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Framework Convention on Climate Change

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Report on the individual review of the annual submission of Japan 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 Japan, 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 17 to 22 October 2016.

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

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Contents

I. Introduction[1]

1. This report covers the review of the 2016 annual submission of Japan 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 17 to 22 October 2016 and was coordinated by Ms. Sevdalina Todorova and Mr. Roman Payo (UNFCCC secretariat). Table 1 provides information on the composition of the expert review team (ERT) that conducted the review of Japan.

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

Area of expertise	*Name*	*Party*
Generalist	Ms. Jackie Mercer	Canada
	Mr. Newton Paciornik	Brazil
Energy	Mr. Pierre Boileau	Canada
IPPU	Ms. Maria Jose Lopez	Belgium
	Mr. Ioannis Sempos	Greece
Agriculture	Mr. Steen Gyldenkaerne	Denmark
	Mr. Renato Rodrigues	Brazil
LULUCF	Ms. Ana Blondel	Canada
	Mr. Erik Karltun	Sweden
	Mr. Robert Waterworth	Australia
Waste	Mr. Cristobal Felix Diaz Morejon	Cuba
	Ms. Violeta Hristova	Bulgaria
Lead reviewers	Ms. Jackie Mercer	
	Mr. Newton Paciornik	

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

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

2. 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. The ERT's assessment takes into account that Japan does not have a quantified emission limitation or reduction commitment for the second commitment period of the Kyoto Protocol inscribed in the third column of Annex B in the Doha Amendment to the Kyoto Protocol.

3. A draft version of this report was communicated to the Government of Japan, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

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

II. Summary and general assessment of the 2016 annual submission

5. Table 2 provides the ERT's 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.

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

Assessment				*Issue or problem ID#(s) in table 3 and/or 5*[a]
Date of submission	Original submission: 14 April 2016 (NIR, CRF tables and SEF tables)			
Review format	Desk review			
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	I.6
	3.	Development and selection of emission factors	Yes	I.10, I.11 and I.12
	4.	Collection and selection of activity data	Yes	L.18 and W.5
	5.	Reporting of recalculations	Yes	L.10
	6.	Reporting of a consistent time series	Yes	W.5

[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.

Assessment			*Issue or problem ID#(s) in table 3 and/or 5*[a]
	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]	Yes	I.8, I.9, I.18, L.1 and L.18
	10. Application of corrections to the inventory	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	No	L.15 and L.19
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	L.12, L.14, W.3 and W.4
Supplementary information under the Kyoto Protocol	Have any issues been identified in the following areas?		
	1. National system:		
	(a) The overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements	No	
	(b) Performance of the national system functions	No	
	2. National registry:		
	(a) Overall functioning of the national registry	No	
	(b) Performance of the functions of the national registry and the technical standards for data exchange	No	
	3. ERUs, CERs, AAUs and RMUs and 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	No	
	(b) The Party has demonstrated methodological consistency between the reference level and	No	

Assessment			*Issue or problem ID#(s) in table 3 and/or 5*[a]
	reporting on forest management in accordance with decision 2/CMP.7, annex, paragraph 14		
	(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?	NA	
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	NA	
	The ERT accepts that the revised estimate submitted by Japan in its 2016 annual submission can replace a previously applied adjustment in the compilation and accounting database	NA	
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Yes	
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	No	
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, CRF = common reporting format, ERT = expert review team, ERU = emission reduction unit, 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, NA = not applicable, NIR = national inventory report, QA/QC = quality assurance/quality control, RMU = removal unit, SEF = standard electronic format, SIAR = standard independent assessment report, UNFCCC Annex I inventory reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories", Wetlands Supplement = *2013 Supplement to the 2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories: Wetlands*.

[a] The ERT identified additional issues in the energy, IPPU, agriculture, LULUCF, KP-LULUCF and waste 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 Intergovernmental Panel on Climate Change (IPCC) *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, may affect completeness and are listed in annex II.

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

6. Table 3 compiles all the recommendations made in the previous review report. The latest available review report was for the 2014 annual submission, published on 23 June 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 Japan

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
General			
G.1	QA/QC and verification (table 3, 2014) (13 and 86, 2013) Adherence to UNFCCC Annex I inventory reporting guidelines	Strengthen the QC procedures to avoid inconsistencies between the CRF tables and the NIR	Resolved. Improvements have been made to Japan's QC processes, including updates to the QA/QC plan, which address previously identified inconsistencies included in this table (see I.3 and KL.1 below)
G.2	Follow-up to previous reviews (124, 2014) Transparency	Provide an update on progress of implementation of previous recommendations in the NIR	No longer relevant. The provision of information on the progress of implementation of previous recommendations is not a mandatory requirement according to decision 24/CP.19. Japan provided information on changes in response to the review process (see G.4 in table 5)
G.3	NIR (12, 2014) (11, 2013) Transparency	Move all information from annex 6.1 to chapter 1 of the NIR	Resolved. Information on Japan's national system (national inventory arrangements) for the preparation of the inventory that was previously reported in annex 6.1 to the NIR was moved to chapter 1 (section 1.2)
Energy			
E.1	Fuel combustion – reference approach – all fuels – CO_2 (25, 2014)	Include in the NIR detailed information on the conversion factors used to convert gross calorific value (GCV) to net calorific value (NCV) for all fuels	Not resolved. Japan has not provided details of the conversion factors for GCV to NCV in the NIR. During the review the Party stated that

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	Transparency*		further consideration is needed before including the information in the NIR
E.2	Fuel combustion – reference approach – solid fuels – CO_2 (26, 2014) (24, 2013) (39, 2012) Consistency*	Address the inconsistencies between the figures reported in the CRF tables and the international statistics from the International Energy Agency in annex 2 to the NIR (which might lead to differences between the reference and sectoral approaches) by providing coal production data in CRF table 1.A(b) and by including relevant explanations of the discrepancies with international statistics in annex 2 to the NIR	Not resolved. Japan still reports fugitive emissions from underground and surface mining in CRF table 1.B.1 and production quantities of 0.54 and 0.78 Mt, respectively, for 2014. Therefore, production should be reported in table 1.A(b), but the ERT noted that production in table 1.A(b) is reported as "NO" and there is no information included in the NIR annex A.4-1 on this intentional inconsistency. A similar issue was observed in the 2015 annual submission
E.3	Feedstocks, reductants and other non-energy use of fuels – all fuels – CO_2 (31, 2014) Transparency	Provide detailed information on the methodology used to estimate the reported quantities of non-energy use of fuels for each individual fuel, with a clear indication of its correspondence to the respective category codes in the energy balance	Resolved. An explanation of the use and reporting of non-energy use of fuels is provided in section 3.2.3 of the NIR and information on the correspondence of fuels between CRF table 1.A(b) and the national energy balance is given in the NIR (annex, table A.4-9). However, the ERT noted that Japan is reporting all use of solid fuels used as reducing agents under category 1.A.2 rather than following the practice of reporting these emissions under the IPPU sector (see also E.14 and E.15 in table 5)
E.4	Feedstocks, reductants and other non-energy use of fuels – all fuels – CO_2 (31, 2014) Transparency	Provide a table in the NIR mapping the various types of fuel as reported in the energy balance with the corresponding fuels as reported in CRF table 1.A(d)	Resolved. Table A.4-9 in the NIR provides the requested mapping of fuels for non-energy use
E.5	1.A.2 Manufacturing industries and construction –	Develop a method to subtract the amount of the fuels reported under the "duplication adjustment" (e.g. proportional to fuel consumption) from all	Resolved. The accuracy of the estimates was improved ("duplication adjustment" was

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	solid, liquid, gaseous and other fuels – CO_2, CH_4 and N_2O (33, 2014) Accuracy	subcategories under manufacturing industries and construction in order to improve the accuracy and comparability of the NIR and to avoid reporting negative energy emissions	not included as a separate subcategory in the CRF tables) and no negative values for energy emissions are reported for the category
E.6	1.A.2 Manufacturing industries and construction – solid, liquid, gaseous and other fuels – CO_2, CH_4 and N_2O (33, 2014) Transparency	Explain the changes made to the energy balance in the NIR (linked to the "duplication adjustment")	Resolved. The methodology for representing the "duplication adjustment" in the energy balance in the inventory is explained in the NIR (sections 3.2.7 and A.4.2.3)
E.7	1.A.2 Manufacturing industries and construction – solid, liquid, gaseous and other fuels – CO_2, CH_4 and N_2O (36, 2014) Transparency	Provide additional information in the NIR on the CO_2 EFs for blast furnace gas (BFG) and coke furnace gas (CFG)	Resolved. The explanation for the development of the BFG and CFG EFs is included in the NIR (pp. 3-20 to 3-21)
E.8	1.A.3.b Road transportation – liquid fuels – CO_2, CH_4 and N_2O (40, 2014) Transparency*	Provide additional information on the annual number of vehicles by type, the annual mileage per vehicle and the fuel efficiency per vehicle type	Not resolved. Japan does not provide the additional information in the NIR as part of its QA/QC activities
E.9	1.A.3.b Road transportation – liquid fuels – CO_2, CH_4 and N_2O (40, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	Include in the QA/QC procedures a comparison of the annual mileage and fuel efficiency by vehicle category with the fuel consumption reported by the energy balance to ensure that no discrepancies occur	Not resolved. Data on fuel efficiency by vehicle type are not included in the NIR and the ERT could not find evidence of a quality check based on these data
E.10	1.B.1.a Coal mining and handling – solid fuels – CH_4 (41, 2014) Transparency	Provide, in the NIR, justification of the use of the mean value of the default range regarding fugitive CH_4 emissions from mining activities in surface mines	Resolved. The NIR (section 3.3.1.1.b) explained that the IPCC average EF is used because there is little information on overburden in Japan. The choice is in line with the 2006 IPCC Guidelines (volume 2, chapter 4, p. 4.19)
E.11	1.A.3.e.i Pipeline transport –	Report emissions from pipeline transport as "NO"	Resolved. The notation key has been revised and a short

