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Report on the individual review of the annual submission of Australia submitted in 2019*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual inventory of emissions and removals of greenhouse gases for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2019 annual submission of Australia, 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 2 to 7 September 2019 in Bonn.

* In the symbol for this document, 2019 refers to the year in which the inventory was submitted, not to the year of publication.

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Contents

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AAU	assigned amount unit
AD	activity data
Annex A source	source category included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
Article 8 review guidelines	"Guidelines for review under Article 8 of the Kyoto Protocol"
CaO	calcium oxide
CER	certified emission reduction
CH_4	methane
CM	cropland management
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
COD	chemical oxygen demand
Convention reporting adherence	adherence to the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
CP	commitment period
CPR	commitment period reserve
CRF	common reporting format
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
FM	forest management
FMRL	forest management reference level
FullCAM	fully integrated Carbon Accounting Model
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
KP-LULUCF activities	activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
Kyoto Protocol Supplement	*2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*
LULUCF	land use, land-use change and forestry
MCF	methane conversion factor
MgO	magnesium oxide
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NDC	nationally determined contribution
NE	not estimated
NF_3	nitrogen trifluoride

NGER	Australian National Greenhouse and Energy Reporting
NIR	national inventory report
NO	not occurring
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulfur hexafluoride
UNFCCC Annex I inventory reporting guidelines	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
UNFCCC review guidelines	"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention"
WDR	wetland drainage and rewetting
Wetlands Supplement	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*

I. Introduction[1]

1. This report covers the review of the 2019 annual submission of Australia organized by the secretariat in accordance with the Article 8 review guidelines (adopted by decision 22/CMP.1 and revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention" (decision 13/CP.20). The review took place from 2 to 7 September 2019 in Bonn and was coordinated by Pedro Torres, Davor Vesligaj and Simon Wear (secretariat). Table 1 provides information on the composition of the ERT that conducted the review of Australia.

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

Area of expertise	*Name*	*Party*
Generalist	Mausami Desai	United States of America
	Hongwei Yang	China
Energy	Branca Americano	Brazil
	Kendal Blanco-Salas	Costa Rica
	Veronika Ginzburg	Russian Federation
IPPU	Ann Marie Ryan	Ireland
	Takuji Terakawa	Japan
	Qing Tong	China
Agriculture	Jorge Alvarez	Peru
	Jacques Kouazounde	Benin
LULUCF and KP-LULUCF activities	Thiago de Araújo Mendes	Brazil
	Atsuko Hayashi	Japan
	Igor Onopchuk	Ukraine
Waste	Takefumi Oda	Japan
	Gao Qingxian	China
Lead reviewers	Mausami Desai	
	Hongwei Yang	

2. The basis of the findings in this report is the assessment by the ERT of the Party's 2019 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines. The ERT notes that the individual inventory review of Australia's 2018 annual submission did not take place in 2018 owing to insufficient funding for the review process.

3. The ERT has made recommendations that Australia resolve the findings related to issues,[2] including issues designated as problems.[3] Other findings, and, if applicable, the encouragements of the ERT to Australia to resolve them, are also included.

[1] At the time of publication of this report, Australia had submitted its instrument of ratification of the Doha Amendment; however, 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, para. 6, pending the entry into force of the Amendment.

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

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

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

5. Annex I shows annual GHG emissions for Australia, including totals excluding and including the LULUCF sector, indirect CO_2 emissions, and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from KP-LULUCF activities, if elected by Australia, by gas, sector and activity.

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

II. Summary and general assessment of the 2019 annual submission

7. Table 2 provides the assessment by the ERT 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 Australia

Assessment			*Issue or problem ID#(s) in table 3 and/or 5*[a]
Date of submission	Original submission: 24 May 2019 (NIR), 24 May 2019 (CRF tables) version 1, 24 May 2019 (SEF-CP1-2018 and SEF-CP2-2018 tables)		
Review format	Centralized		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	No	
	(b) Selection and use of methodologies and assumptions?	Yes	I.21, W.13, KL.7
	(c) Development and selection of EFs?	Yes	G.3, I.18, A.5, L.9
	(d) Collection and selection of AD?	Yes	I.19
	(e) Reporting of recalculations?	No	
	(f) Reporting of a consistent time series?	Yes	I.8
	(g) Reporting of uncertainties, including methodologies?	No	
	(h) QA/QC?	QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below)	
	(i) Missing categories/completeness?[b]	No	
	(j) Application of corrections to the inventory?	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	No	G.7
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes	
Supplementary information under	Have any issues been identified related to the following aspects of the national system:		

