non-energy use in the period 1990–2009 was reported under the petrochemical sector and in the production of carbon black; and in the period 2010–2014 under mineral industry. However, no information about bitumen consumption in those sectors was provided in the NIR. During the review, Spain confirmed to the ERT that this is an error in the reporting, and that the inventory team considers that the notation key "NA" should apply for the entire time series, for both the "CO_2 emissions (column I)" and the "Reported under (column J)" field in CRF table 1A(d). Despite the occurrence of bitumen consumption, CO_2 emissions are considered negligible according to the 2006 IPCC Guidelines The ERT commends Spain for the explanation and recommends that the Party correct the reported	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines

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*
		value in CRF table 1.A(d) in accordance with paragraph 37(c) of the UNFCCC Annex I inventory reporting guidelines	
Agriculture			
A.10	3. General (agriculture) – CO_2, CH_4 and N_2O	The ERT notes that the agriculture chapter of the NIR lacks much of the information needed by the ERT to conduct a proper assessment of the inventory submission. In particular, the NIR does not present descriptions, references and sources of information for the specific methodologies, including higher-tier methods and models, assumptions, EFs and AD, as well as the rationale for their selection as required by the UNFCCC Annex I inventory reporting guidelines	Yes. Transparency*
		In response to a question raised during the review, Spain informed the ERT that it has begun an in-depth review of the whole agriculture sector and this review is taking longer than expected. Spain noted that the inventory team expected to complete this review process before the end of 2016 and to include a complete and coherent agriculture chapter in 2017	
		The ERT recommends that Spain update the agriculture chapter in the NIR and its annexes and include all of the necessary methodological information required in accordance with the UNFCCC Annex I inventory reporting guidelines (para. 50), following the NIR outline described in its appendix	
A.11	3.B Manure management – CH_4 and N_2O	During the review, the ERT noted that the MCFs used for the different MMS were not transparently presented in CRF table 3.B(a)s2 and that the MCF values presented in annex 3.2, table A.3.2.4, appear to be from the IPCC good practice guidance. In response to a question raised during the review, Spain informed the ERT that for tier 2 animal species, a series of concatenated MMS is used, which means that the MCFs cannot be directly estimated. Spain also informed the ERT that it still uses MCF values from the IPCC good practice guidance and does not properly incorporate the 2006 IPCC Guidelines. Spain further informed the ERT that the Spanish inventory team made an assessment during a European Union review of the effect on CH_4 emissions from using the MCF values provided in the IPCC good practice guidance instead of the 2006 IPCC Guidelines and that this leads to an overestimate of emissions	Yes. Transparency*
		In response to the list of potential problems and further questions raised by the ERT during the review, Spain provided revised estimates of CH_4 emissions from manure management for all animal categories estimated using MCF values from the 2006 IPCC Guidelines applied to the MMS in Spain's 50 provinces according to average temperatures in the two climatic regions (cool and	

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
		temperate) for each year in the period 1990–2014. The choice of B_0 and MMS usage were based on tables 10A-4 to 10A-9 of the 2006 IPCC Guidelines for dairy cattle, non-dairy cattle and swine for the Western Europe region. MMS usage for other animal categories remained as in the original submission	
		The revised estimates reduced CH_4 emissions from this category by 1 139.0 kt CO_2 eq in 1990 (–18%). The ERT considers that the potential overestimation has been resolved	
		To be fully consistent with the revision to CH_4 emissions from manure management, Spain also provided revised estimates of direct and indirect N_2O emissions from manure management. Direct N_2O emissions were estimated according to equation 10.25 of the 2006 IPCC Guidelines and the default EF_3 provided in table 10.21. Indirect N_2O emissions, volatilization and leaching from manure management were estimated using equations 10.27 and 10.29 and the default values of nitrogen loss due to volatilization and 1% for the ratio of nitrogen loss from solid and liquid MMS due to leaching provided in table 10.22. The revised estimates increased N_2O emissions from this category by 71.4 kt CO_2 eq in 1990 (4% increase)	
		The ERT agrees with the estimation method presented and recommends that Spain update the NIR accordingly in the next submission	
A.12	3.D.a.2.a Animal manure applied to soils – N_2O	During the review, the ERT noted that the amount of nitrogen input from animal manure applied to soils (284 070 513.93 kg N/year) as reported under this category is higher than the total amount of nitrogen excretion from MMS (198 789 220.66 kg N/year) as reported under category 3.B(b) (N_2O emissions from manure management), taking into account the nitrogen reported under category 3.B.5 (Indirect N_2O)	Yes. Transparency*
		In response to a question raised during the review, Spain notified the ERT that there is an error in the reported amount of nitrogen under animal manure applied to soils, leading to an overestimation of N_2O emissions. In response to the list of potential problems and further questions raised by the ERT during the review, Spain provided revised estimates of N_2O emissions from animal manure applied to soils. It revised the amount of nitrogen available for application to managed soils using equation 10.34 from the 2006 IPCC Guidelines, ensuring that the nitrogen amount reported is fully consistent with the nitrogen amounts in MMS (see also A.14 below)	
		The revised estimates reduced N_2O emissions from this category by –10.5 kt CO_2 eq in 1990 (–0.8%). The ERT considers that the potential overestimation has been resolved and recommends	