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	gaseous fuels – CO_2, CH_4 and N_2O (44, 2014) (35, 2013) Transparency	and provide explanations in the NIR	explanation is provided in the NIR that fossil fuels are not used in pipeline transport in Japan (section 3.2.9.5)
E.12	1.B.2.b Natural gas – gaseous fuels – CH_4 (45, 2014) Transparency*	Clarify the text of the NIR regarding fugitive emissions from natural gas distribution to industrial consumers	Not resolved. No explanation of this issue is provided in the NIR
E.13	1.B.2.a Oil – liquid fuels – CO_2 and CH_4 (49, 2014) Transparency	Include, in the NIR, an explanation of condensate and light crude oil, in particular the exact definition of each product and the quantities produced in 2012	Resolved. A definition is provided for condensate that is consistent with that used internationally. Amounts of crude oil produced without condensate are provided in table 3-64 of the NIR and emissions from condensate production are included in CRF table 1.B.2
IPPU			
I.1	2. General (IPPU) – (52, 2014) Transparency	Include, in the NIR, a sector overview of the drivers behind significant increases or decreases of emissions	Resolved. A sector overview of the drivers behind significant increases or decreases of emissions was included in the NIR (p. 4-3)
I.2	2.A.4 Other process uses of carbonates – CO_2 (54, 2014) Accuracy	Introduce a periodic review of country-specific factors (e.g. every 3–5 years) for limestone and dolomite use and include the results of such a review in the NIR	Resolved. Information on reviews of EFs has been included since the 2015 NIR (section 4.3)
I.3	2.B.3 Adipic acid production – N_2O (55, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	Make the necessary corrections, in the NIR, to calculate the efficiency (operation rate) of the N_2O decomposition unit and improve the QC procedures	Resolved. The necessary corrections were made in the NIR (p. 4-22), suggesting that QC procedures were also improved
I.4	2.B.9 Fluorochemical production – HFCs, PFCs and SF_6 (56, 2014) Transparency	Provide, in the NIR, more details on how the fugitive emissions are quantified and whether the fugitive emissions relate to production and destruction rates	Resolved. Details about the method used for estimating fugitive emissions associated with fluorochemical production are included on pages 4-49 and 4-50 of the NIR

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
Agriculture			
A.1	3. General (agriculture) – CH_4 and N_2O (62, 2014) Transparency	Improve the transparency of the reporting by providing initial and recalculated data in a table	Resolved. The requested information was included in the NIR (table 10-4)
A.2	3.A Enteric fermentation – CH_4 (63, 2014) (58, 2013) Transparency	Provide information in the NIR on the justification of the CH_4 EFs for enteric fermentation for sheep and goats	Resolved. The EFs were changed from country-specific EFs to the default EFs, as suggested in the 2006 IPCC Guidelines
A.3	3.A.3 Swine – CH_4 (64, 2014) (58, 2013) Transparency	Include, in the NIR, additional information on the country-specific CH_4 EFs (related to each weight category of swine and a calculation sheet determining how the EF was obtained)	Resolved. Japan reports a new country-specific CH_4 EF (1.40 kg/head/year). The value is closer to the default IPCC value of 1.50 kg/head/year and well referenced in the NIR
A.4	3.B Manure management – N_2O (65, 2014) Transparency	Report a weighted average value of $Frac_{GASM}$	Resolved. A weighted average value of $Frac_{GASM}$ is reported in CRF table 3.D
A.5	3.B Manure management – CH_4 (66, 2014) (53, 2013) Transparency	Provide the MCF values in CRF table 4.B(a)	No longer relevant. For country-specific EFs, MCF values are not established because the EFs are estimated directly from actual measurement data. Therefore, MCF values are not reported in CRF table 3.B(a)s2 (applicable when using a tier 2 method) but instead are reported as "NE"
A.6	3.B Manure management – CH_4 and N_2O (67, 2014) (55, 2013) (73, 2012) Transparency	Improve the description of the methodology used to obtain the country-specific CH_4 and N_2O EFs for pasture, paddock and range for cattle	Resolved. Further methodological descriptions are included and referenced in the NIR (p. 5-12)
A.7	3.B Manure management – CO_2 and N_2O (67, 2014) Transparency*	Improve the transparency of the description of the methodology used to estimate emissions from the heaping and sun-drying of poultry waste	Not resolved. The NIR does not contain sufficient information on the methodology used
A.8	3.D Direct and indirect N_2O emissions from agricultural soils –	Calculate and report the weighted average values of $Frac_{GRAZ}$ and report them in CRF table 4.D	No longer relevant. There are no reporting cells in the CRF table for $Frac_{GRAZ}$ according to

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	N_2O (68, 2014) Transparency		the UNFCCC Annex I inventory reporting guidelines
A.9	3.D.a.2.b Sewage sludge applied to soils – N_2O (69, 2014) Completeness	Estimate and report N_2O emissions from sewage sludge applied to soils under the agriculture sector	Resolved. N_2O emissions from sewage sludge applied to soils have been estimated and explained in the NIR (p. 5-39)
A.10	3.C Rice cultivation – CH_4 (70, 2014) Transparency	Include information on the type and amounts of organic amendments added to rice cultivation areas in CRF table 4.C and provide documentation for this information in the NIR	Resolved. The Party provided sufficient information and references on the organic amendments in the NIR (p. 5-27 and table 5-34)
LULUCF			
L.1	4 General (LULUCF) – (table 3, 2014) (73 and 81, 2013) (83 and 110, 2012) (77 and 79, 2011) Completeness*	Estimate and report emissions for all mandatory categories:	Addressing. Improvements to the estimates have been implemented as follows:
		(a) Carbon stock change in soils for other land converted to cropland and grassland	Resolved. The emissions are reported as “IE” (under cropland remaining cropland and grassland remaining grassland)
		(b) Carbon stock change in organic soils for grassland remaining grassland (grazed meadows)	Resolved. The emissions are reported as “NO” and the rationale is explained on page 6-36 of the NIR
		(c) Carbon stock change in soils for land converted to wetlands, except for forest land converted to wetlands	No longer relevant. The emissions are reported as “NE” for non-forest land converted to flooded land (explained as “under investigation” in CRF table 4.D) and as “NE” for land converted to peat extraction and assumed to be insignificant. Issue has been reassessed for this category by current ERT (see L.15 in table 5)
		(d) Carbon stock change in soils for cropland and grassland converted to other land	Resolved. The emissions are reported as “NA” for mineral soils and “NO” for organic

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
			soils
		(e) N_2O emissions from disturbance associated with grassland and other land converted to cropland for mineral soils	Resolved. Relevant emissions are reported under the equivalent category lands converted to cropland in CRF table 4(III)
		(f) CO_2, CH_4 and N_2O emissions from controlled biomass burning for cropland remaining cropland and from controlled burning and wildfires for grassland remaining grassland, and from wildfires on forest land converted to grassland and wetlands	Addressing. Emissions from controlled burning for cropland remaining cropland have been reported since the 2015 annual submission. Emissions from biomass burning are reported as "NE" in the 2016 annual submission for grassland (controlled burning and wildfires), owing to lack of suitable activity data, and for land converted to wetlands (wildfires), as assumed to be insignificant (see L.18 and L.19 in table 5)
L.2	4 General (LULUCF) – (73, 2014) (69, 2013) Transparency	Include explanation of why the total land area increased between 1990 and 2012	Resolved. Explanations and relevant references have been provided in section 6.1 of the NIR since the 2015 annual submission
L.3	4.A.1 Forest land remaining forest land – CO_2 (77, 2014) (71, 2013) (88, 2012) Transparency*	Provide information, in the NIR, that supports the assumptions made regarding the reporting of the biomass carbon stock pools in bamboo forest and the reporting of dead organic matter and soil carbon changes for the subcategories "bamboo" and "forests with less standing trees"	Addressing. Japan provided some information in section 6.5.1 of the NIR and provided additional rationale and links during the review to two relevant references,[d, e] which better support the assumptions made on the reporting, but these additional references were not included in the NIR
L.4	4.A.1 Forest land remaining forest land – CO_2 (79, 2014) Transparency	Provide additional information on the expert judgement assumption on soil drainage in forest land with organic soils	Resolved. Relevant information is provided on page 6-16, section 6.5.1.b, of the NIR
L.5	4.B.2 Land converted to cropland – CO_2 (83, 2014) (95, 2012) (78, 2011) Transparency	Provide an estimate of the carbon stock changes in soils for mineral and organic soils separately for the subcategory other land converted to cropland	Resolved. The area of organic soil is still reported as "IE". However, the ERT recognizes that the UNFCCC Annex I inventory reporting guidelines provide some flexibility when

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
			available activity data do not allow this separation (footnote 8 to CRF table 4.B). Furthermore, net carbon stock changes in organic and mineral soils are reported as "IE". This issue has been reassessed by the current ERT (see L.13 in table 5)
L.6	4.B.2 Land converted to cropland – CO_2 (83, 2014) (77, 2013) (95, 2012) (78, 2011) Transparency	Provide a better justification for the assumption of zero gains and losses for other land converted to cropland	Resolved. Net carbon stock changes in living biomass for recovered orchards have been estimated since the 2015 annual submission and are reported as "IE" (included under cropland remaining cropland). Net carbon stock changes in living biomass for recovered rice and upland fields are still assumed to be zero following the tier 1 method in the 2006 IPCC Guidelines, since no specific methodology exists for these types of cropland, as explained on pages 6-7 and 6-30 of the NIR
L.7	4.F.1 Other land remaining other land – CO_2 (85, 2014) (82, 2013) (105, 2012) Comparability	Report abandoned cultivated areas under an appropriate land-use category (e.g. cropland)	Resolved. Abandoned cultivated areas have been reported under cropland remaining cropland since the 2015 annual submission, as indicated in section 6.6.1 of the NIR and confirmed by Japan during the review
Waste			
		No recommendations were made in the 2014 annual review report	
KP-LULUCF			
KL.1	General (KP-LULUCF) – General (101, 2014) Transparency	Review, and update as necessary, QA/QC procedures	Resolved. Japan has improved the QA/QC as per the issue raised in the 2014 review report related to errors in the land-use matrix and area of deforestation under organic soils. However, owing to changes in the inventory

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
			methods (in particular the move to a tier 3 method for soils for cropland and grazing land management), some new QA/QC issues around the calibration and validation of the models were raised (see KL.5 and KL.6 in table 5)
KL.2	Revegetation – CO_2 (107, 2014) Transparency	Provide an explanation, in the NIR, of the decrease in removals per unit area that occurred between 2008 and 2012	Resolved. Revegetation in Japan covers a wide range of different activities and vegetation types. Removals are estimated using a variety of methods, including growth curves that change the rates of removal over time. Japan has provided extra information on this in the 2016 annual submission, which explains this trend (section 11.5.1.1 of the NIR)

Abbreviations: CRF = common reporting format, EF = emission factor, ERT = expert review team, $Frac_{GASM}$ = fraction of livestock nitrogen excretion that volatilizes as ammonia and nitrogen oxides, IE = included elsewhere, IPCC = Intergovernmental Panel on Climate Change, IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, MCF = methane conversion factor, NE = not estimated, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control, UNFCCC Annex I inventory reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories", 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

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

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

[c] The review of the 2015 annual submission of Japan was not conducted, as per decision 27/CP.19. Therefore, the recommendations reflected in table 3 are from the 2014 annual review report. For the same reason, 2015 is excluded from the list of years in which the issue has been identified.

[d] Food and Agriculture Organization of the United Nations (FAO). 2007. *World bamboo resources. A thematic study prepared in the framework of the Global Forest Resources Assessment 2005.* Rome: FAO. Available at <http://www.fao.org/docrep/010/a1243e/a1243e00.htm>.

[e] FAO. 2010. *Global Forest Resources Assessment 2010. Country Report. Japan*. Rome: FAO. Available at <http://www.fao.org/docrep/013/al539E/al539E.pdf>.

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

7. 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 Japan, and have not been addressed by the Party.