Assessment			*Issue or problem ID#(s) in table 3 and/or 5[a]*
the Kyoto Protocol	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	No	
	(b) Performance of the national system functions?	No	
	Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry?	No	
	(b) Performance of the functions of the national registry and the technical standards for data exchange?	No	
	Have any issues been identified related to reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the standard independent assessment report?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	No	
	Have any issues been identified related to the following reporting requirements for KP-LULUCF activities:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	Yes	KL.7
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	No	
	(c) Reporting requirements of decision 6/CMP.9?	No	
	(d) Country-specific information to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34?	No	
CPR	Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Did the Party submit a revised estimate to replace a previously applied adjustment?	NA	The Party does not have a previously applied adjustment
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for 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	

Assessment			*Issue or problem ID#(s) in table 3 and/or 5[a]*
Questions of implementation	Did the ERT list any questions of implementation?	No	

[a] The ERT identified additional issues and/or problems in the general, energy, IPPU, agriculture, LULUCF and waste sectors as well as issues and/or problems related to reporting on KP-LULUCF activities that are not listed in this table but are included in table 5.
[b] Missing categories, if any, for which methods are provided in the 2006 IPCC Guidelines may affect completeness and are listed in annex III.

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

8. Table 3 compiles all the recommendations made in previous review reports that were included in the previous review report, published on 30 April 2018.[4] 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 2019 annual submission and provided the rationale for its determination, which takes 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 Australia

ID#	*Issue and/or problem classification[a, b]*	*Recommendation made in previous review report*	*ERT assessment and rationale*
General			
G.1	Recalculations (G.4, 2017) Transparency	Include in the NIR the description of the new rounding policy for AD, EFs and other parameters for all sectors.	Resolved. The NIR (vol. 1, section 1.2.3, p.19) includes an abbreviated reference to the standardization of rounding, specifically regarding the number of decimal places to be employed for inventory input parameters, molecular factors and AD used for emission estimates. During the review, the Party clarified that a detailed description of the policy was included in the 2018 submission (2018 NIR, vol. 1, section ES.4.1).
G.2	Article 3, paragraph 14, of the Kyoto Protocol (G.5, 2017) KP reporting adherence	Identify any changes to the information reported in accordance with Article 3, paragraph 14, when compared with the previous inventory submission.	Resolved. The NIR (vol. 3, section 15, p.95) indicates what has changed since the previous submission, namely the Party's provision of funding and assistance to the NDC Partnership to establish the Regional Pacific NDC Hub.
G.3	EFs (G.6, 2017) Transparency	Document and justify the appropriateness of the default EFs for CH_4 emissions for categories 2.B and 5.D. Derive country-specific EFs for those cases where the default EFs are applied for key categories of the national inventory and it is impossible to justify the appropriateness of their use. Correctly note the use of country-specific factors where a default value has been assessed as being appropriate for Australia.	Resolved. The Party explained the choice and appropriateness of the EFs used. It applied country-specific EFs for key categories 2.B.1 (ammonia production) and 2.B.2 (nitric acid production) (see the NIR, vol. 1, pp.193–195). The Party used country-specific EFs derived from plant-specific data to estimate CH_4 emissions for non-key category 2.B.8 (petrochemical and carbon black production) (see the NIR, vol. 1, p.202). For key category 5.D (wastewater treatment and discharge), EFs were derived using facility-specific information and default parameters from the

[4] FCCC/ARR/2017/AUS. The ERT notes that the report on the individual inventory review of Australia's 2018 annual submission has not been published yet. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2017 annual submission.