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		that Spain update the NIR accordingly in the next submission	
A.13	3.D.a.3 Urine and dung deposited by grazing animals – N_2O	During the review, the ERT noted that the EF_3 for this category is reported in CRF table 3.D as 0.02004 kg-N_2O-N in 1990. The EF_3 in the 2006 IPCC Guidelines for PRP/CPP is 0.02 kg-N_2O-N and for PRP/SO is 0.01 kg-N_2O-N. The ERT notes that Spain reports nitrogen excretion in CRF table 3.B(b) for sheep and other livestock on pasture, range and paddock MMS. In response to a question raised during the review, Spain informed the ERT that it used the EF_3 for PRP/CPP of 0.02 kg-N_2O-N for sheep and other livestock instead of the lower EF_3, PRP/SO of 0.01 kg-N_2O-N, leading to an overestimation of N_2O emissions. In response to the list of potential problems and further questions raised by the ERT during the review, Spain provided revised estimates of direct N_2O emissions from urine and dung deposited by grazing animals using the EF_3 from the 2006 IPCC Guidelines (volume 4, chapter 11, table 11.1) of 0.02 kg-N_2O-N for cattle, poultry and pigs and 0.01 kg-N_2O-N for sheep and other animals The revised estimates reduced direct N_2O emissions from this category by –1 466.30 kt CO_2 eq in 1990 (–52.1%). Spain has also recalculated indirect N_2O emissions from atmospheric deposition (category 3.D.b.1), as a result of the recalculation in this category 3.D.a.3 (see also A.14 below) The ERT considers that the potential overestimation has been resolved and recommends that Spain update the NIR and the CRF table accordingly in the next submission	Yes. Transparency*
A.14	3.D.b.1 Atmospheric deposition – N_2O	Spain has recalculated estimates of indirect N_2O emissions from atmospheric deposition from managed soils as a consequence of the revision of estimates under categories 3.D.a.2.a (Animal manure applied to soils) and 3.D.a.3 (Urine and dung deposited by grazing animals), done in response to the list of potential problems and further questions (see A.12 and A.13 above). Indirect N_2O emissions from atmospheric deposition from managed soils have been estimated using a tier 1 methodology from the 2006 IPCC Guidelines (volume 4, chapter 11, equation 11.9), and applying an EF_4 from the 2006 IPCC 2006 Guidelines, volume 4, chapter 11, table 11.3 (EF_4 = 0.01 kg-N_2O-N, FracGASF=0.10 for synthetic fertilizers and FracGASM=0.20 for all organic N fertilizers and dung and urine deposited by grazing animals) Recalculation implies a reduction in N_2O emission estimates of –0.27 kt in 1990 (equivalent to –79.2 kt of CO_2 eq), representing a variation of –7.4% of the estimated emissions of the category. The ERT commends Spain for providing this recalculation	Yes. Transparency*

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		The ERT considers that the potential overestimation has been resolved and recommends that Spain update the NIR accordingly in the next submission	
A.15	3.D.b.2 Nitrogen leaching and run-off – N_2O	During the review, the ERT noted that Spain uses a $Frac_{LEACH-(H)}$ value of 0.30, the default value from table 11.3 of the 2006 IPCC Guidelines, as presented in CRF table 3.D. The 2006 IPCC Guidelines state that "For dryland regions, where precipitation is lower than evapotranspiration throughout most of the year and leaching is unlikely to occur, the default $Frac_{LEACH}$ is zero. The method of calculating whether $Frac_{LEACH-(H)} = 0.30$ should be applied is given in Table 11.3". In response to a question raised during the review, Spain informed the ERT that it misinterpreted the 2006 IPCC Guidelines in preparing the national inventory. Spain also informed the ERT that it expected to get the necessary data during 2016 from the National Meteorological Agency in order to implement an accurate calculation of indirect N_2O emissions in the next inventory submission. According to Spain, preliminary assessments indicate that the $Frac_{LEACH-(H)}$ value of 0.30 should apply to less than one third of the total national surface and by applying this value to the whole territory, emissions are overestimated	Yes. Accuracy*
		In response to the list of potential problems and further questions raised by the ERT during the review (see also A.12 above), Spain provided revised estimates of indirect N_2O emissions from nitrogen leaching and run-off from managed soils using equation 11.10 from the 2006 IPCC Guidelines (volume 4, chapter 11) and using the $Frac_{LEACH-(H)}$ value of 0.30 only for those cropland areas where irrigation is employed as indicated in table 11.3 of the 2006 IPCC Guidelines. Spain informed the ERT that the National Meteorological Agency data to thoroughly determine leaching potential based upon precipitation, evapotranspiration and soil water handling capacity could not be provided within the six-week deadline. The revised estimates reduced indirect N_2O emissions from this category by –1 674.2 kt CO_2 eq in 1990 (–89.9%). The ERT considers that the potential overestimation has been resolved	
		The ERT recommends that Spain update the estimates for the category, using data from the National Meteorological Agency in line with the methodology described in the 2006 IPCC Guidelines in its next submission	
A.16	3.F Field burning of agricultural residues –CH_4 and N_2O	Spain reported in its NIR (section 5.6.2) that emissions from this category are estimated using the methodology from the Revised 1996 IPCC Guidelines. However, no clear information on the quantity of biomass burned for each crop or the parameters used to calculate CH_4 and N_2O emissions was included in the NIR. The ERT also noted that in CRF table 3.F Spain reported	Yes. Accuracy*