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

ID#[a]	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[b]
General		
	No such general issues were identified	
Energy		
E.2	Address the inconsistencies between the figures reported in the CRF tables and the international statistics from the International Energy Agency in annex 2 to the NIR (which might lead to differences between the reference and sectoral approaches) by providing coal production data in CRF table 1.A(b) and by including relevant explanations of the discrepancies with international statistics in annex 2 to the NIR	4 (2012–2016)
IPPU		
	No such issues for the IPPU sector were identified	
Agriculture		
	No such issues for the agriculture sector were identified	
LULUCF		
	No such issues for the LULUCF sector were identified	
Waste		
	No such issues for the waste sector were identified	
KP-LULUCF		
	No such issues for KP-LULUCF activities were identified	

Abbreviations: CRF = common reporting format, 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.

[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] Following paragraph 9 of decision 27/CP.19 in relation to Parties without a quantified emission limitation or reduction commitment for the second commitment period of the Kyoto Protocol, and noting that the 2014 annual submission of Japan was reviewed, Japan's 2015 annual submission was not reviewed.

V. Additional findings made during the 2016 technical review

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

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

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the 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, in previous review reports, Japan has been encouraged to provide an update on the progress of implementation of previous recommendations in the NIR (see G.2 in table 3). In the 2016 NIR (section 10.4.1.3), information has been included on improvements resulting from recommendations made in previous review reports. In particular, table 10-11 includes a summary of improvements made to the national inventory in response to recommendations; however, the table only includes fully implemented recommendations	Not an issue
		The ERT encourages Japan to provide additional information in the NIR to track the implementation status of recommendations made in previous review reports, in particular to include comprehensive information on the progress of all previous recommendations and related improvements (implemented, in progress or planned). This would increase transparency on how recommendations are being addressed as well as show progress over time	
G.5	Further improvements (identified by the Party)	The ERT noted that an inventory improvement plan has been developed by Japan but that the NIR did not contain any details describing how the plan is used to prioritize and plan improvements and track implementation over time. During the review week, the Party provided some additional clarification on inventory improvement procedures, including criteria for prioritizing improvements to emission/removal categories	Not an issue
		The ERT encourages the Party to include, in chapter 1 of the NIR, additional details on the improvement plan, including the manner in which emission/removal categories have been prioritized for improvements, to increase transparency related to anticipated future improvements	
G.6	Uncertainty analysis	The ERT noted that information on the total uncertainty including LULUCF, as well as detailed information on the uncertainties for all sectors, is provided in annex 2 to the NIR; however, no information is provided on the total uncertainty (level and trend) excluding LULUCF	Not an issue
		Although the above-mentioned information is not explicitly a requirement of the	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		UNFCCC Annex I inventory reporting guidelines, the ERT reiterates the encouragement from the previous review report for Japan to include information on the total uncertainty (level and trend) excluding LULUCF in its NIR to enhance comparability with the reporting of other Parties and to improve the transparency of its reporting	
Energy			
E.14	Feedstocks, reductants and other NEU of fuels – gaseous and solid fuels – CO_2	In CRF table 1.A(d) there is information reported on NEU of other oil and coke oven/gas coke and it is indicated that the resulting emissions are reported under ammonia production. However, in the column "CO_2 emissions from the NEU reported in the inventory" of table 1.A(d), the CO_2 emissions are reported as "NO". Further, there is no reporting of NEU of other bituminous coal in table 1.A(d), but CO_2 emissions from NEU for ammonia production are reported in the column "CO_2 emissions from the NEU reported in the inventory". In addition, the ERT noted that the 2014 values for solid fuels for apparent energy consumption (excluding NEU, reductants and feedstocks) (5 116.63 PJ) in table 1.A(c) do not account for the NEU of solid fuels reported in table 1.A(d). During the review, the Party explained that for some years other oil and coke oven/coke were not consumed for ammonia production, and that the amount of other bituminous coal for NEU is included in the amount for energy use The ERT recommends that Japan adhere to the requirement for the reporting of NEU of solid fuels under the IPPU sector by transparently reporting the allocation of fuels and emissions between the two sectors in the NIR and ensure consistency of reporting across the CRF tables	Yes. Comparability*
E.15	Feedstocks, reductants and other NEU of fuels – gaseous and solid fuels – CO_2	The emissions from other kerosene, residual fuel oil and coal tar from NEU of fuels are reported as "NE" in the column "CO_2 emissions from the NEU reported in the inventory" of CRF table 1.A(d). During the review, Japan explained that it reports emissions from consumption of NEU fuels as "NE" assuming that the carbon in these fuels is stored in long-lived products and the emissions are captured when the waste is incinerated. Almost all of the quantities of other kerosene and residual fuel oil for NEU are used for feedstock of petrochemical products, and coal tar for NEU is used for chemical industries. In general, CO_2 emissions from NEU of fuels are included under the IPPU or waste sector The ERT recommends that Japan provide greater transparency in the NIR and CRF tables (e.g. documentation boxes) and justification for the application of the "NE"	Yes. Transparency*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		notation key when fuels are used for non-energy purposes, to demonstrate that there are no omissions of any potential emissions	
E.16	1.A.1.a Public electricity and heat production – other fuels – CO_2	The 2014 CO_2 IEF for other fuels (28.63 t/TJ) is among the lowest of the reporting Parties (range: 7.12–145.14 t/TJ). The Party did not provide any specific comment on this observation during the review and there is no information on the composition of the fuel category in the NIR	Yes. Transparency*
		The ERT recommends that Japan increase the transparency of its reporting regarding the composition of other fuels for public electricity and heat production in order to justify the CO_2 IEF and ensure comparability of reporting	
E.17	1.A.3.b Road transportation – liquid fuels – N_2O	In the NIR (section 3.2.9.2), Japan indicated that the close-coupled catalytic converter was introduced in the country in 2000 and this has reduced N_2O emissions significantly (emissions reduced by more than half since 2000, despite an increasing number of vehicles). The ERT noted that a brief mention of the close-coupled catalytic converter is made in the NIR, but there is no clear explanation and justification as to why the close-coupled catalytic converter is so much better at reducing N_2O emissions, while at the same time reducing NO_X. During the review, Japan explained that the technology is consistent with the low-emission vehicle type included in table 3.2.3 of the 2006 IPCC Guidelines (volume 2), having the lowest EF among existing technologies	Yes. Transparency*
		Noting the explanations provided during the review about the technological change introduced, the ERT recommends that Japan provide, in its NIR, additional justification of the performance of the close-coupled catalytic converter, including references to performance studies, in order to better explain the trend in the emissions for this category	
E.18	1.A.5 Other (not specified elsewhere) – gaseous, liquid and solid fuels – CO_2, CH_4 and N_2O	According to the 2006 IPCC Guidelines, the category other (not specified elsewhere) is used for reporting emissions not included elsewhere and includes emissions from fuels delivered to a country's military. Japan reports "NO" for the category. During the review, Japan indicated that the Japan Self-Defence Forces are not the military and therefore emissions for the category 1.A.5 have been reported as "NO"	Yes. Transparency*
		The ERT recommends that Japan include information in the NIR explaining where emissions from the fuel consumption of the Self-Defence Forces are included in the inventory, to ensure transparency and comparability of reporting	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
IPPU			
I.5	2 General (IPPU)	The ERT noted that for the IPPU sector Japan's NIR is very well structured and transparently describes the approaches followed to estimate emissions. All recommendations from the previous review report were fully resolved and the ERT received quick and comprehensive responses to all questions raised during the review. The ERT commends Japan for its efforts to ensure the quality of the inventory for the sector	Not an issue
I.6	2 General (IPPU) – CO_2, CH_4 and N_2O	The ERT noted that GHG emissions from the consumption of reducing agents for the production of soda ash, iron and steel, ferroalloys, lead and zinc are reported under the category 1.A.2 (manufacturing industries and construction) in the energy sector and not under categories 2.B.7, 2.C.1, 2.C.2, 2.C.5 and 2.C.6, respectively, in the IPPU sector, as required by the 2006 IPCC Guidelines and the UNFCCC Annex I inventory reporting guidelines. During the review, Japan explained that "there is no plan at present to change Japan's principle of comprehensively capturing emissions in the energy sector, without separating between energy and reductant use". The Party considers this method to be more accurate, ensuring that there is no double counting or omission of emissions. The Party also considers that this method can more accurately capture the iron and steel industry's ongoing efforts in global warming countermeasures and reflect them in the inventory. These efforts have been undertaken through the recognition of all coke and other input into the steelwork plants as energy and managing the total process Although the ERT understands the rationale put forward by Japan, it considers that the allocation of emissions under the energy sector negatively impacts the transparency and comparability of the inventory. The ERT is also of the view that if the Party applies carbon mass balances and category-specific QA/QC procedures for the processes that involve reducing agents, using the guidance in chapter 4.2 of the 2006 IPCC Guidelines (sections 4.2.2.5 and 4.2.4), then the reallocation of emissions will not result in any double counting or omission of emissions The ERT recommends that Japan reallocate emissions from the consumption of reducing agents for the production of soda ash, iron and steel, ferroalloys, lead and zinc to the categories 2.B.7, 2.C.1, 2.C.2, 2.C.5 and 2.C.6, respectively, in line with the UNFCCC Annex I inventory reporting guidelines and the 2006 IPCC Guidelines	Yes. Comparability*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
I.7	2.A Mineral industry – CO_2	The ERT noted that CO_2 emissions from the consumption of soda ash for glass production are reported under the category 2.A.4.b (other uses of soda ash) and not under category 2.A.3 (glass production) The ERT recommends that Japan reallocate the emissions from the consumption of soda ash for glass production to the category 2.A.3 (glass production), as required by the 2006 IPCC Guidelines and the UNFCCC Annex I inventory reporting guidelines	Yes. Comparability*
I.8	2.A.2 Lime production – CO_2	The ERT noted that the NIR does not include emissions from the use of non-marketed lime in the food industry and the aluminium industry. During the review, Japan explained that: (1) it does not account for emissions from lime production in sugar mills because it is considered that there is a recarbonation process; and (2) for aluminium, there are no statistics confirming the production of lime in aluminium production The ERT recommends that Japan either provide a justification for the information that lime production does not lead to CO_2 emissions in sugar mills owing to subsequent recarbonation, or provide an estimation of these emissions in line with the 2006 IPCC Guidelines. In addition, the ERT recommends that Japan work with the industry to obtain information to confirm that lime is not produced by aluminium manufacturers. If this is not possible, the ERT recommends that the Party estimate and include in the inventory the CO_2 emissions related to the non-marketed lime that is consumed in aluminium production	Yes. Completeness*
I.9	2.A.3 Glass production – CO_2	The emissions from glass manufacturing reported by Japan are associated with the consumption of the following raw materials: limestone, dolomite and soda ash. Other minor CO_2-emitting raw materials for glass manufacturing are not included in the inventory (e.g. barium carbonate, bone ash, potassium carbonate and strontium carbonate). During the review, Japan provided a study[c] to the ERT about the consumption of carbonate raw materials in the country. According to the study, the Japan Trade Statistics include information on carbonates other than limestone, dolomite and soda ash, such as strontium carbonate and sodium bicarbonate, that may emit CO_2, but their quantities are small and detailed information is not available The ERT recommends that Japan either estimate and include in the inventory the CO_2 emissions associated with the consumption of minor CO_2-emitting raw materials for glass manufacturing or provide information demonstrating that the carbonate is not consumed	Yes. Completeness*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
I.10	2.B.5 Carbide production – CO_2	To estimate CO_2 emissions from CaC_2 production, Japan applies a country-specific CO_2 EF, which is based on measurements from two plants. The EF was not reported in the NIR for confidentiality reasons. The ERT noted that the CO_2 EF for CaC_2 production cannot be lower than the EF based on the stoichiometry of the reaction (1 mole of CO_2 per mole of CaC_2).[d] The stoichiometric EF is 0.6875 t CO_2/t CaC_2, assuming that all CO is converted to CO_2 and that by-product gases (mainly CO) generated in carbide production are recovered and burned as fuel (based on what has been as reported in the NIR, p. 4.28). Moreover, the 2006 IPCC Guidelines state that, in addition to the stoichiometric EF, excess carbon is oxidized in the process. Therefore, the CO_2 EF has to be more than 0.6875 t CO_2/t CaC_2. The 2006 IPCC Guidelines (volume 3, chapter 3.6.2.2, table 3.8) propose 1.090 t CO_2/t CaC_2 as the default EF. By using the confidential data provided during the review, the ERT identified that the country-specific EF is lower than the stoichiometric EF. During the review, the Party was unable to provide a justification for why the country-specific CO_2 EF is lower than the stoichiometric EF The ERT recommends that Japan either: revise the country-specific EF in consultation with the operators of CaC_2 plants, taking into account the fact that the country-specific EF used cannot be below the EF based on the stoichiometry of the reaction and the need to take into consideration the additional carbon that is oxidized in the process; or recalculate the CO_2 emissions from CaC_2 production by applying the default EF provided in the 2006 IPCC Guidelines (volume 3, chapter 3.6.2.2)	Yes. Accuracy*
I.11	2.B.6 Titanium dioxide production – rutile TiO_2 production – CO_2	To estimate CO_2 emissions from rutile TiO_2 production, Japan applies a plant-specific CO_2 EF provided by the single manufacturer. The EF was not reported in the NIR for confidentiality reasons. The ERT notes that, according to the 2006 IPCC Guidelines, on the basis of stoichiometry and assuming complete conversion of the input carbon to CO_2 through further conversion of CO in excess air, the CO_2 EF cannot be less than 0.826 t CO_2/t TiO_2 (based on 1.5 moles of CO_2 per mole of TiO_2). Moreover, as indicated in the 2006 IPCC Guidelines, additionally to the stoichiometric EF, excess carbon is oxidized in the process. Therefore, the CO_2 EF has to be more than 0.826 t CO_2/t TiO_2. The 2006 IPCC Guidelines propose 1.34 t CO_2/t TiO_2 as the default EF (volume 3, chapter 3.7.2.2, table 3.9). By using the confidential data provided during the review, the ERT identified that the CO_2 EF of rutile TiO_2 is lower than the IPCC default EF and for some years even lower than the stoichiometric EF. During the review, the Party confirmed that, as	Yes. Accuracy*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue[a] and/or a problem[b]? If yes, classify by type