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			2006 IPCC Guidelines (see the NIR, vol. 1 pp.308–311).
G.4	Uncertainty analysis (G.7, 2017) Convention reporting adherence	Complete an inventory uncertainty analysis on a gas-by-gas basis using the particular GHGs recommended by the 2006 IPCC Guidelines, or provide transparent information that the procedures used are in accordance with the 2006 IPCC Guidelines.	Resolved. The Party undertook the uncertainty assessment on a gas-by-gas basis and included the results in the NIR (vol. 3, annex 2, tables A2.1–A2.2 (excluding LULUCF) and tables A2.3–A2.4 (including LULUCF)). This approach is in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 3).
G.5	Uncertainty analysis (G.8, 2017) Convention reporting adherence	Include information on the base-year uncertainty assessment in the next annual inventory submissions.	Resolved. The Party included information on the base-year uncertainty assessment for the whole inventory (including and excluding LULUCF) in the NIR (vol. 3, annex 2, p.113).
Energy			
	No issues identified		
IPPU			
I.1	2. General (IPPU) (I.13, 2017) Convention reporting adherence	Refer to the correct tier levels in NIR table 4.2 for CO_2 emissions for categories 2.B.1 and 2.C.1 and for CO_2 and PFC emissions for category 2.C.3 in accordance with the 2006 IPCC Guidelines.	Resolved. The tier levels in NIR table 4.2 for CO_2 emissions for categories 2.B.1 (ammonia production) and 2.C.1 (iron and steel production) and for CO_2 and PFC emissions for category 2.C.3 (aluminium production) were corrected in accordance with the 2006 IPCC Guidelines. The Party specified that tier 3 methodology was applied in all cases.
I.2	2.A.1 Cement production – CO_2 (I.2, 2017) (I.4, 2016) (I.7, 2015) Accuracy	Confirm or update the CaO and MgO content ratios in order to ensure the accuracy of the values for more recent years and the consistency of the time series.	Resolved. For 2016 onward CaO and MgO content for two of the producers was updated from the country-specific EF to a new facility-specific EF based on the CaO and MgO content of the clinker in accordance with the provisions set out in the NGER system. The remaining producers continue to use the country-specific EF as this best suits their particular product specifications. This information was included in the NIR (vol. 1, section 4.3.1, p.180, and vol. 3, annex A.6.3, p.165).
I.3	2.A.4 Other process uses of carbonates – CO_2 (I.15, 2017) Accuracy	Correct the CO_2 IEF in CRF table 2(I).A-Hs1, verify whether the CO_2 emission estimates are accurate and provide information about the results in the next submission.	Resolved. The CO_2 IEF was corrected in CRF table 2(I).A-Hs1 and a description of the methodology for estimating emissions was provided in the NIR (vol. 1, section 4.3.4, p.184). The CO_2 IEF is 0.47 t CO_2/t and within the IPCC default range (0.37–0.52 t CO_2/t).
I.4	2.B.1 Ammonia production – CO_2 (I.5, 2017) (I.7, 2016) (I.10, 2015) Transparency	Improve the level of transparency used to report disaggregated subcategory emission data for ammonia production, while preserving the legally required confidentiality in the overall reporting of emissions.	Resolved. CRF table 2(I).A-Hs1 contains information on AD for ammonia production for the entire time series and the NIR (vol. 1, section 4.4.1, p.192) reports disaggregated emissions from ammonia production.
I.5	2.B.1 Ammonia production – CO_2 (I.6, 2017) (I.8, 2016) (I.10, 2015) Transparency	Ensure consistency between the emission levels reported in the IPPU chapter of the NIR and in the key category analysis.	Resolved. The emission levels were reported consistently in the IPPU chapter of the NIR (vol. 1, section 4, table 4.12) and the key category analysis (NIR, vol. 3, annex 1).

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
I.6	2.B.1 Ammonia production – CO_2 (I.16, 2017) Accuracy	Correct the double counting of CO_2 emissions in urea production and use by excluding from ammonia production (category 2.B.1) the CO_2 emissions recovered for use in the production of urea and by reporting such emissions in accordance with the 2006 IPCC Guidelines (vol. 3, chap. 3, box 3.2).	Resolved. Information related to the CO_2 captured and used in either the production of urea or the manufacture of food and drink products and its deduction from CO_2 emissions from ammonia production, thus avoiding double counting, was included in the NIR (vol. 1, section 4.4.1, p.193).
I.7	2.B.1 Ammonia production – CO_2 (I.17, 2017) Transparency	Correct figure 4.4 of the NIR to reflect the correct amount of CO_2 generated per t ammonia produced.	Resolved. The amount of CO_2 generated per t ammonia produced presented in figure 4.4 of the NIR submitted in 2017 (vol. 1, p.200) was corrected in figure 4.5 of the NIR (vol. 1, p.203).
I.8	2.C Metal industry – CO_2 (I.7, 2017) (I.11, 2016) (I.34, 2015) Consistency	Investigate whether other drivers could be applied to estimate emissions from lead production, zinc production and other (metal production) for 1990–2008, such as production volumes.	Addressing. The Party reported in the NIR (vol. 1, p.213) that nickel and silver production for 1990–2008 were estimated using metal production statistics. However, the ERT could not confirm the emission level or AD from the information provided in the NIR and the CRF tables. During the review, Australia explained that it will incorporate new information on lead and zinc production in the next annual submission.
I.9	2.C.1 Iron and steel production – CH_4 (I.8, 2017) (I.15, 2016) (I.17, 2015) Transparency	Correct the AD for steel production in the CRF tables and improve the QA/QC tests for the reporting in the NIR and the CRF tables in order to avoid data entry errors.	Resolved. Steel production AD reported in CRF table 2(I).A-Hs2 were reported as confidential throughout the time series in the 2018 and 2019 submissions owing to the confidentiality of the data.
I.10	2.D.1 Lubricant use – CO_2 (I.14, 2017) Accuracy	Correct the CO_2 IEF in CRF table 2(I).A-Hs2, verify whether the CO_2 emission estimates are accurate and provide information about the results in the next submission.	Resolved. The Party corrected the CO_2 IEF in CRF table 2(I).A-Hs2 in the NIR. The corrected CO_2 IEF is 0.54 t CO_2/t for the entire time series and within the IPCC default range (0.23–0.95 t CO_2/t). The change did not affect the estimated CO_2 emissions.
I.11	2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.9, 2017) (I.22, 2016) (I.23, 2015) Transparency	Include in the methodological description in the NIR a more accurate description of the methodology used, in particular the use of the vintage stock model.	Resolved. The Party updated the description of the methodology in the NIR (vol. 1, section 4.8.2), including on the use of the vintage stock model.
I.12	2.F.5 Solvents – HFCs (I.10, 2017) (I.28, 2016) (I.30, 2015) Accuracy	Align the calculation method with the definition provided in the NIR, and apply an operational loss of 25, 50 and 25 per cent, respectively, for use of fluorinated gases as solvents.	Resolved. HFC emissions from use of fluorinated gases in aerosols and solvents were recalculated to ensure that all charge was calculated as lost over three years by applying an operational loss of 25, 50 and 25 per cent, respectively, for each year.
I.13	2.G.3 N_2O from product uses – N_2O (I.11, 2017) (I.34, 2016) Transparency	Include in the NIR the information that in 2003 one of the two N_2O-producing plants in Australia ceased production and the Party started to import N_2O, and that for 2003 onward N_2O emissions from product uses are estimated on the basis of imports in addition to domestic production.	Resolved. The Party included in the NIR (vol. 1, section 4.9, p.251) the information that in 2003 one of the two N_2O-producing plants in Australia ceased production and the Party started to import N_2O, and that for 2003 onward N_2O emissions from product uses were estimated on the basis of imports in addition to domestic production.