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		emissions only for category 3.F.5 and reported "NO" for the other categories	
		In response to a question raised by the ERT during the review, Spain stated that it considers that the approach contained in the Revised 1996 IPCC Guidelines is wider (covers more types of crops), reflects in a better way the current situation of this activity in Spain, when most of crop residues burned are under category 3.F.5 and are derived from cotton, vineyards and olive groves (whose EFs are not specifically covered in the 2006 IPCC Guidelines, table 2.5) and is consistent with emissions of other nitrogen compounds. Upon a request of the ERT, Spain also provided during the review an Excel spreadsheet contained detailed information of the equation used and the parameters applied for each crop type	
		The ERT commends Spain for the information provided and recommends that the Party provide a detailed methodological description of this activity in the next NIR, outlining the quantity of biomass burned for each crop, the parameters and EFs	
LULUCF			
L.7	4. General (LULUCF)	The previous review report indicated that Spain assumes that land-use areas and soil management in the period 1970–1990 are constant (see L.1 in table 3). The ERT noted that Spain included this issue in its inventory improvement plans and raised a question requesting the Party to provide more information about its implementation	Yes. Accuracy*
		Spain explained that national inventory cartography and particularly LULUCF cartography are a priority under the improvement plan for the Spanish inventory, and the following initiatives are being promoted: (1) the national forestry system team is currently analysing other national cartographic information available, different from that already used, such as the forestry map of Spain 1:400 000 (MFE400), published in 1966, and, at the same time, a pilot project to assess new alternative data in one province in Spain is under preparation; (2) the national inventory team is evaluating alternatives to improve the inventory cartography and particularly LULUCF cartography. The Party recognized that these initiatives would certainly improve LULUCF data and could provide more information about the 1970–1990 time frame. However, Spain informed the ERT that the current situation makes it extremely difficult to set up and develop specific programmes to properly address these complex issues	
		The ERT welcomes this additional information provided by the Party during the review, and recommends that Spain provide in the NIR an update on the ongoing and planned analyses to	

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*
		address the proper reflection for the land-use areas and management in the period 1970–1990	
L.8	4.C.1 Grassland remaining grassland CO_2	Spain mentioned in its NIR the lack of information to differentiate between managed and unmanaged grassland. For (DOM, the Party has used a tier 1 methodology to assume a balance, but the same approach was not used for living biomass. Additionally, the Party assumed that there is no change in the carbon pool for DOM, and reported the notation key "NE" in CRF table 4C. In response to a question raised by the ERT during the review, Spain explained that the inventory team applied a tier 1 methodology to DOM under the assumption that there are no significant changes in grassland types or disturbance or management regimes in grasslands, as stated in section 6.2.2.1 of the 2006 IPCC Guidelines, and that there is not sufficient information to confirm the assumption needed for the application of the tier 1 methodology in living biomass. Spain explained further that in the case of the DOM pool, the use of "NE" (instead of "NO") is based on the existence of the activity and the absence of estimation of the carbon change The ERT recommends that Spain develop an approach to collect sufficient information on this category to determine if it is a key category and therefore the appropriateness of applying tier 1 methodologies to these pools	Yes. Accuracy*
Waste			
W.6	5.A Solid waste disposal on land – CH_4	Spain reported in its NIR (section 7.2.1.1) that for the period 1950–1990, the amounts of waste deposited on managed disposal sites (category 5.A.1) are calculated on the basis of a waste generation per capita rate and a fraction of waste deposited. However, no further information on the assumptions made and the underlying sources could be found in the NIR In response to a question raised by the ERT, the Party explained that data on population were provided by the National Statistics Office, waste production per capita was kept almost unchanged and the rest of the parameters were extrapolated. An Excel spreadsheet including all this information was also provided to the ERT Moreover, during the review, the Party provided the ERT with a list of waste amounts deposited per waste type on managed sites. The ERT noted that it would increase transparency to include these detailed data (at least for some years back to 1950) on waste amounts of the different fractions landfilled in the NIR or in the annex Therefore, the ERT recommends that Spain include the information on the assumptions and	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*
		underlying sources provided during the review in its next submission. In addition, the ERT encourages Spain to include the waste amounts of the different fractions landfilled in the NIR or in the annex (at least for some years back to 1950)	
W.7	5.A Solid waste disposal on land – CH_4	The ERT noted that Spain applied the DOCf provided by the IPCC good practice guidance (0.55) for the calculation of landfill gas generated. However, this default parameter was updated in the 2006 IPCC Guidelines (to 0.50) In response to the list of potential problems and further questions raised by the ERT during the review, Spain provided revised estimates of CH_4 emissions from solid waste disposal on land (category 5.A) fully adapting to the methodology in the 2006 IPCC Guidelines (volume 5, chapter 3), including the value of 0.50 for the fraction of DOCf for the calculation of landfill gas generated. In addition, Spain has further adapted its first-order decay model to the 2006 IPCC Guidelines, and adapted the DOC values of relevant municipal solid waste components accordingly (see W.8 below) The revised estimates decreased CH_4 emissions from this category for the whole time series (e.g. by –1 849.30 kt CO_2 eq (–15.3%) in 2014 or by –653.70 kt CO_2 eq (–13.1%) in 1990) The ERT considers that the potential overestimation has been resolved and recommends that Spain update the NIR accordingly in the next submission	Yes. Transparency*
W.8	5.A Solid waste disposal on land – CH_4	Spain applies equation 5.4 of the IPCC good practice guidance to obtain a weighted DOC value for mixed waste. This value is obtained on the basis of data on the composition of waste as shown in table 7.2.4 in the NIR and the DOC default from the IPCC good practice guidance. The ERT noted that the 2006 IPCC Guidelines provide a more detailed equation (equation 3.7, page 3.13) that considers the updated default DOCs as provided in table 2.4 of the 2006 IPCC Guidelines. Paper and textiles could now be separately considered (different default DOCs provided: 0.4 for paper, 0.24 for textiles) and the DOC of wood was changed from 0.30 to 0.43. The ERT also noted that the fraction "organic material" was set equal to food waste in Spain's inventory In response to a question raised by the ERT, the Party explained that 77% of this waste fraction is made up of food components, but relevant garden and park waste is also included (containing higher DOCs than food according to the 2006 IPCC Guidelines). In the list of preliminary main findings sent to the Party at the end of the review week, the ERT recommended that the Party reconsider all its waste fractions and adapt the DOCs accordingly in its next submission. In response to the list of potential problems as raised in W.7 above, Spain decided to adopt the DOC defaults of the 2006	Yes. Transparency*