		explained in the NIR section on the EFs, the CO_2 EF is derived from CO_2 emissions calculated by taking into account coke input, carry-over amounts of coke (raw material left without reacting) and the carbon content of coke. Therefore, it cannot be directly compared with the stoichiometric EF. The ERT considers that the explanation provided by Japan does not adequately justify why the country-specific CO_2 EF is lower or very close to the stoichiometric EF The ERT recommends that Japan either: revise the country-specific EF in consultation with the operators of the rutile TiO_2 plant, taking into account that the EF could not be lower than the EF based on the stoichiometry of the reaction and that, additionally to the stoichiometric EF, excess carbon is oxidized in the process; or recalculate the CO_2 emissions from rutile TiO_2 production applying the default EF provided in the 2006 IPCC Guidelines (volume 3, chapter 3.7.2.2)	
I.12	2.B.8 Petrochemical and carbon black production – ethylene production – CO_2	According to the NIR (p. 4-33), the CO_2 EF used for the estimation of emissions from ethylene production is country-specific and based on surveys by the Japanese petrochemical industry. This EF is not included in the NIR because it is considered to be confidential. By reviewing the confidential data provided to it, the ERT identified that the country-specific CO_2 EF is two orders of magnitude lower than the default EF provided in the 2006 IPCC Guidelines. The IPCC default EF for Japan is 90% of 1.73 t CO_2/t ethylene if naphtha is used as feedstock, and 0.95 t CO_2/t ethylene if ethane is used as feedstock, according to tables 3.14 and 3.15 of the 2006 IPCC Guidelines. During the review, the Party replied that a possible reason for this could be that the Japanese country-specific EF is derived from CO_2 emissions associated with the production of ethylene only. The Party noted that the EFs included in table 3.14 of the 2006 IPCC Guidelines include the CO_2 emissions not only from ethylene production but also from the production of propylene, butadiene, aromatics and all other chemicals produced by the steam cracking process. The ERT considers that the total CO_2 emissions from the steam cracking process should be included in the inventory and not only the CO_2 emissions associated with the production of the ethylene from the steam cracking process as was done by the Party The ERT recommends that Japan either: justify that the country-specific CO_2 EF has been developed in a manner consistent with the 2006 IPCC Guidelines, covering the total CO_2 emissions from the steam cracking process, and is considered to be more accurate than the IPCC default EF; or recalculate the CO_2 emissions from ethylene	Yes. Accuracy*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		production by applying the default EF provided in the 2006 IPCC Guidelines (volume 3, chapter 3.9.2.2)	
I.13	2.C.1 Iron and steel production – CO_2 and CH_4	In CRF table2(I).A-Hs2, the AD for steel are reported as "NE" although CO_2 and CH_4 emissions are reported. Japan reported in the NIR that these emissions are associated with the consumption of carbon electrodes in electric arc furnaces to make steel. The consumption of carbon electrodes was reported in table 4-44 of the NIR The ERT recommends that Japan report the relevant AD (consumption of carbon electrodes in electric arc furnaces or steel production) for the category 2.C.1.b in CRF table2(I).A-Hs2	Yes. Transparency*
I.14	2.E.1 Integrated circuit or semi-conductor – HFCs, PFCs, SF_6 and NF_3	To estimate emissions of F-gases from semiconductor manufacturing (under category 2.E.1), Japan applies a tier 2a method, which is described on page 4-66 of the NIR. The parameters and EFs of this method were reported in table 4-55 of the NIR. The ERT noted that: (1) the value of the parameter "fraction of gas controlled" was not reported; (2) only CF_4 was reported as a by-product in table 4-55 of the NIR, although according to the 2006 IPCC Guidelines (table 6.3) the use of c-C4F8 (or PFC c-318) results in the by-product hexafluoroethane (C2F6) emissions; and (3) the AD for category 2.E.1 were reported as "NE" in CRF table 2(II)B-Hs1, although data about the consumption of F-gases were reported in table 4-55 of the NIR. During the review, Japan explained that: (1) the "fraction of gas controlled" was not reported for confidentiality reasons; (2) the by-product C2F6 was included in the emissions reported in the CRF tables but, owing to an error in the NIR compilation, the by-product was not reported in table 4-55 of the NIR; and (3) the AD will be included in the CRF tables in the next annual submission The ERT recommends that Japan report in the NIR information about the "use rate" per specific gas and "by-production rate" of C2F6, along with information that the fraction of gas controlled is not reported for confidentiality reasons. The ERT also recommends that Japan report the AD (consumption of F-gases) for category 2.E.1 in CRF table 2(II)B-Hs1	Yes. Transparency*
I.15	2.E.2 TFT flat panel display – HFCs, PFCs, SF_6 and NF_3	To estimate emissions of F-gases from liquid crystal manufacturing (under category 2.E.2 TFT flat panel display), Japan applies a tier 2a method, which is described on page 4-67 of the NIR. The parameters and EFs of this method were reported in table 4-56 of the NIR. The ERT noted that: (1) the value of the parameter "fraction of gas controlled" was not reported; (2) the exact "use rate" per specific gas was not reported (instead the Party reported that the range of "use rate" of all gases was 40–97%); (3) only CF_4 was	Yes. Transparency*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		reported as a by-product in table 4-56 of the NIR, although according to the 2006 IPCC Guidelines (table 6.4) the use of c-C4F8 (or PFC c-318) results in the by-product fluoroform (CHF_3, HFC-23) emissions; and (4) the AD for category 2.E.2 were reported as "NE" in CRF table 2(II)B-Hs1, although data about the consumption of F-gases were reported in table 4-56 of the NIR. During the review, Japan explained that: (1) the "fraction of gas controlled" was not reported for confidentiality reasons; (2) the "use rate" for each gas is as indicated in table 6.4 of the 2006 IPCC Guidelines, with the exception of PFC-116, and because of this a 0% rate was used so as not to underestimate emissions; (3) the by-product CHF_3 was included in the emissions reported in the CRF tables but, owing to an error in the NIR compilation, the by-product was not reported in table 4-56 of the NIR; and (4) the AD will be included in the CRF tables in the next annual submission The ERT recommends that Japan report in the NIR information about the "use rate" per specific gas and "by-production rate" of CHF_3, along with information that the fraction of gas controlled is not reported for confidentiality reasons. The ERT further recommends that Japan report the AD (consumption of F-gases) for category 2.E.2 in CRF table 2(II)B-Hs1	
I.16	2.F. Product uses as substitutes for ozone-depleting substances – HFCs and PFCs	In CRF table 2(II)B-Hs2, emissions of HFCs from commercial refrigeration (2.F.1) and emissions of PFCs from solvents (2.F.5) were not disaggregated by specific chemical (e.g. HFC-134a) as required by paragraph 32 of the UNFCCC Annex I inventory reporting guidelines. Instead, they were reported together as an unspecified mix of HFCs (2.F.1) or as an unspecified mix of PFCs (2.F.5). Moreover, no information was reported in the NIR about the global warming potential (GWP) values used to convert these amounts of unspecified mixtures of HFCs and PFCs to CO_2 eq. During the review, Japan stated that emissions of HFCs and PFCs are calculated per gas species and the respective GWPs are used. However, since the data on the number of devices used for the calculation of the emissions per gas species could be company-specific production data from a single company, based on requests from data providers, it is difficult to provide/disclose disaggregated data by gas for reasons of confidentiality The ERT recommends that Japan report the information provided during the review about the emissions of unspecified mixtures of HFCs from commercial refrigeration and PFCs from solvents, along with the average GWP of these mixtures, in the next NIR	Yes. Transparency*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
I.17	2.F.1 Refrigeration and air conditioning – domestic refrigeration – HFCs	To estimate the emissions from the use of F-gases in domestic refrigeration, Japan applies a tier 2a method from the 2006 IPCC Guidelines. The parameters of the method were reported in table 4-58 of the NIR, with the exception of the parameters "refrigerant contained per operated device" and "refrigerant contained per disposed device". During the review, Japan explained that, given the assumption that refrigerators are sealed tight, it considered that the parameters of the estimation model "refrigerant contained per operated device" and "refrigerant contained per disposed device" were equal to the "refrigerant charged per device at production" The ERT recommends that Japan report in the NIR the information provided during the review about the parameters "refrigerant contained per operated device" and "refrigerant contained per disposed device"	Yes. Transparency*
I.18	2.F.1 Refrigeration and air conditioning – HFCs	To estimate emissions for the category 2.F.1, Japan applies a method very similar to the tier 2a method given in the 2006 IPCC Guidelines. A part of the IPCC tier 2a method accounts for the emissions related to the management of refrigerant containers. The ERT noted that this part of the tier 2a method is not included in the methodology applied by Japan for the 2.F.1 category. As it is described in the 2006 IPCC Guidelines (volume 3, chapter 7.5.2.1, p. 7.49): "The emissions related to the refrigerant container management comprise all the emissions related to the refrigerant transfers from bulk containers (typically 40 tonnes) down to small capacities where the mass varies from 0.5 kg (disposable cans) to 1 tonne (containers) and also from the remaining quantities – the so-called refrigerant heels (vapour and /or liquid) – left in the various containers, which are recovered or emitted". On page 4-49 of the NIR, regarding returned gas cylinders, Japan reported that when residual gas is decomposed and the containment shell is cleansed, or when there is release into the atmosphere, these emissions are reported under the subcategory 2.B.9. During the review, Japan was unable to confirm that all emissions related to the management of refrigerant containers as described in the 2006 IPCC Guidelines (e.g. from bulk containers to small disposable cans of 0.5 kg, and the so-called refrigerant heel left in various containers) are reported under category 2.B.9. Also, Japan was unable to provide to the ERT the time series of HFC emissions related to the management of refrigerant containers because the data are apparently not available The ERT recommends that Japan estimate and report the HFC emissions related to	Yes. Completeness*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		refrigerant container management using equation 7.11 from the 2006 IPCC Guidelines	
I.19	2.F.1 Refrigeration and air conditioning – HFCs	The emissions from manufacturing, stocks and disposal from the use of F-gases for the subcategories domestic refrigeration, stationary air conditioning and road vehicles under mobile air conditioning were reported in aggregate under emissions from manufacturing in CRF table 2(II)B-Hs2. Moreover, all AD for all subcategories of the category were reported as "NE" owing to lack of data. The ERT considers that Japan could disaggregate these emissions and report AD based on the data reported in tables 4-58, 4-59, 4-64 and 4-65 of the NIR and some simple calculations. For example, regarding the AD for the subcategory domestic refrigeration, the amount "filled into new manufactured products" given in CRF table 2(II)B-Hs2 is equal to the "total HFCs charged in the year of production" in NIR table 4-58; the amount "in operating systems (average annual stocks)" given in CRF table 2(II)B-Hs2 is equal to the product of the "number of operated devices" with the "refrigerant charged per device at production" in NIR table 4-58; and the amount "remaining in products at decommissioning" given in CRF table 2(II)B-Hs2 is equal to the product of the "number of HFC devices disposed" with the "refrigerant charged per device at production" in NIR table 4-58. Similarly, the emissions from domestic refrigeration could be reported in a disaggregated manner by applying the equations of the estimation model that is reported on page 4-70 of the NIR. Recovery is also reported in table 4-58 of the NIR but is reported as "NE" in CRF table 2(II)B-Hs2. Moreover, emissions and AD for refrigeration and air conditioners in rail and marine vessels could be reported on separate lines in CRF table 2(II)B-Hs2 The ERT recommends that Japan report transparently the emissions from domestic refrigeration, stationary air conditioning and mobile air conditioning and the AD and recovery of all subcategories of category 2.F.1 in CRF table2(II)B-Hs2 for all phases of the lifetime of the equipment (i.e. manufacturing or assembly, operation, disposal and recovery), in order to enhance the transparency and comparability of the inventory of the emissions of F-gases	Yes. Transparency*
I.20	2.F.1 Refrigeration and air conditioning – commercial refrigeration – HFCs	The ERT noted that, according to table 4-60 of the NIR, there was production of "HFC devices" in 1990 and 1995, but that the emissions from manufacturing and stock were reported as "NO" in CRF table 2(II).B-H. During the review, Japan explained with respect to manufacturing and operation emissions for the years 1990 and 1995, HFC devices had not yet replaced HCFC devices and there were actually no HFC emissions.	Yes. Transparency*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		The item entitled "HFC devices" mistakenly includes HCFC devices The ERT recommends that Japan correct the reference to manufacturing and operation emissions from "HFC devices" for 1990 and 1995 in table 4.60 in the next NIR	
I.21	2.F.2 Foam blowing agents – HFCs	In CRF table 2(II)B-Hs2, the AD for foam blowing agents in closed cells "amount in operating systems (average annual stocks)" were reported as "NE" owing to a lack of data. From the description of the method applied by the Party (equation on p. 4-80 of the NIR), the ERT considers that Japan could estimate and report these AD based on the data reported in tables 4-68 and 4-69 of the NIR and some simple calculations. Moreover, the ERT noted that, in CRF table 2(II)B-Hs2, the AD for foam blowing agents in open cells "amount filled into new manufactured products" was reported as "NO" and the AD for "amount in operating systems (average annual stocks)" were reported as "NE". The ERT noted that, as reported on page 4-83 of the NIR, emissions were calculated assuming that all of the emissions from foam blowing agents occurred at the time of production. Therefore, the ERT considers that the consumption of HFCs reported in tables 4-70 and 4-71 of the NIR should be reported in CRF table 2(II)B-Hs2 as AD for "amount filled into new manufactured products" and the AD for "amount in operating systems (average annual stocks)" should be reported as "NO" The ERT recommends that Japan improve the transparency of the reporting of AD for foam blowing agents in open and closed cells in CRF table 2(II)B-Hs2 using data currently reported in the NIR, where possible, in order to enhance the transparency and comparability of the inventory of the emissions of F-gases	Yes. Transparency*
Agriculture			
A.11	3.A.1 Cattle – CH_4	The ERT noted that Japan uses a technique similar to the IPCC tier 2 method for the calculation of CH_4 emissions associated with enteric fermentation by cattle. The emissions were calculated by multiplying the cattle population (dairy and non-dairy) by the EFs using the dry matter intake established on the basis of country-specific research. The ERT recognizes and appreciates the efforts made by Japan in using country-specific research and notes the equations provided in the NIR (pp. 5-2 to 5-6) and the documents provided to the ERT during the review (some available only in Japanese). The ERT commends the Party for the verification activity that it conducted comparing the national calculation method with the IPCC tier 2 method and including the results in the	Not an issue