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
I.14	2.G.3 N_2O from product uses – N_2O (I.18, 2017) Transparency	Include an explanation in the NIR that no AD on N_2O imports are available and emissions are estimated using a per capita usage factor assumed to include imports and domestic production throughout the time series.	Resolved. Australia included relevant information in the NIR (vol. 1, section 4.9, p.251).
I.15	2.G.3 N_2O from product uses – N_2O (I.18, 2017) Transparency	Explain the methodology used for estimating N_2O imports using the per capita usage factor, verify that no under- or overestimation of emissions occurs and report the results in the NIR.	Addressing. Australia included information on production and imports of N_2O in the NIR (vol. 1, section 4.9, p.251). However, the information provided was not disaggregated and thus the ERT could not validate the amounts of N_2O imported. Australia explained that it will continue to seek additional data to enable it to disaggregate this information in future submissions.
Agriculture			
A.1	3. General (agriculture) (A.10, 2017) Convention reporting adherence	Update the default EFs in NIR table 5.11 in accordance with the 2006 IPCC Guidelines.	Resolved. Australia included in the NIR (vol. 1, section 5.3.7, table 5.12, p.282) default EFs in line with the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.10).
A.2	3. General (agriculture) (A.11, 2017) Transparency	Document in the NIR the expert judgment used in line with the 2006 IPCC Guidelines (vol. 1, chap. 2, table 2A.1), for example through the provision of, or reference to, external documents containing the expert judgment protocols, minutes of panel meetings, reports, peer-reviewed articles, etc.	Resolved. Australia included relevant information on the expert judgment used in the NIR (vol. 1, section 5.2.1, table 5.4, p.272) in line with the 2006 IPCC Guidelines (vol. 1, chap. 2, table 2A.1).
A.3	3. General (agriculture) – CH_4 and N_2O (A.13, 2017) Transparency	Explain in the NIR the reasons for adjusting the numbers of cattle and the assumptions considered per animal species in order to obtain the annual equivalent number of animals held on feedlots.	Resolved. Australia included information on the approach and assumptions used to derive the annual equivalent number of animals held on feedlots in the NIR (vol. 1, sections 5.3.2.2–5.3.2.3, pp.276–278).
A.4	3.A Enteric fermentation – CH_4 (A.14, 2017) Transparency	Include in the NIR information on the conduct and results of the QA reviews of FullCAM (related to the review of agriculture, cropland and grassland) and of the agriculture inventory expert advisory panel, providing information on (1) review recommendation outcomes; (2) status of implementation of those recommendations; and (3) reference.	Resolved. Australia included in the NIR (vol. 1, section 5.2.1, p.272) information on the conduct and results of the reviews of the agriculture, cropland and grassland methods, FullCAM and the agriculture inventory expert advisory panel (see NIR table 5.4).
A.5	3.A.4 Other livestock – CH_4 (A.15, 2017) Accuracy	Describe in the NIR a justification of the methodology used to identify the country-specific EFs for emus/ostriches in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 2, table 2A.1); for example, by providing a summary or references in the NIR to the available information on the expert judgment (reports or peer review); or revise the methodology in accordance with the	Not resolved. In response to a question raised by the ERT during the review, Australia announced that it will undertake a review of the country-specific CH_4 EF for enteric fermentation for emus and ostriches and of the methodology applied. During the review, Australia mentioned that the review is ongoing and that it is planning to provide an update on the review in its next submission.