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		IPCC Guidelines for the calculation of landfill gas generated The ERT commends the Party for making this improvement and for providing the revised estimates (see W.7 above) and recommends that the Party adapt the methodological description accordingly in its next NIR. The ERT, noting W.1 in table 3, also recommends that Spain continue its efforts to develop more country-specific parameters	
W.9	5.B. Biological treatment of solid waste – CH_4 and N_2O	The ERT noted that the default EFs for CH_4 and N_2O applied by Spain for the calculation of emissions from composting (category 5.B.1) and anaerobic digestion at biogas facilities (category 5.B.2) are not in line with the latest corrigenda (July 2015) for the 2006 IPCC Guidelines in which the default N_2O EF for composting was changed from 0.3 to 0.24 g N_2O/kg waste treated (wet weight basis). The default CH_4 EF for anaerobic digestion (category 5.B.2) was changed from 1 to 0.8 g CH_4/kg waste treated (wet weight basis). The ERT is of the view that the use of the outdated EFs leads to an overestimation of N_2O emissions from composting (category 5.B.1) for the years 1990–2014, and an overestimation of CH_4 emissions from anaerobic digestion (category 5.B.2) for the years 2002–2014 In response to a question during the review, Spain informed the ERT that this issue has already been detected by the inventory team and that its implementation is included in the inventory improvement plan for its next inventory submission The ERT recommends that Spain adapt the EFs accordingly and provide revised estimates for categories 5.B.1 and 5.B.2, by using the EFs provided in the latest corrigenda for the 2006 IPCC Guidelines	Yes. Accuracy*
W.10	5.B.1 Composting – CH_4 and N_2O	Spain reports in the NIR (section 7.3.1.1) the AD used for calculating CH_4 and N_2O emissions for this category. Upon a request of the ERT, Spain explained that the types of waste considered for the composting process are the organic fraction of separately collected waste, organic fraction of waste mechanically recovered in mechanical biological treatment plants, garden and park waste as well as sludge; however, home composting is not included in the figures although it is implemented in several regions in Spain The ERT encourages the Party to describe more clearly in the NIR the different types and amounts of waste considered for composting and to make efforts to obtain data on home composting, to enable their inclusion in the emission estimation	Not an issue

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W.11	5.B.1 Composting – CH_4 and N_2O	The ERT noted an increasing trend of AD on composting (category 5.B.1) until 2012 (from 769.12 kt dm in 1990 to 4 466.88 kt dm in 2012), followed by a decrease of 15% in 2013 and 2014 (same value for both years, 3 799.52 kt dm) In response to a question raised by the ERT during the review, Spain explained that this is attributable to a change in the methodology as requested by Eurostat (the European Union Statistical Office). Until 2012, the whole volumes treated (entries into the composting facilities) were taken into account, whereas from 2013 onwards, material rejected in a pretreatment process are subtracted from the entries. The Party explained that a recalculation for previous years was not possible owing to the lack of data for these rejected volumes. The Party noted that there is an overestimation of emissions from composting (category 5.B.1) in previous years and informed the ERT about its plan to assess options to ensure time-series consistency and coherence for the next inventory submission The ERT welcomes this plan and recommends that the Party investigate options to establish time-series consistency and recalculate historical emissions from composting accordingly and check the values of the AD in 2013 and 2014	Yes. Consistency*
W.12	5.D.1 Domestic wastewater – CH_4	The ERT noted that Spain calculates CH_4 emissions for category 5.D.1 using constant historical population equivalent numbers for 1990–2007. The ERT is of the view that an increase over time can be expected in line with the growing population and the increasing GDP. In response to a question raised by the ERT during the review, Spain explained that the numbers for 1990–2007 were based on a study carried out by the Spanish Centre for Public Works Studies and Experimentation and that only the distribution between treated and non-treated domestic wastewater varies throughout the time series Additionally, the ERT noted that Spain uses a correction factor "I" for additional industrial BOD discharged into sewers of 1.25 for uncollected domestic wastewater, whereas the default value of the 2006 IPCC Guidelines is 1.00. During the review, Spain confirmed that a correction factor "I" of 1.25 was applied for the calculation of TOW for both treatment paths of domestic wastewater (collected as well as uncollected domestic wastewater). However, the 2006 IPCC Guidelines provides for a correction factor (1.25) of industrial discharge only for collected wastewater, whereas for uncollected domestic wastewater (e.g. septic tanks), no commercial and industrial wastewater is to be expected (default "I" = 1.00) Moreover, Spain uses "population equivalent" numbers for estimating the total amount of TOW.	Yes. Transparency*

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		According to the 2006 IPCC Guidelines, TOW is a function of human population (i.e. population numbers) and BOD is a function of generation per person. "Population equivalent" values (68 585 462 in 1990 according to table 7.4.4 of the NIR) are, however, higher than "population" values (38 851 320 in 1990, according to the box for additional information in CRF table 5.D), so there seems to be a certain coverage of commercial and industrial sources as well. If this is the case, no additional factor "I" should be considered, either for collected or for uncollected wastewater. Spain explained that population equivalent numbers are based on the wastewater treatment plant database of the Directorate General of Water of the Spanish Ministry of Agriculture, Food and Environment; no further explanation on the origin of this parameter was provided	
		The ERT concluded that Spain's approach for the calculation of CH_4 emissions from domestic wastewater is not fully in line with the 2006 IPCC Guidelines and leads to an overestimation of emissions for the base year	
		In response to the list of potential problems and further questions raised by the ERT, Spain provided revised estimates of CH_4 emissions, using a new time series of historical AD – determined by extrapolating the population equivalent numbers in line with the population numbers back to 1990 – and applying a correction factor for industrial discharge of 1.00 for the calculation of TOW for both treatment paths of domestic wastewater (collected as well as uncollected domestic wastewater). This revision resulted in lower CH_4 emissions over the whole time series (e.g. by –15.26 kt CH_4 or –381.5 kt CO_2 eq in 1990, representing a variation of –32.7% of the estimated emissions of the category). The ERT considers that the potential overestimation has been resolved	
		The ERT recommends that Spain update the information in the NIR with the new data and parameters used in the estimates for the CH_4 emissions from domestic wastewater	
W.13	5.D.2 Industrial wastewater – CH_4	The ERT noted that Spain calculated CH_4 emissions from industrial wastewater treatment by applying a simple method (g CH_4/m^3 treated waste) based on the EMEP/EEA guidebook.[f] The 2006 IPCC Guidelines, however, provide a methodology considering the degradable organic material in wastewater (COD) as well as an EF taking into account different treatment/discharge pathways or systems. In response to a question raised by the ERT, Spain explained that individual questionnaires are sent annually to oil refineries and paper pulp manufacturing industries, requesting information on volumes of wastewater treated, COD values of influent entering the plant, COD values of the discharge and, if applicable, biogas generated, biogas burned and amount of sludge generated. Gaps in reporting, especially on influent COD, have prevented the Party from implementing the 2006	Yes. Accuracy*