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		NIR (p. 5-7) However, after reviewing the information, the ERT still had questions about the methodology. The ERT encourages Japan to improve the transparency of the reporting related to the methodology by including additional information about the calculation of the dry matter intake for the estimation of CH_4 from cattle	
A.12	3.B.1 Cattle – CH_4	The ERT noted that Japan has a very high IEF for CH_4 from manure management systems for dairy cattle. Thus, the 2014 CH_4 IEF of Japan for dairy cattle (58.98 kg CH_4/head/year) is among the highest of the reporting Parties (range: 4.32–73.14 kg CH_4/head/year) and the value increased over the time series. In response to a question raised by the ERT, the Party explained that the manure management systems in the country are quite different from those of other Parties (e.g. the "piling" system, with higher EFs, accounts for a larger share of the manure management systems). According to table 5-16 in the NIR, the CH_4 EF for dairy cattle is 3.8% for piling compared with 0.13% for non-dairy cattle. In addition, moisture for dairy cattle faeces is high and kept under anaerobic conditions, which explains the high CH_4 EF for piling. However, the ERT noted that the references provided in the NIR to support the information were not peer-reviewed papers and they are not available online The ERT found the explanation provided by the Party during the review for the CH_4 IEF satisfactory and recommends that Japan report a justification for the CH_4 IEF in the NIR, together with background information on the management systems in Japan from the reference materials	Yes. Transparency*
A.13	3.D.a Direct N_2O emissions from managed soils – N_2O	Japan reported that the EFs for N_2O associated with the application of synthetic fertilizers and organic fertilizers were considered to be the same value because there were no significant differences identified when analysing data for N_2O emissions from agricultural fields in Japan. However, the ERT notes that many articles in the specialized literature illustrate that some countries reported different values for synthetic and organic fertilizers. During the review, Japan acknowledged that there are research results in Japan that show that the EF may be different between synthetic fertilizers and organic fertilizers, but explained that no EF could be established because of insufficient data. In addition, Japan stated that there is a possibility that the EFs are different because of the difference in quality of fertilizer among organic fertilizers The ERT recognizes the complexity of establishing the EF for organic fertilizers and	Not an issue