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		2006 IPCC Guidelines (vol. 3, chap. 10.2.4).	
A.6	3.C Rice cultivation – CH_4 (A.19, 2017) Transparency	Include in the NIR the scaling factors used, including a justification for the scaling factors used for the average growing season.	Resolved. Australia included in the NIR (vol. 1, section 5.5.2, p.306) updated information on the scaling factor for rice cultivation to account for a non-flooded pre-season of more than 180 days.
LULUCF			
L.1	4. General (LULUCF) (L.16, 2017) Comparability	Correct the annual changes in data for land-use categories between the previous and the current inventory year in CRF table 4.1 for all categories.	Resolved. Australia corrected the information in CRF table 4.1 and included information on annual changes in land area for all categories.
L.2	4. General (LULUCF) – CO_2, CH_4 and N_2O (L.3, 2017) (L.29, 2016) Comparability	Explain in the NIR and CRF table 9 under which categories the estimates for the following categories and pools are reported: cropland, wetlands and settlements converted to forest land (all pools except organic soils); cropland converted to grassland (all pools); and cropland and grassland converted to settlements (all pools).	Not resolved. CRF table 9 does not explain the reporting of "IE" for all pools. During the review, Australia informed the ERT that technical issues with CRF Reporter had prevented the Party from entering this information for the 2019 submission. The ERT suggests that Australia consult with the secretariat to resolve this issue.
L.3	4. General (LULUCF) – CO_2, CH_4 and N_2O (L.4, 2017) (L.29, 2016) Comparability	Provide separate AD and estimates for the following categories and pools currently reported as "IE": cropland, wetlands and settlements converted to forest land (all pools except organic soils); cropland converted to grassland (all pools); and cropland and grassland converted to settlements (all pools). Until this is done, provide in the NIR an update of the status of efforts to provide estimates for these pools.	Addressing. Australia reported separately the carbon stock changes in the living biomass, dead organic matter and mineral soils pools for cropland, wetlands and settlements converted to forest land. The ERT agrees with Australia's rationale for not reporting conversions of cropland to grassland and vice versa separately, namely that seasonal variations and management practices do not result in permanent conversions. Australia informed the ERT and reported in the NIR (vol. 2, section 6.13.6) that a planned improvement is to report conversions of cropland and grassland to settlements separately.
L.4	4.A.2 Land converted to forest land – CO_2, CH_4 and N_2O (L.5, 2017) (L.7, 2016) (L.28, 2015) Consistency	Implement the planned improvement to allocate the AD and emissions and removals from forest conversion events that occurred before 1990 and that are followed by natural regeneration in a consistent manner and in accordance with the 2006 IPCC Guidelines.	Resolved. Australia reported separate AD and carbon stock changes for conversions of cropland, grassland, wetlands and settlements to forest land in CRF table 4.A (see the NIR, vol. 2, section 6.5.1.1).
L.5	4.A.2 Land converted to forest land – CO_2, CH_4 and N_2O (L.6, 2017) (L.8, 2016) (L.28, 2015) Consistency	In the specific case of subsequent land-use changes within a period shorter than 50 years, base the rule for the allocation of AD and estimates in each reporting year on the end-use category of the land in that year.	Resolved. Australia reallocated areas previously converted from forest land but consequently re-established with forest cover within a period shorter than 50 years to land converted to forest land (see the NIR, vol. 2, sections 6.5.1.1–6.5.1.2).
L.6	4.A.2 Land converted to forest land – CO_2, CH_4 and N_2O (L.7, 2017) (L.9, 2016) (L.29, 2015) Completeness	Report emissions and removals occurring throughout the reporting period owing to natural forest regeneration before 1990.	Resolved. Australia reported recalculations made to include natural forest regeneration before 1990 in the 2018 NIR (section 6.5.5) and the 2019 NIR (section 5.1.1).