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		IPCC Guidelines for this subcategory so far	
		The ERT commends the Party for making this progress in data requesting, and recommends – despite the lack of data availability – that it adapt the methodology accordingly to be in line with the 2006 IPCC Guidelines. Where no country-specific data are available, IPCC default values should be used or gap filling applied	
KP-LULUCF			
KL.3	General (KP-LULUCF) – CO_2	The ERT noted that table A11.1.1 of the NIR shows the data source used for each activity (afforestation and reforestation, deforestation, forest management and cropland management)	Yes. Transparency*
		In response to a question raised by the ERT on data source and approaches for the identification and georeferencing of lands under Article 3, paragraphs3 and 4, of the Kyoto Protocol, Spain clarified that the annual areas for AR are based on annual data obtained from three sources: (1) statistics on afforestation of farmland subsidized by the European Union Common Agricultural Policy (CAP); (2) database on afforestation/reforestation of farmland without CAP subsidies, grassland, wetlands and other land as part of the forestry policy (non-CAP); and (3) data reflected in the Forestry Statistics Yearbook. However, the annual areas for deforestation are based on interpolation or extrapolation of data obtained from cartographic sources, depending on the transition and the period of the time series	
		The ERT commends Spain for this additional explanation and information, and recommends that Spain include information on the AD sources used for afforestation and reforestation, deforestation, forest management and cropland management in its next NIR	
KL.4	General (KP-LULUCF) – N_2O	In CRF table NIR-1, in the notation keys for changes in carbon pools for afforestation and reforestation, deforestation, forest management and cropland management, Spain notes that it does not report the pools litter, dead wood and soil after the conversion period. In response to a question raised by the ERT during the review to provide justification for not reporting these pools after the conversion period, Spain referred to the relevant sections in the NIR. However, these justifications are based on the application of tier 1 assumptions, and the ERT notes that under the Kyoto Protocol (decision 2/CMP.7, annex, para. 26), a Party may choose not to account for a given pool in a commitment period only if transparent and verifiable information is provided that demonstrates that the pool is not a source	Yes. Transparency*

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		Therefore, the ERT recommends that Spain provide additional justification in the NIR that these pools are not a net source of emissions	
KL.5	Article 3.3 activities – CO_2	Spain considers that the transition from forest land to grassland – non-herbaceous is not human induced and reported as a natural evolution of the vegetation. Therefore, it does not report these emissions under deforestation but rather under forest management In response to a question raised by the ERT during the review, Spain explained that this assumption is based on the fact that there is not an economic interest, as exists in the case of transition from forest land to grassland – herbaceous; therefore, this transition is not included under deforestation. Furthermore, the Spanish inventory does not differentiate between managed and unmanaged grassland because, currently, there is no homogeneous statistical information that enables it. The ERT considers that the justification given by Spain for the claim that it is not human induced is not sufficient, as it is from a managed category of forest management. As there is a loss of carbon from the managed category (forest management), this loss of carbon should be considered deforestation rather than non-human-induced carbon losses	Yes. Accuracy*
		Therefore, the ERT recommends that Spain provide additional justification in the NIR that the transition from forest land to grassland – non-herbaceous is not human induced or, otherwise, account for the emissions under deforestation	
KL.6	Article 3.3 activities – CO_2	Spain reported the technical correction in CRF table “Accounting” as “NO”. The ERT noted that in the initial report to facilitate the calculation of the assigned amount Spain stated (page 8) that since the establishment of the reference level no technical corrections were made and that this has no effect on accounting since Spain has chosen to be accountable for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol at the end of the commitment period. Spain indicated that as soon as adequate information is available to make technical corrections it will carry them out. The Party provided a technical assessment report (as an annex to the initial report to facilitate the calculation of the assigned amount) and in accordance with decision 2/CMP.6, paragraphs 4 and 5 (page 8 of the initial report). In this technical assessment, no recommendations for technical corrections were made and therefore the Party has not presented such a value in the first year of the second commitment period	Yes. Transparency*
		The ERT recommends that Spain update section 11.5.2.5 of the NIR with the information provided in the initial report and with the link to the report on the technical assessment carried out by Spain	