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue[a] and/or a problem[b]? If yes, classify by type
		notes that the 2006 IPCC Guidelines show the same EF for synthetic fertilizers and organic fertilizers. However, the ERT encourages Japan to report any developments in this area and to include information on efforts made to develop separate EFs in the NIR	
A.14	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N_2O	Japan has attributed a small amount of CH_4 and N_2O emissions from other crops (excluding rice and tea) to volcanic ash soil. During the review, the ERT questioned the scientific basis for that allocation and Japan answered that volcanic ash soil (andosol) is generally well-drained soil. Therefore, it is considered that the N_2O EF is small (IEF of 0.00007 kg/t dry matter for 2014). During the review, Japan provided the ERT with the reference[f] that it used to establish its country-specific EF, providing background information on the lower N_2O EF for well-drained soil compared with poorly drained soil	Not an issue
		The ERT commends Japan for including this country-specific category and considered the explanations provided to be satisfactory. The ERT encourages Japan to report the explanation for the N_2O EF in its NIR	
LULUCF			
L.8	4 General (LULUCF) – General	The ERT commends Japan for the notable improvements in its reporting of GHG emissions/removals from the LULUCF sector since the 2014 annual submission, notably the implementation of a tier 3 method based on the Rothamsted carbon (Roth-C) model to estimate carbon stock changes in cropland and grassland mineral soils and the estimation of emissions from controlled burning for cropland remaining cropland, previously reported as "NE". The ERT considers that Japan's inventory system for the LULUCF sector is well developed, although it could still benefit from improvements in AD for some of the categories still not reported and in the documentation in the NIR of trends, recalculations and improvements	Not an issue
		The ERT encourages the Party to continue to enhance its inventory for the LULUCF sector	
L.9	4 General (LULUCF) – General	The ERT identified a few inconsistencies between the NIR and the CRF tables in relation to the area of land converted to cropland in 2014. The area of cropland provided in the NIR (section 6.6.2.a, p. 6-30) for 2014 is 34.6 kha, while the area in CRF table 4.B shows as 35.83 kha. In response to questions from the ERT, Japan acknowledged this and other errors in some of the updates in the NIR when documenting the	Yes. Consistency*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		reallocation of abandoned cultivated soils under cropland (page 6-61 and table 6-45 of the NIR) and in some of the input to the CRF tables in relation to the AD provided in CRF table 4(I) The ERT recommends that Japan enhance its QA/QC measures to ensure full correspondence between data reported in the NIR and in the CRF tables and a more accurate documentation of recent updates/improvements in the NIR	
L.10	4 General (LULUCF) – General	The ERT noted large recalculations for the LULUCF sector compared with the 2014 annual submission. Recalculations reported in the 2015 annual submission (which were not reviewed) resulted in large changes, notably for cropland, where net emissions for 1990 increased by 8 166.98 kt CO_2 eq (191.8%), and for grassland, where net emissions/removals changed from a net sink of 230.99 kt CO_2 eq to a net source of more than 1 110 kt CO_2 eq for 1990. Recalculations reported in the 2016 annual submission resulted in changes that were relatively smaller, but still significant, resulting in increases in the net sink for the LULUCF sector in 1990 of 813.82 kt CO_2 eq (1.4%) and in 2013 by 387.78 kt CO_2 eq (0.6%), mainly owing to: (1) the revision of areas of deforestation for all years in the period 1990–2013, which had an impact on all categories related to forest conversion to other land uses (e.g. forest land converted to settlements); and (2) revisions of AD associated with harvested wood products (HWPs). The ERT considers that the drivers for the recalculations and their impacts on the reported estimates are not sufficiently documented in the NIR, notably the main drivers for the recalculations The ERT recommends that Japan more clearly document in the NIR the main drivers for the recalculations and their impact on the sectoral estimates	Yes. Transparency*
L.11	4 General (LULUCF) – General	The ERT found that the area of organic soils (histosols) reported for the agriculture sector in CRF table 3.D under the category cultivation of organic soils (category 3.D.a.6) (176.40 kha) does not consider the area of organic soils reported for the LULUCF sector in CRF table 4.C (56.22 kha). The ERT noted that, although the areas of organic soils reported in CRF table 3.D.a.6 look similar to the areas of organic soils reported under cropland in CRF table 4.B (175.94 kha, with small differences likely owing to rounding), the specific areas of organic soils in pasture land reported under grassland in CRF table 4.C (40.25 kha) seem to not be included in the area of histosols reported under the agriculture sector. In response to questions from the ERT, Japan	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue[a] and/or a problem[b]? If yes, classify by type
		stated that the area of cultivated organic soils reported for the agriculture sector includes all areas of organic soils for rice fields and upland fields and 3% of pasture land (ratio of annually cultivated), while organic soils for orchard, grazed meadow and wild land are not included because they are not cultivated	
		The ERT recommends that Japan include in the NIR a clear explanation for the difference between areas reported for cultivated histosols under the agriculture sector and cropland and grassland organic soils reported under the LULUCF sector using a similar rationale to the one provided to the ERT during the review and which was reported in the 2014 and 2015 NIRs	
L.12	4.B.1 Cropland remaining cropland – CO_2	The ERT noted that, as a result of the implementation of the Roth-C model for estimating carbon stock change in soils for the 2015 annual submission, net carbon stock changes in mineral soils reported under cropland remaining cropland show a very high variability: a highly increasing trend in accumulation of carbon over the period 1990–2003 (going from a carbon stock change net value of –2.23 Mt C in 1990 to +0.58 Mt C in 2003), followed by an abrupt reduction of carbon until 2008 (–2.29 Mt C), which then restarts accumulating at a relatively high rate until 2014 (–0.71 Mt C). This trend is not adequately explained in the NIR. In response to questions from the ERT, Japan provided some information and additional time series of data on carbon input amounts and inter-annual changes in temperature, which still do not sufficiently explain this trend. Furthermore, Japan noted in its responses to the ERT its plan to better explain the trend	Yes. Transparency*
		The ERT considers that the background data and information provided in the CRF tables and the NIR and in the responses of the Party to the questions of the ERT are not sufficient for the ERT to assess the accuracy and time-series consistency of the estimates of carbon stock changes in cropland mineral soils, and recommends that Japan clearly explain in the NIR the resulting estimates from the Roth-C model and their trends	
L.13	4.B.2 Land converted to cropland – CO_2	In response to questions from the ERT in relation to issue L.5 included in table 3, Japan clarified that the calculation method for carbon stock changes in cropland mineral soils was completely revised since the 2015 annual submission by applying a tier 3 method based on the Roth-C model, and that for estimation of carbon stock changes in cropland organic soils tier 1 or tier 2 methods were used. Japan also clarified that, even though	Yes. Transparency*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		the same notation key is used for all subcategories under land converted to cropland as those used in the previous annual submission for carbon stock changes in soils, the use of the notation key "IE" is different in this annual submission: estimates of carbon stock changes in mineral soils for land converted to cropland are included under mineral soils for cropland remaining cropland, and likewise estimates of carbon stock changes in organic soils for land converted to cropland are included under organic soils for cropland remaining cropland. These explanations are also included in the comments to the relevant cells in the CRF tables	
		The ERT commends Japan for its efforts to improve its reporting and recommends that Japan more clearly explain in the NIR the allocation of carbon stock changes in soils and the use of the notation key "IE" in its reporting of organic soils for land converted to cropland (using the above-mentioned clarifications provided to the ERT as a starting point)	
L.14	4.C.1 Grassland remaining grassland – CO_2	The ERT noted that, as a result of the implementation of the Roth-C model for estimating carbon stock change in soils in the 2015 annual submission, net carbon stock changes in mineral soils reported under grassland remaining grassland show a very high variability: increasing trend in accumulation of carbon in mineral soils over the period 1990–2008 (going from a carbon stock change net value of –236.59 kt C in 1990 to +372.82 kt C in 2008), followed by a notable reduction of carbon until 2011 (–23.60 kt C), with some inter-annual variability in the other years. This trend is not adequately explained in the NIR. In response to questions from the ERT, Japan provided some information and additional time series of data on carbon input amounts and inter-annual changes in temperatures, which do not sufficiently explain this trend. Furthermore, Japan recognized in its responses to the ERT the need to better explain this trend	Yes. Transparency*
		The ERT considers that the background data and information provided in the CRF tables and the NIR and in the responses of the Party to the questions of the ERT are not sufficient for the ERT to assess the accuracy and time-series consistency of the estimates for grassland mineral soils, and recommends that Japan clearly explain in the NIR the resulting estimates from the Roth-C model and their trends	
L.15	4.D Wetlands – CO_2	The ERT questioned the Party about the assumption mentioned in the NIR and CRF table 4.D that carbon stock changes for land managed for peat extraction and reported as "NE" for living biomass and soil carbon pools would be insignificant in terms of the	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue[a] and/or a problem[b]? If yes, classify by type
		likely level of emissions, on the basis of the provision in paragraph 37(b) of annex I to decision 24/CP.19. In response, Japan provided details of a rough estimation of emissions from peat extraction made for both on site and off site using an area value from a company involved and default EFs and tier 1 methodology provided by the 2006 IPCC Guidelines to support its assumption that these emissions are insignificant in terms of the likely level of emissions from peat extraction activities	
		The ERT recommends that Japan more clearly justify in the NIR its assumption of insignificance in terms of the likely level of emissions from carbon stock changes in living biomass and mineral and organic soil carbon pools managed for peat extraction in accordance with paragraph 37(b) of annex I to decision 24/CP.19	
		The ERT encourages the Party to continue its efforts and to use the Wetlands Supplement in preparing its estimates for wetlands for future annual submissions	
L.16	4.F.2 Land converted to other land – CO_2	The ERT noted that Japan uses the notation key "NA" to report carbon stock changes in dead organic matter and mineral soils for cropland and grassland converted to other land and "NO" for all carbon stock changes for wetlands and settlements converted to other land. In addition, it is not clear in the NIR what is included under forest conversion to other land and what is the rationale for including soil and stone mining under other land. During the review, Japan provided further details on its criteria for allocating land under other land and explained the use of the notation keys "NA" – using the tier 1 zero assumption for carbon stock per unit area – and "NO" – areas cannot be obtained by the available method – for the above-mentioned carbon pools	Yes. Transparency*
		The ERT recommends that Japan enhance its documentation in the NIR of what is allocated under other land and under conversions to this category from other land uses and better explain its rationale and justification for using "NA" for some of the carbon pools reported under this land category	
L.17	4(III) Direct N_2O emissions from N mineralization/immobilization – N_2O	For CRF table 4(III), the UNFCCC Annex I inventory reporting guidelines require reporting of the total area of the subcategories, in accordance with the subdivision used (as stated in footnote 3 to the table). However, although the Party reported consistently the total land areas in CRF tables 4.A and 4.F for 4.A.1 (forest land remaining forest land) and 4.F.2 (land converted to other land) and CRF table 4(III), the ERT noted an inconsistency in the areas reported in CRF tables 4.B and 4.C for 4.B.2 (land converted to cropland) and 4.C.1 (grassland remaining grassland) and CRF table 4(III). In response	Yes. Consistency*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		to questions from the ERT, Japan explained that the reason for this inconsistency is that the area of organic soils was not included in the area reported in CRF table 4(III) for cropland and grassland, and noted its intention to revise this inconsistency in the next annual submission	
		The ERT recommends that Japan improve the consistency of its reporting for the sector across categories 4.B, 4.C and 4(III)	
L.18	4(V) Biomass burning – CO_2, CH_4 and N_2O	The ERT noted that CO_2, CH_4 and N_2O emissions from controlled burning and wildfires on grassland remaining grassland and from wildfires on land converted to grassland are reported as "NE" owing to lack of suitable AD, without any plan for future improvements being mentioned in the NIR	Yes. Completeness*
		The ERT recommends that Japan develop a plan to obtain suitable AD for these potential sources and report the associated emissions in future annual submissions to improve the completeness of its GHG inventory	
L.19	4(V) Biomass burning – CO_2, CH_4 and N_2O	The ERT noted that emissions from controlled burning and wildfires under wetlands are reported as "NE". In response to further questions from the ERT in relation to emissions from biomass burning on wetlands remaining wetlands, Japan noted that, for CH_4 and N_2O estimations for biomass burning on wetlands, only the biomass burning in river locations was considered and these emissions were regarded as insignificant and therefore reported as "NE", on the basis of the provision in paragraph 37(b) of annex I to decision 24/CP.19, and the Party provided a rough estimation using the tier 1 methodology from the 2006 IPCC Guidelines and some draft AD obtained from available statistics	Yes. Transparency*
		In response to the draft version of this review report, Japan noted that emissions from wildfires on land converted to wetlands are assumed to be insignificant	
		For other locations, page 6-83 of the NIR explains that CH_4 and N_2O emissions from wildfires on land other than forest land and cropland are reported as "NE" because information collected on wildfires is not sufficient, and that CO_2 emissions are not included in CRF table 4(V) because they are included in the estimation of carbon stock changes	
		The ERT recommends that Japan more clearly justify in the NIR its assumption of insignificance in terms of the likely level of emissions of CH_4 and N_2O from controlled	