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
L.7	4.B.2.1 Forest land converted to cropland – CO_2 4.C.2.1 Forest land converted to grassland – CO_2 (L.15, 2017) Transparency	Enhance the description of the recalculations performed to improve understanding of the application of the FullCAM tree parameter updates and the alignment with sectoral estimation periods.	Resolved. Australia included a detailed description of the recalculations in the NIR (section 6.9.5 and appendices 6.A–6.D).
Waste			
W.1	5.B.1 Composting – N_2O (W.3, 2017) Accuracy	Recalculate the N_2O emissions from composting using the correct EF and ensure that the recalculations are adequately described in the NIR.	Resolved. Although for the 2019 submission no recalculations were made for the biological treatment of solid waste, recalculations were made for the 2018 submission for this category (which was not subject to an annual review), and the correct EF was applied for N_2O emissions (0.03 t CO_2 eq/t waste).
W.2	5.B.2 Anaerobic digestion at biogas facilities – CH_4 (W.5, 2017) Transparency	Provide more information in the NIR regarding anaerobic digesters, including the number of anaerobic digesters, where anaerobic digestion takes place, and on where this activity is already included in other categories, and estimate emissions in cases where AD for anaerobic digestion in solid waste treatment facilities exist.	Resolved. The Party provided in the NIR (vol. 2, section 7.4, p.298) information on the processing capacity per day at the three facilities in operation in Australia that could be classified as anaerobic digestion facilities. It estimated emissions using a conservative measure of plant capacity and confirmed that emissions remain below the significance threshold set out in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.
W.3	5.D.1 Domestic wastewater – N_2O (W.6, 2017) Accuracy	Apply the EFs from the 2006 IPCC Guidelines or provide justification in the NIR that the EFs contained in the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* better reflect Australian conditions.	Resolved. The NIR (vol. 2, section 7.6.2.3, p.312) provides the EF for sewage (0.01 kg N_2O-N/kg N), which is from the 2006 IPCC Guidelines (vol. 5, chap. 6, table 6.11).
W.4	5.D.1 Domestic wastewater – CH_4 (W.7, 2017) Accuracy	Provide documentation showing that an MCF for septic tanks of 0.15 is appropriate for Australian conditions. In the absence of such documentation, apply the 2006 IPCC Guidelines default MCF factor of 0.5 for waste treated in septic tanks.	Resolved. Australia updated the MCF for septic systems to align it with the default value of 0.5 provided in the 2006 IPCC Guidelines and reported it in the NIR (vol. 2, section 7.6.2.2, p.311).
W.5	5.D.1 Domestic wastewater – CH_4 (W.7, 2017) Accuracy	Provide in the NIR the share of the population not connected to the sewer system.	Resolved. The Party reported in the NIR (vol. 2, section 7.6.1, p.302) that in Australia approximately 5 per cent of the population is not connected to the domestic sewer system and instead uses on-site wastewater treatment systems such as septic tanks.
W.6	5.D.1 Domestic wastewater – CH_4 (W.8, 2017) Transparency	Correct the value reported for COD per person in the NIR and explain how Australia determines COD per person for the portion of AD obtained from the NGER system as well as from facilities not captured under NGER.	Resolved. Australia corrected the previously reported COD value (0.677) and provided in the NIR (vol. 2, section 7.6.2.1, p.308) information on the average COD per capita entering facilities captured under NGER (0.0688 t COD/person/year) and facilities captured under other categories (0.0585 t COD/person/year).
W.7	5.D.2 Industrial wastewater – CH_4	Include in the NIR information on how measured COD data obtained under the	Resolved. Australia reported in the NIR that, where available, information on the COD

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	and N_2O (W.9, 2017) Transparency	NGER system are used in conjunction with the country-specific COD generation rates for industrial wastewater and clarify how the commodity production amount matched the wastewater amount reported in NGER for the calculation of a residual commodity production (tonnes or litres) that is not covered by NGER. Explain in the NIR the background for the assumption that no on-site wastewater treatment occurs outside NGER reporting for pulp and paper production, sugar production and beer production.	treated at each facility was prepared using direct measurements reported under the NGER system. With regard to pulp and paper, sugar and beer production, an analysis was undertaken on the proportion of current production and facility numbers covered by the NGER system (see the NIR, vol. 2, section 7.6.3, p.314).
KP-LULUCF activities			
KL.1	FM – CO_2 (KL.3, 2017) (KL.5, 2016) Accuracy	Consider a longer time series (including 1990–2009) for determining the calibration period for applying the natural disturbance provision (e.g. using (part of) the information presented on wildfires for 1850–2009) and avoid restricting the calibration period to 2000–2012.	Resolved. Australia considered using a longer time period (including 1990–2009) in constructing the background level of natural disturbances and reported this information in the NIR (vol. 3, section 11.6.4.3). The ERT agreed with the rationale of Australia not to consider data for prior to 2000 in constructing the background level in order to exclude the trend in emissions from wildfires (as required by the Kyoto Protocol Supplement, box 2.3.6) and owing to a lack of reliable data for prior to 1988 and to exclude the trend in emissions from wildfires (as required by the Kyoto Protocol Supplement, box 2.3.6).
KL.2	Deforestation – CO_2 (KL.10, 2017) Transparency	Enhance the description of the calculations of emissions and removals occurring from deforestation (forest land converted to grassland).	Resolved. Australia referenced the explanation of the recalculations provided in sections 6.9.5 and 11.4.6 of the NIR (vol. 2) and the additional information provided in appendices 6.A–6.D.
KL.3	RV – CO_2 (KL.11, 2017) Comparability	Provide in the annual submission information on progress in relation to the planned improvements to report carbon stock changes from individual pools and align the calculations for RV with the FullCAM tier 3 spatial modelling approach used for most KP-LULUCF activities.	Resolved. Australia provided information in the NIR (vol. 3, section 11.9.3.4) explaining that work on disaggregating carbon stock changes by carbon pool has begun.
KL.4	HWP – CO_2 (KL.7, 2017) (KL.8, 2016) Transparency	Document the process for deriving the country-specific half-lives for HWP and provide information to justify that the methodologies used are at least as detailed or accurate as those prescribed in decision 2/CMP.7, annex, paragraph 29.	Not resolved. During the review, Australia informed the ERT that a planned improvement is under way in relation to developing estimates of HWP using default half-lives and the first-order decay method described in decision 2/CMP.7, annex, paragraph 29.