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KL.7	Article 3.4 activities – CO_2	The ERT noted that Spain reports blank cells for natural disturbances in CRF table 4 (KP-1)A1.1. In response to a question raised by the ERT, Spain responded that currently there are no data to report in these cells The ERT recommends that Spain use the notation key "NO" for afforestation and reforestation deforestation and forest management HWP categories, to clarify that no activities meeting the requirements of natural disturbances have been observed	Yes. Comparability*
KL.8	Forest management – CO_2	Spain reported the forest management cap in CRF table "Accounting" as 80 061.46 kt CO_2 eq. However, the ERT noted that this value was calculated in relation to the Convention base year (1990) and not related to the base year as indicated in decision 2/CMP.8, annex I, paragraph 1(b), that is, 1990 for CO_2, CH_4 and N_2O and 1995 for HFCs, PFCs, SF_6 and NF_3 (in the case of Spain). According to calculations made by the ERT, the revised forest management cap is equal to 79 341.27 kt CO_2 eq (see document FCCC/IRR/2016/ESP) The ERT recommends that Spain correct the value of the forest management cap in the CRF table in its next submission	Yes. Accuracy*
KL.9	Forest management – CO_2	Spain reported in annex A3.3.12 (page A3.105) of the NIR that soil organic carbon is not a source in forest management and justified this assumption by providing estimates of annual variations In response to a question raised by the ERT during the review, Spain reported that based on data referenced from the European Network Monitoring Damage Level I and II, changes in stock of soil organic carbon for both forest management and afforestation and reforestation is neutral. In the NIR, Spain provides additional information in the aforementioned annex showing minimal variation between points in time, but it does not explicitly show that soil organic carbon is not a source The ERT recommends that Spain provide additional information in its next inventory to clearly demonstrate that soil organic carbon is not a source	Yes. Transparency*
KL.10	Cropland management – CO_2	The ERT noted an increase of carbon stock change in mineral soils in cropland management from 2008 (–58.20 kt, source) to 2014 (195.53 kt, sink). In response to a question raised by the ERT during the review, Spain provided additional information and an explanation of the drivers of the change in carbon stocks in mineral soils between these dates According to Spain, the carbon stock change in mineral soils in cropland management is based on	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*
		the following: 1. Soil conservation techniques in remaining woody crops, which represent gains of carbon in mineral soils 2. Transitions from other land uses to cropland: 2.a. grassland to cropland, which represents losses of carbon in mineral soils; and 2.b. other land to cropland, which represents gains of carbon in mineral soils 3. Transitions from cropland to settlements in the commitment period, which represents losses of carbon in mineral soils The variation in the magnitude of these elements and its addition affect the final carbon stock change in mineral soils in cropland management. At the beginning of the commitment period (2008), the impact of the transition from grassland to cropland is higher than the effect of the use of conservative soil practices in woody crops and transitions from other land to cropland. So, in this case, carbon stock change in mineral soils in cropland management is a source However, over the period 2008–2014, on the one hand, the effect of transitions from grassland to cropland diminishes as a result of the reduction of the cumulative areas in this transition. On the other hand, the gains due to conservative soil practices increased gradually, as a result of the increase of the areas under these conservative soil practices. At the end of the time series (2014), the gains of carbon in this pool are higher than the losses, and thus, the carbon stock change of mineral soils in cropland management becomes a sink The ERT acknowledged these explanations and recommends that Spain include the information on the trend of carbon stock change in mineral soils in cropland management in its NIR	
KL.11	Cropland management – CO_2	Spain reported "NO" in CRF table 4.B for carbon stock change in organic soils (column K); however, in the NIR, page 6.55, the Party reported that the total area of organic soil in the country is 0.04% of total national territory (reference: IGN maps of Spain, 1992). The ERT noted that this value is under the level of significance and the more appropriate notation would be "NE". The ERT also noted that in the FAOSTAT database, there is an area provided for cultivated organic soils of 11.19 kha, which would place the category above the threshold for significance In response to a question raised by the ERT during the review, Spain explained that this issue has been raised by previous ERTs (see document FCCC/ARR/2013/ESP, para. 61) and as a result Spain	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
		indicated that there are no histosols in the country. In accordance with the expert opinion of the University of Santiago de Compostela, there are no cultivated organic soils in Spain. The only places in Spain where the carbon content in soils is sufficient to classify them as histosols are in the east and north of Galicia but these are not under cultivation and their natural vegetation is more or less hydrophilic heather (Erica sp.). Information is included in sections 6.3.4.1.3 and 6.3.4.2.1 of the NIR. Spain also explained that the reference to IGN 1992 data, which is also included in the FAOSTAT database, has been kept in the NIR for consistency and transparency purposes The ERT acknowledges this explanation and encourages Spain to include in the NIR the reasons related to the differences in data on organic soils between the inventory and FAOSTAT data	
KL.12	Harvested wood products – CO_2	Spain reports HWP as occurring in forest management only. The Spanish inventory team has considered, as an initial simplification, that all the timber harvesting is located in areas under forest management. This assumption is based on the current lack of national information on this issue, due to the complexity of the timber sector in Spain. However, the Spanish inventory team has included in the improvement plan for the NIR (section 6.8.4) the task of identifying the origin of the national HWP and is currently analysing available national data sources to solve it The ERT commends Spain on its efforts to improve the estimation and reporting of net emissions from HWP, and recommends that it report on progress made in its NIR	Yes. Accuracy*
KL.13	Direct and indirect N2O emissions from N fertilization – N_2O	Spain does not include N_2O emissions in the category forest land remaining forest land, and reports in the NIR that no sufficient information about management practices are available to provide this estimate. The ERT finds that this omission has a potential impact on categories of forest management and on additional categories under the Kyoto Protocol Therefore, the ERT recommends that Spain identify additional sources to obtain data that can support the reporting and accounting of these potential emissions	Yes. Completeness*

Abbreviations: AD = activity data, BOD = biochemical oxygen demand, COD = chemical oxygen demand, CKD = cement kiln dust, CRF = common reporting format, DOC = degradable organic carbon, DOCf = fraction of degradable organic carbon that decomposes, DOM = dead organic matter, EF = emission factor, ERT = expert review team, FAOSTAT = Statistics Division of the Food and Agriculture Organization of the United Nations, FEIQUE = Spanish Federation of Chemical Industries, GDP = gross domestic product, HWP = harvested wood products, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, 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, LPG = liquid petroleum gas, LULUCF = land use, land-use change and forestry, MCF = methane conversion factor, MMS = manure management system, ND = not determined, NE = not estimated, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, SIAR = standard independent assessment report, TOW = total organically degradable material in wastewater, 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] 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] European Environment Agency. 1996. *EMEP/CORINAIR Atmospheric Emission Inventory Guidebook*. Available at <http://www.eea.europa.eu/themes/air/emep-eea-air-pollutant-emission-inventory-guidebook>.