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue[a] and/or a problem[b]? If yes, classify by type
		burning and wildfires in river locations, under wetlands, and of emissions from wildfires on land converted to wetlands by including in the NIR a rationale similar to the detailed explanations and calculations provided to the ERT during the review week	
L.20	4.G Harvested wood products – CO_2	Japan uses a tier 3 country-specific method to estimate carbon stock changes (and net emissions/removals) associated with sawnwood, wooden board and plywood used in buildings on the basis of available statistics and reports them under category 4.G.1 solid wood. The method estimates the 'inflow' carbon on the basis of the wood used to construct buildings and the 'outflow' carbon on the basis of the discarded carbon when buildings are destroyed. However, from the description of the method provided in section 6.11.1 of the NIR, the ERT noted that carbon losses (and associated emissions) for this category are estimated in each year only for buildings being destroyed within that year and as an instantaneous oxidation in the same year (i.e. no decay function is considered, as recommended in the 2006 IPCC Guidelines). During the review, the ERT asked Japan to explain how the method used ensures that net additions to the HWP pool are not overestimated (i.e. that carbon releases (net CO_2 emissions) are not underestimated) and also asked the Party to clarify whether renovations that may occur during the lifetime of any building are considered in the available statistics and method used. In response Japan explained the allocation rules used for its reporting of HWP under this category, noting that all carbon for buildings is calculated as instant oxidation in the year when the buildings are destroyed (i.e. tier 3 country-specific method). Japan noted that data about destroyed buildings are based on statistics, and emissions/removals are estimated appropriately, considering economic recessions and natural disasters. Japan clarified that renovations are not considered in Japan's original method for "Building (tier 3)" but are considered for "Wood used for other than buildings (tier 2)" The ERT recommends that Japan improve the documentation in the NIR of what is included in each HWP commodity reported under category 4.G by better describing how the methods used account for carbon losses due to destruction and renovation of buildings	Yes. Transparency*
Waste			
W.1	5 General (waste)	Paragraph 89 of the 2014 annual review report reiterated an encouragement from previous review reports (2012 and 2013) for Japan to implement planned improvements, such as the development of the country-specific parameter methane generation rate	Not an issue

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		constant (k) for sludge, country-specific CH_4 EFs for industrial wastewater and the estimation of CH_4 recovery from industrial wastewater, for its next annual submission. During the review, Japan stated that, while survey results from the last fiscal year for country-specific CH_4 and N_2O EFs for industrial wastewater will be used for reporting in the next NIR, the development of the country-specific k value for sludge and the estimation of a country-specific CH_4 EF for recovery from industrial wastewater treatment plants are not included in the Party's short-term development plans	
		The ERT appreciates the clarification of these issues and encourages the Party to report the country-specific CH_4 and N_2O EFs for industrial wastewater in the next NIR as planned. The ERT also encourages the Party to continue working towards the implementation of improvements (such as the development of the country-specific k value for sludge and the estimation of CH_4 recovery from industrial wastewater) and to consider adding the status of implementation of such long-term improvements to Japan's inventory improvement plan and to report on this in the NIR	
W.2	5.A Solid waste disposal on land – CH_4	In the NIR, section 2.2.5 (p. 2-18), Japan noted that "the main driving factor for the decrease in emissions since FY1990 is the decrease in CH_4 emissions from solid waste disposal on land as a result of decrease in the amount of disposal of biodegradable waste due to improvement of volume reduction ratio by intermediate treatment under Waste Management and Public Cleansing Act, Basic Law for Establishing the Recycling-based Society, and other recycling laws". During the review, Japan explained that it is difficult to numerically evaluate the recycle/reuse contribution to GHG emission reductions in the waste sector and/or the percentage contribution of these reductions to Japan's total GHG emissions. However, the Party noted that while the recycling rate of waste in Japan had increased in 2013 (16%) compared with in 1990 (8%), the total disposal amount had reduced in 2013 (16 Mt/year) compared with in 1990 (110 Mt/year)	Not an issue
		The ERT encourages Japan to provide additional information in the NIR related to recycling and reuse to support the further understanding of the factors causing GHG emission reductions in the waste sector	
W.3	5.A.1 Managed waste disposal sites – CH_4	The ERT noted that the trend in CH_4 IEFs (anaerobic) is not stable and varies in the range of –34.0% (2012/2013) to +52.1% (2006/2007)). The CH_4 IEF values are among the highest reported by Parties (range: 0.01–0.50 t CH_4/t waste) and the CH_4 IEF for semi-aerobic sites shows considerable variation (e.g. 24.7% in 1991/1992 and 55.8% in	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue[a] and/or a problem[b]? If yes, classify by type
		2006/2007). In response to a question raised by the ERT, Japan explained that, because emission estimates for this category are based on the first-order decay method from the 2006 IPCC Guidelines, there are time lags between the series of AD (landfill amount) and CH_4 emissions	
		Taking into account the response from the Party, the ERT recommends that Japan provide additional details in the NIR on the impact on estimated CH_4 emissions of time lags in the AD for waste landfilling and additional information on any significant inter-annual changes and the trend in the CH_4 IEFs	
W.4	5.A.3 Uncategorized waste disposal sites – CH_4	The ERT noted that the 2014 CH_4 IEF (0.74 t/t waste) for uncategorized waste disposal sites is the highest reported by Parties (range: 0.04–0.74 t CH_4/t waste) with large variations in the values (e.g. 0.007 t CH_4/t waste in 1990 and 1998 to 0.361 and 0.74 t CH_4/t waste in 2013 and 2014, respectively). Japan provided the same explanation for the observation as provided for issue W.3 above	Yes. Transparency*
		Noting the various factors impacting the IEF, the ERT recommends that Japan include in the NIR additional information on the main factors contributing to the observed trend in the CH_4 IEF for uncategorized waste disposal sites	
W.5	5.C.1 Waste incineration – CO_2	The inter-annual change in the CO_2 IEF for waste incineration (both biogenic and non-biogenic for municipal solid waste) showed a large reduction in the value for 2014 compared with that for 2013 (18.7% and 25.6%, respectively). The ERT noted that the IEF reported for 2014 (702.47 kg/t waste for biogenic and 1 895.63 kg/t waste for non-biogenic) does not match the rest of the time series (which is relatively stable). Japan explained that the data for 2014 are temporary and will be updated in the next inventory submission. The ERT noted that, although use of preliminary data is not uncommon for AD, this is not typically the case for EFs. The ERT also noted that there was no indication from Japan that there was a major change to the composition of the waste between 2013 and 2014. Noting that the preliminary data are the 'best available', the ERT considers that use of these data should be justified as producing the most accurate estimates. If that is not possible, then the waste composition and EFs from the previous year should be used and recalculated for the subsequent annual submission	Yes. Accuracy*
		The ERT recommends that, prior to using temporary data, the Party ensure that the use of such data would result in a more accurate estimate of emissions than extrapolating previous data in accordance with procedures in the 2006 IPCC Guidelines, and also	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is the finding an issue[a] and/or a problem[b]? If yes, classify by type*
		recommends that Japan include an explanation of any unexpected reduction in the time series of CO_2 IEFs in the NIR	
KP-LULUCF			
KL.3	General (KP-LULUCF)	Japan does not have a quantified emission limitation and reduction commitment for the second commitment period of the Kyoto Protocol. The Party has included information in its NIR on which voluntary activities under Article 3, paragraph 4, of the Kyoto Protocol it will include in its reporting. The Party indicated it will report on revegetation (as per the first commitment period) and add reporting for cropland management and grazing land management. The ERT notes that this is in accordance with decision 3/CMP.11	Not a problem
KL.4	Cropland management – CO_2	Japan used the well-known and respected soil carbon model Roth-C to estimate changes in soil carbon stocks for cropland management/cropland remaining cropland. The ERT noted that Japan uses different area data for the calculation of the area under cropland management (AD) compared with the area data used to run the Roth-C model (see p. 6-26 of the NIR). The ERT noted that this could lead to inconsistencies in the emission estimates where the total emissions using one method are applied to the activity areas derived from another method. In response to the questions of the ERT, Japan stated that, although the data are not completely consistent, they are harmonized in the final results to match the official activity areas. The ERT agreed that this harmonization should ensure consistent representation of lands	Yes. Transparency*
		The ERT recommends that Japan improve the description of the different sources of land-use data used as inputs for soil carbon estimates for cropland in the Roth-C model and how these are harmonized to ensure consistent representation of lands and to prevent over- or underestimation of AD and net emissions/removals	
KL.5	Cropland management – CO_2	The ERT notes and commends Japan for moving to tier 3 methods (Roth-C model) for estimating changes in mineral soil carbon stocks for cropland management activities. However, the ERT noted that the NIR contains limited information on the calibration and validation activities and how the overall result of the models neither over- nor underestimates emissions for cropland management. Further, as also noted in issue L.12 above, the ERT found that the trends in emissions were not well explained. During the review, Japan noted that: (1) the calibration and validation results are presented in	Yes. Accuracy*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue[a] and/or a problem[b]? If yes, classify by type
		external references; and (2) it is currently undertaking model verification activities and these will be reported in future annual submissions The ERT recommends that Japan report the results of the verification activities in the next annual submission. The ERT encourages Japan to include a summary of calibration and validation results in the NIR to demonstrate that the models are not systematically over- or underestimating net emissions/removals. The ERT also encourages the Party to include an analysis of which factors are driving changes in soil carbon (e.g. changes in management, climate or lag effects), which could better explain the trends in emissions and removals over time	
KL.6	Grazing land management – CO_2	The ERT notes and commends Japan for moving to tier 3 methods (Roth-C model) for estimating changes in mineral soil carbon stocks for grazing land management activities. However, the ERT noted that the NIR contains limited information on the calibration and validation activities and how the overall result of the models neither over- nor underestimates emissions for grazing land management (see also L.14 above). During the review, Japan noted that: (1) the calibration and validation results are presented in external references; and (2) it is currently undertaking model verification activities and these will be reported in future annual submissions The ERT recommends that Japan report the results of the verification activities in the next annual submission. The ERT encourages Japan to include a summary of calibration and validation results in the NIR to demonstrate that the models are not systematically over- or underestimating net emissions/removals	Yes. Accuracy*

Abbreviations: AD = activity data, CRF = common reporting format, EF = emission factor, ERT = expert review team, F-gas = fluorinated gas, GHG = greenhouse gas, HWP = harvested wood products, IE = included elsewhere, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, NE = not estimated, NEU = non-energy use, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control, TFT = thin-film transistor, UNFCCC Annex I inventory reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories", Wetlands Supplement = *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*, 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

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

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

[c] Kazunari K. 2010. *Evaluation and Verification of Limestone and Dolomite origin CO_2 emissions using I/O table and Industrial Statistics data in Japan*. Research Institute of Economy, Trade and Industry. Available at <http://www.rieti.go.jp/users/kainou-kazunari/10j026_e.pdf>.