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

[b] The report on the review of the 2018 annual submission of Australia was not available at the time of the 2019 review. Therefore, the previous recommendations reflected in table 3 are taken from the 2017 annual review report. For the same reason, 2018 is excluded from the list of review years in which the issue could have been identified.

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

9. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues included in table 4 have been identified in three successive reviews, including the review of the 2019 annual submission of Australia, and have not been addressed by the Party.

Table 4
Issues and/or problems identified in three successive reviews and not addressed by Australia

ID#	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[a]
General	No issues identified	
Energy	No issues identified	
IPPU		
I.8	Investigate whether other drivers could be applied to estimate emissions from lead production, zinc production and other (metal production) for 1990–2008, such as production volumes	4 (2015–2019)
Agriculture	No issues identified	
LULUCF		
L.2	Explain in the NIR and CRF table 9 under which categories the estimates for the following categories and pools are reported: cropland, wetlands and settlements converted to forest land (all pools except organic soils); cropland converted to grassland (all pools); and cropland and grassland converted to settlements (all pools)	3 (2016–2019)
L.3	Provide separate AD and estimates for the following categories and pools currently reported as "IE": cropland, wetlands and settlements converted to forest land (all pools except organic soils); cropland converted to grassland (all pools); and cropland and grassland converted to settlements (all pools). Until this is done, provide in the NIR an update of the status of efforts to provide estimates for these pools	3 (2016–2019)
Waste	No issues identified	
KP-LULUCF activities		
KL.4	Document the process for deriving the country-specific half-lives for HWP and provide information to justify that the methodologies used are at least as detailed or accurate as those prescribed in decision 2/CMP.7, annex, paragraph 29	3 (2016–2019)

[a] The report on the review of the 2018 annual submission of Australia has not yet been published. Therefore, 2018 was not included when counting the number of successive years in table 4.

V. Additional findings made during the individual review of the 2019 annual submission

10. Table 5 contains findings made by the ERT during the individual review of the 2019 annual submission of Australia that are additional to those identified in table 3.

Table 5
Additional findings made during the individual review of the 2019 annual submission of Australia