[d] "Guide for measurement methods and emission factors in the cement sector in Spain", available at <https://www.oficemen.com/show_doc.asp?id_doc=665>; and "Guide for GHG emission monitoring Spanish cement sector (2013–2020)", available at <https://www.oficemen.com/show_doc.asp?id_doc=647>.

[e] Asociación Nacional de Fabricantes de Cales y Derivados de España.

[f] European Environment Agency. *EMEP/EEA Air Pollutant Emission Inventory Guidebook*. Available at <http://www.eea.europa.eu/themes/air/emep-eea-air-pollutant-emission-inventory-guidebook>.

VI. Application of adjustments

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

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

12. Spain 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 Spain 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 Spain.

Table 6
Total greenhouse gas emissions for Spain, base year[a]–2014[b]
(kt CO_2 eq)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions including indirect CO_2 emissions[c]*		*Land-use change (Article 3.7 bis as contained in the Doha Amendment)[d]*	*KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)[e]*	*KP-LULUCF activities (Article 3.4 of the Kyoto Protocol)*	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*			*CM, GM, RV, WDR*	*FM*
FMRL								–23 100.00
Base year	257 995.60	283 361.70	257 995.60	283 361.70	NA		–1 107.73	
1990	255 234.78	280 600.88	255 234.78	280 600.88				
1995	294 485.29	320 181.56	294 485.29	320 181.56				
2000	343 983.81	378 646.32	343 983.81	378 646.32				
2010	320 375.33	353 724.69	320 375.33	353 724.69				
2011	321 823.09	353 872.24	321 823.09	353 872.24				
2012	318 757.06	348 556.43	318 757.06	348 556.43				
2013	288 012.95	320 122.04	288 012.95	320 122.04		–7 792.31	621.40	–24 832.64
2014	290 243.41	321 744.07	290 243.41	321 744.07		–7 340.00	448.75	–24 742.63

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 CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs SF_6 and NF_3. 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 CO_2 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.

Table 7

Greenhouse gas emissions by gas for Spain, excluding land use, land-use change and forestry, 1990–2014[a]

(kt CO_2 eq)

	CO_2[b]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1990	230 154.96	29 575.35	16 602.66	3 039.92	1 164.38	NA, NO	63.61	NA, NO
1995	265 725.35	31 370.41	16 057.08	5 872.42	1 055.37	NA, NO	100.93	NA, NO
2000	311 599.72	35 247.71	19 684.73	11 430.35	496.12	NA, NO	187.68	NA, NO
2010	283 581.40	35 291.21	16 311.83	18 197.09	108.26	NA, NO	234.90	NE, NA, NO
2011	283 918.68	35 615.14	15 482.33	18 523.61	93.33	NA, NO	239.15	NE, NA, NO
2012	279 830.31	34 614.99	15 039.61	18 793.61	57.91	NA, NO	220.01	NE, NA, NO
2013	252 259.69	34 043.96	15 629.73	17 904.06	70.75	NA, NO	213.86	NA, NO
2014	253 466.92	34 450.65	16 499.63	17 053.32	66.11	NA, NO	207.44	NA, NO
Per cent change 1990–2014	**10.1**	**16.5**	**–0.6**	**461.0**	**–94.3**	**NA**	**226.1**	**NA**

Abbreviations: NA = not applicable, NE = not estimated, NO = not occurring.

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

[b] Spain did not report indirect CO_2 emissions in common reporting format table 6.

Table 8
Greenhouse gas emissions by sector for Spain, 1990–2014[a b]
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	211 604.43	30 495.31	30 558.32	–25 366.10	7 942.81	NA
1995	248 222.18	32 565.03	29 995.17	–25 696.27	9 399.18	NA
2000	289 825.47	42 171.52	35 193.18	–34 662.51	11 456.14	NA
2010	265 545.50	42 427.71	31 958.12	–33 349.36	13 793.36	NA
2011	267 886.76	40 384.41	31 263.15	–32 049.15	14 337.93	NA
2012	265 634.14	38 652.15	29 991.55	–29 799.37	14 278.60	NA
2013	239 232.25	36 386.83	30 673.15	–32 109.08	13 829.81	NA
2014	238 091.85	37 742.38	32 133.99	–31 500.65	13 775.84	NA
Per cent change 1990–2014	**12.5**	**23.8**	**5.2**	**24.2**	**73.4**	**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] Spain did not report indirect CO_2 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 Spain

(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment	*Article 3.3 of the Kyoto Protocol*		*Forest management and elected Article 3.4 activities of the Kyoto Protocol*				
	Land-use change	*Afforestation and reforestation*	*Deforestation*	*Forest management*	*Cropland management*	*Grazing land management*	*Revegetation*	*Wetland drainage and rewetting*
FMRL				–23 100.00				
Technical correction				NA				
Base year	NA				–1 107.73	NA	NA	NA
2013		–8 389.44	597.13	–24 832.64	621.40	NA	NA	NA
2014		–7 935.45	595.45	–24 742.63	448.75	NA	NA	NA
Per cent change 1990–2014					**–140.5**	**NA**	**NA**	**NA**

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

[a] Base year refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs SF_6 and NF3. The base year for cropland management, under Article 3, paragraph 4, of the Kyoto Protocol is 1990 for Spain. 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] The value reported in this column refers to 1990.