[d] The ERT notes that, according to the chemical reaction of CaC_2 formation, at least 1 mole of CO_2 (or 44 kg) is emitted for the formation of 1 mole of CaC_2 (or 64 kg). Thus, the CO_2 EF should be at least 44 kg CO_2/64 kg CaC_2 or 687.5 kg CO_2/t CaC_2.

[e] Osada T, Fukumoto Y, Tamura T, Shiraihi M and Ishibashi M. 2005. *Greenhouse gas generation from livestock waste composting, Non-CO_2 Greenhouse Gases (NCGG-4)*. Proceedings of the Fourth International Symposium NCGG-4. pp.105–111. See also the Ministry of Agriculture, Forestry and Fisheries of Japan 2012 Project on Survey and Investigation for Elaboration of GHG Emissions from Agriculture, Forest and Fisheries Sector, within the Project on Development for Method of Promotion for Countermeasures of Global Environment in the Agriculture, Forest and Fisheries Sector in 2011.

[f] Akiyama H, Yagi K and Yan X. 2006.Estimations of emission factors for fertilizer-induced direct N_2O emissions from agricultural soils in Japan. Summary of available data. *Soil Science and Plant Nutrition*. 52: pp.774–787.

VI. Application of adjustments

9. Japan does not have a quantified emission limitation or reduction commitment in the second commitment period of the Kyoto Protocol and therefore the application of adjustments does not apply.

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

10. Japan does not have a quantified emission limitation or reduction commitment in the second commitment period of the Kyoto Protocol and does not account for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol.

VIII. Questions of implementation

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

Annex I

Overview of greenhouse gas emissions and removals for Japan 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 Japan.

Table 6
Total greenhouse gas emissions for Japan, 1990–2014[a]
(kt CO_2 eq)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions including indirect CO_2 emissions*[b]		*Land-use change (Article 3.7 bis as contained in the Doha Amendment)*[c]	*KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)*[d]	*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*[e]	*FM*
FMRL								0.00
1990	1 211 447.79	1 270 742.95	1 211 447.79	1 270 742.95	NA		11 023.44	
1995	1 305 245.66	1 379 924.54	1 305 245.66	1 379 924.54				
2000	1 299 902.22	1 386 713.84	1 299 902.22	1 386 713.84				
2010	1 235 778.92	1 304 902.64	1 235 778.92	1 304 902.64				
2011	1 285 278.15	1 354 616.01	1 285 278.15	1 354 616.01				
2012	1 317 744.68	1 390 339.97	1 317 744.68	1 390 339.97				
2013	1 342 835.65	1 407 883.23	1 342 835.65	1 407 883.23		960.68	2 047.69	–51 070.04
2014	1 302 398.86	1 363 862.31	1 302 398.86	1 363 862.31		1 602.59	3 013.37	–50 033.24

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

[b] The Party has not reported indirect CO_2 emissions in common reporting format table 6.

[c] The value reported in this column refers to 1990.

[d] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[e] Japan has provided information, in accordance with decision 3/CMP.11, paragraph 8, that it will report on CM, GM and RV under Article 3, paragraph 4, of the Kyoto Protocol. The base year for CM, GM and RV under Article 3, paragraph 4, of the Kyoto Protocol is 1990.

Table 7

Greenhouse gas emissions by gas for Japan, 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*[c]	*SF_6*	*NF_3*
1990	1 155 993.62	48 582.35	30 812.41	15 932.31	6 539.30		12 850.07	32.89
1995	1 242 494.02	45 806.84	32 150.30	25 213.13	17 609.92		16 447.52	202.81
2000	1 274 297.99	41 474.30	28 999.21	22 851.86	11 873.11		7 031.36	186.01
2010	1 212 970.23	38 272.26	22 312.32	23 304.97	4 249.54		2 423.87	1 369.46
2011	1 261 862.94	37 281.70	21 835.79	26 071.20	3 755.45		2 247.64	1 561.30
2012	1 296 186.36	36 452.82	21 425.97	29 348.39	3 436.33		2 234.54	1 255.57
2013	1 311 509.15	36 065.69	21 477.90	32 087.66	3 280.06		2 101.81	1 360.96
2014	1 265 490.61	35 481.87	20 848.33	35 784.94	3 361.43		2 064.41	830.72
Per cent change 1990–2014	**9.5**	**–27.0**	**–32.3**	**124.6**	**–48.6**		**–83.9**	**2 425.8**

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

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

[c] The cells for unspecified mix of HFCs and PFCs are blank in the Party's submission.

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

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*[c]
1990	1 091 235.57	109 309.82	41 997.80	–59 295.16	28 199.76	
1995	1 172 036.01	135 098.00	41 328.92	–74 678.88	31 461.61	
2000	1 209 835.59	106 634.08	39 235.82	–86 811.62	31 008.36	
2010	1 164 439.41	78 355.48	39 856.99	–69 123.72	22 250.76	
2011	1 213 597.98	80 165.09	39 430.36	–69 337.86	21 422.59	
2012	1 246 948.79	82 779.84	38 889.55	–72 595.29	21 721.80	
2013	1 260 638.74	87 011.58	38 838.52	–65 047.58	21 394.38	
2014	1 214 698.24	89 649.66	38 372.24	–61 463.44	21 142.17	
Per cent change 1990–2014	**11.3**	**–18.0**	**–8.6**	**3.7**	**–25.0**	

Abbreviations: IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry.
[a] Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.
[b] Japan did not report indirect CO_2 emissions in common reporting format table 6.
[c] The cells for the category other are blank in the Party's submission.

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 Japan

(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[c]	*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				0.00				
Technical correction				1 489.30				
Base year	NA				10 261.57	840.66	–78.79	NA
2013		–532.44	1 493.12	–51 070.04	3 553.69	–299.54	–1 206.47	NA
2014		–531.45	2 134.04	–50 033.24	4 328.38	–90.22	–1 224.79	NA
Per cent change base year–2014					**–57.8**	**–110.7**	**1 454.5**	**NA**

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

[a] Japan has provided information, in accordance with decision 3/CMP.11, paragraph 8, that it will report on cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol. For activities under Article 3, paragraph 3, of the Kyoto Protocol, and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] Values in this table include emissions on land subject to natural disturbances, if applicable.

[c] The value reported in this column refers to 1990.

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

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

Key parameters	*Values*
Periodicity of accounting	NA
Election of activities under Article 3, paragraph 4	Cropland management, grazing land management and revegetation
Election of application of provisions for natural disturbances	No
3.5% of total base-year GHG emissions, excluding LULUCF and including indirect CO_2 emissions	NA
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

Additional information to support findings in table 2

Missing categories that may affect completeness

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

(a) Carbon dioxide (CO_2) emissions from sugar mills under category 2.A.2 lime production (see I.8 in table 5);

(b) CO_2 emissions from non-marketed lime under category 2.A.2 lime production (see I.8 in table 5);

(c) CO_2 emissions from minor glass raw materials (e.g. barium carbonate, bone ash, potassium carbonate and strontium carbonate) under category 2.A.3 glass production (see I.9 in table 5);

(d) Hydrofluorocarbon emissions from refrigerant container management under category 2.F.1 refrigeration and air conditioning (I.18 in table 5);

(e) CO_2, methane and nitrous oxide emissions from biomass burning on grassland (controlled burning and wildfires) and land converted to wetlands (wildfires) (see L.1 in table 3, L.18 and L.19 in table 5).

Annex III

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 Japan for 2016. Available at <http://unfccc.int/resource/docs/2016/asr/JPN.pdf>.

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

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

FCCC/ARR/2012/JPN. Report of the individual review of the annual submission of Japan submitted in 2012. Available at <http://unfccc.int/resource/docs/2013/arr/jpn.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 Japan for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_jpn_1_2.pdf>.

Standard independent assessment report, part 2, for Japan for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_jpn_2_2.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Akira Osako (Greenhouse Gas Inventory Office of Japan), including additional material on the methodology and assumptions used. The following documents[1] were also provided by Japan:

"Evaluation and Verification of Limestone and Dolomite origin CO_2 emissions using I/O table and Industrial Statistics data in Japan" (Kainou Kazunari, RIETI).

Shibata, M., Terada, Fuminori, T., Kurihara, M., Nishidam T. and Iwasaki, K,, Estimation of methane production in ruminants. National Institute of Animal Industry. Animal Science Technology Journal 64 (8): 790-796, 1993.

Akiyama, H., Yagi, K., and Yan, X, "Estimations of emission factors for fertilizer-induced direct N_2O emissions from agricultural soils in Japan", Summary of available data, Soil Science and Plant Nutrition, 52, 774-787, 2006.

Akinori Mori and Masayuki Hojito, "Methane and nitrous oxide emissions due to excreta returns from graizing cattle in Nasu, Japan", Grassland Science 61(2), 109-120. (2015).

Katayanagi, N., Fumoto, T., Hayano, M., Takata, Y., Kuwagata, T., Shirato, Y., Sawano, S., Kajiura, M., Sudo, S., Ishigooka, Y and Yagi, K. Development of a method for estimating total CH4 emission from rice paddies in Japan using the DNDC-Rice model. Science of the Total Environment 547 (2016) 429–440.

Osada, T., Fukumoto, Y., Tamura, T,, Shiraihi, M. and Ishibashi, M. Greenhouse gas generation from livestock waste composting. Proceedings of the Fourth International Symposium NCG-4 (Non-CO, Grecnhouse Gases), 2005, 105-111.

FAO. 2007 – WORLD BAMBOO RESOURCES, A thematic study prepared in the framework of the Global Forest Resources Assessment 2005. Viale delle Terme di Caracalla, 00153 Rome, Italy. Available at: http://www.fao.org/docrep/010/a1243e/a1243e00.htm.

FAO. 2010 – GLOBAL FOREST RESOURCES, ASSESSMENT 2010, COUNTRY REPORT, JAPAN. Viale delle Terme di Caracalla Rome 00153, Italy. Available at: http://www.fao.org/docrep/013/al539E/al539E.pdf.

[1] Reproduced as received from the Party.

Annex IV

Acronyms and abbreviations

AAU	assigned amount unit
AD	activity data
CER	certified emission reduction unit
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
FAO	Food and Agriculture Organization of the United Nations
$Frac_{GASM}$	fraction of livestock nitrogen excretion that volatilizes as ammonia and nitrogen oxides
GHG	greenhouse gas
IE	included elsewhere
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
KP-LULUCF	LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
kt	kilotonne
LULUCF	land use, land-use change and forestry
MCF	methane conversion factor
NA	not applicable
NE	not estimated
NIR	national inventory report
NO	not occurring
QA/QC	quality assurance/quality control
RMU	removal unit
SEF	standard electronic format
SIAR	standard independent assessment report
UNFCCC	United Nations Framework Convention on Climate Change