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

Table 10
Key relevant data for Spain under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Key parameters	*Values*
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: not elected
	(f) Revegetation: not elected
	(g) Wetland drainage and rewetting: not elected
Election of activities under Article 3, paragraph 4	Cropland management
Election of application of provisions for natural disturbances	Yes, for afforestation and reforestation and forest management
3.5% of total base year GHG emissions, excluding LULUCF and including indirect CO_2 emissions	9 917.659 kt CO_2 eq (79 341.275 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 unit, 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 Spain. 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 Spain
(t CO_2 eq)

	Original submission	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	1 590 189 509			1 590 189 509
Annex A emissions for 2014				
CO_2	253 466 918			253 466 918
CH_4	38 165 813	34 450 651		34 450 651
N_2O	19 966 675	16 499 629		16 499 629
HFCs	17 053 320			17 053 320
PFCs	66 105			66 105
Unspecified mix of HFCs and PFCs	NA, NO			NA, NO
SF_6	207 444			207 444
NF_3	NA, NO			NA, NO
Total Annex A sources	**328 926 275**	**321 744 067**		**321 744 067**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014				
3.3 Afforestation and reforestation	–7 935 450			–7 935 450
3.3 Deforestation	595 452			595 452
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014				
3.4 Forest management for 2014	–24 742 631			–24 742 631
3.4 Cropland management for 2014	448 749			448 749
3.4 Cropland management for the base year	–1 107 732			–1 107 732

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[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 Spain
(t CO_2 eq)

	Original submission	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2013				
CO_2	252 259 690			252 259 690
CH_4	38 085 352	34 043 957		34 043 957
N_2O	18 913 576	15 629 727		15 629 727
HFCs	17 904 062			17 904 062
PFCs	70 747			70 747
Unspecified mix of HFCs and PFCs	NA, NO			NA, NO
SF_6	213 856			213 856
NF_3	NA, NO			NA, NO
Total Annex A sources	**327 447 284**	**320 122 039**		**320 122 039**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013				
3.3 Afforestation and reforestation	–8 389 435			–8 389 436
3.3 Deforestation	597 126			597 126
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013				
3.4 Forest management for 2013	–24 832 638			–24 832 638
3.4 Cropland management for 2013	621 400			621 400
3.4 Cropland management for the base year	–1 107 732			–1 107 732

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[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

A. Missing categories that may affect completeness

1. No mandatory categories of the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* were identified as missing.

B. Recommendation for an in-country review: list of issues

2. The expert review team (ERT) has recommended that the next review for Spain be conducted as an in-country review. In accordance with decision 13/CP.20, annex, paragraph 64, the ERT has provided a list of questions and issues to be addressed during this in-country review, as set out below.

3. The ERT has identified that for a number of categories, the implementation of the use of the 2006 IPCC Guidelines was not complete. In addition, the ERT considered that the national inventory report is generally lacking transparency, making it difficult to assess the accuracy and completeness of the inventory. According to the ERT the issues to be addressed that are included in tables 3 and 5 of this report are:

(a) General: G.5;

(b) Energy: E.4, E.10, E.13, E.14, E.15 and E.16;

(c) Industrial processes and product use: I.1, I.2, I.8, I.11, I.12, I.13, I.15, I.17, I.18, I.19 and I.20;

(d) Agriculture: A.1, A.2, A.3, A.4, A.5, A.6, A.7, A.8, A.9, A.10, A.14 and A.16;

(e) Land use, land-use change and forestry (LULUCF): L.1, L.7 and L.8;

(f) Waste: W.1, W.6, W.8, W.9, W.11 and W.12;

(g) LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol: KL.4, KL.5 and KL.9.

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>.

Annual status report for Spain for 2016. Available at <http://unfccc.int/resource/docs/2016/asr/esp.pdf>.

FCCC/ARR/2015/ESP. Report on the individual review of the annual submission of Spain submitted in 2015. Available at <http://unfccc.int/resource/docs/2016/arr/esp.pdf>.

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

FCCC/ARR/2013/ESP. Report of the individual review of the annual submission of Spain submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/esp.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 Spain for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_esp_1_2.pdf>.

Standard independent assessment report, part 2, for Spain for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_esp_1_2.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Martin Fernandez Diez-Picazo (Inventories Unit, Spanish Ministry for Agriculture, Food and Environment), including additional material on the methodology and assumptions used.

Annex V

Acronyms and abbreviations

AAU	assigned amount unit
AD	activity data
AWMS	animal waste management system
BOD	biochemical oxygen demand
B_0	Maximum methane producing capacity
CER	certified emission reduction
CH_4	methane
CM	cropland management
COD	chemical oxygen demand
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CPR	commitment period reserve
CP2	second commitment period
CRF	common reporting format
DOC	degradable organic carbon
DOCf	fraction of degradable organic carbon that decomposes
DOM	dead organic matter
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
FAOSTAT	Statistics Division of the Food and Agriculture Organization of the United Nations
FEIQUE	Spanish Federation of Chemical Industries
FM	forest management
FMRL	forest management reference level
$Frac_{LEACH-(H)}$	ratio of nitrogen losses from solid and liquid storage of manure management
F-gas	fluorinated gas
GDP	gross domestic product
Gg	gigagram
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
kg	kilogram
KP-LULUCF	LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
kt	kilotonne
ktoe	kilotonne of oil equivalent
LULUCF	land use, land-use change and forestry
MCF	methane conversion factor
MMS	manure management system
N	nitrogen
NA	not applicable
ND	not determined
NE	not estimated
NF_3	nitrogen trifluoride

NIR	national inventory report
NO	not occurring
N_2O	nitrous oxide
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
t	tonne
TiO_2	titanium dioxide
TJ	terajoule
TOW	total amount of organically degradable material in wastewater
WDR	wetland drainage and rewetting
UNFCCC	United Nations Framework Convention on Climate Change