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
General			
G.6	Key category analysis	The ERT noted from annex 1 to the NIR (vol. 3) that the Party applied approach 1 for identifying key categories in accordance with paragraph 14 of the UNFCCC Annex I inventory reporting guidelines. In response to a question raised by the ERT on planned improvements to the key category analysis, the Party explained that it will examine the possibility of updating the analysis to include other approaches provided in the 2006 IPCC Guidelines (vol. 1, chap. 4, section 4.3) in accordance with the additional reporting guidance provided in paragraph 14 of the UNFCCC Annex I inventory reporting guidelines.	Not an issue/problem
		The ERT encourages the Party to perform category-level uncertainty assessments using approach 2 to identify additional key categories in order to inform the prioritization of improvements in future submissions in accordance with paragraph 14 of the UNFCCC Annex I inventory reporting guidelines.	
G.7	Notation keys	The ERT noted from annex 5 to the NIR (vol. 3) that Australia reported information showing that emissions and removals reported as "NE" are insignificant in terms of the overall emission level and trend and meet the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. The Party did not include information confirming that the total national aggregate estimated emissions for all gases and categories considered insignificant remain below 0.1 per cent of the national total GHG emissions. During the review, the Party clarified that this information will be included in the next annual submission.	Yes. Transparency
		The ERT recommends that the Party provide information stating that the total national aggregate estimated emissions for all gases and categories reported as "NE" remain below 0.1 per cent of the national total GHG emissions in line with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	
Energy			
E.1	1. General (energy sector)	The ERT noted some errors in the NIR and CRF tables; for example, the AD for imported other oils were not reported using the reference approach (CRF table 1.A(b)) for 2017; the AD for category 1.B.2.c.2.i (flaring – oil) for 2010 were incorrect; the AD for coal imports were not reported using the reference approach (CRF table 1.A(b)) for 2010–2016; and the incorrect year was indicated in the title of NIR table 3.15. The ERT also noted that these errors do not have an effect on the GHG emission estimates. During the review, in response to questions raised by the ERT, the Party acknowledged these errors.	Not an issue/problem
		The ERT encourages the Party to ensure the correct input of data in the CRF tables and the NIR.	
E.2	International bunkers and multilateral operations – liquid fuels – all gases	The ERT noted discrepancies between CRF tables 1.D and 1.A(b) for jet kerosene used in international aviation bunkers for 2011, 2016 and 2017 and for gas and diesel oil and residual fuel oil used in international marine bunkers for all reported years. The Party acknowledged these discrepancies. The ERT noted that the discrepancies do not have an effect on the GHG emission estimates.	Yes. Convention reporting adherence
		The ERT recommends that the Party correct the AD on international bunkers to avoid discrepancies between CRF tables 1.D and 1.A(b) in its next submission.	

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
E.3	1.A Fuel combustion – sectoral approach – solid fuels – CO_2	The CO_2 EFs for coal reported by electricity generation plants vary annually across the time series (85.6–95.9 Gg/PJ), while the country-specific CO_2 EFs for coal (used for other sources of coal combustion, such as coal combustion in steel industry, black coal used in other industries and brown coal used in industry) are constant (90.0 Gg/PJ for black coal and 93.5 Gg/PJ for brown coal). The ERT considers that the mixture of coal used for other sources of coal combustion could also vary from year to year and consequently lead to a change in the country-specific CO_2 EFs. The Party indicated that, in the case of coal used for non-electricity generation, the country-specific EFs are statistically tested each year against the mean of the newly measured CO_2 EFs. This test showed that there was no significant difference between the country-specific EF used and the mean of the new measurements. The ERT recommends that the Party include the rationale for using constant country-specific CO_2 EFs for coal combustion for sources other than electricity production in its next NIR.	Yes. Transparency
E.4	1.A.3.b.iii Heavy-duty trucks and buses – liquid fuels – N_2O	There is significant variation across the N_2O IEFs for diesel oil for subcategory 1.A.3.b.iii (heavy-duty trucks and buses) for 2000, 2002, 2006, 2011, 2015 and 2016 reported in the 2019 annual submission, and the IEFs reported for 2008 and 2011 have changed significantly since the 2017 annual submission. During the review, the Party explained that the N_2O EFs differ significantly for medium-duty trucks, heavy-duty trucks and buses and, therefore, the IEF fluctuates according to the relative share of these vehicle types. For example, in 2000 the proportion of emissions from heavy-duty trucks in the total emissions increased. As heavy-duty trucks have a higher IEF than medium-duty trucks or buses, the weighted average IEF is higher. The ERT recommends that the Party explain in the NIR the inter-annual variation in the N_2O IEFs for heavy-duty trucks and buses and the impact on the N_2O IEFs under subcategory 1.A.3.b.iii.	Yes. Transparency
E.5	1.A.3.d Domestic navigation – all fuels – CH_4 and N_2O	Australia used country-specific EFs for non-CO_2 gases for domestic navigation. Data for 1995 and from studies conducted in previous years (e.g. by Lloyd's Register of shipping), which the ERT noted are very likely to be out of date, were used for the country-specific EFs for domestic navigation. The Party confirmed that there has been no recent work to update the EFs for non-CO_2 gases for navigation. It informed the ERT that it will consider updating these EFs for future submissions, noting that domestic navigation is a minor source of emissions and will be prioritized accordingly. Although domestic navigation is not a key category for Australia, the ERT encourages the Party to consider updating the EFs for non-CO_2 gases for domestic navigation.	Not an issue/problem
E.6	1.B.2.b Natural gas – liquid fuels – CO_2, CH_4 and N_2O	The ERT noted an outlier in the inter-annual change in the CH_4 IEF for category 1.B.2.b.4 (natural gas transmission and storage). The Party explained that category 1.B.2.b.4 includes both pipeline transmission, and transmission and storage at liquefied natural gas terminals. The AD for the two sources are different: pipeline length (in km) is used as the AD for natural gas pipeline transmission, while the amount of liquefied natural gas (in m^3) is used as the AD for liquefied petroleum gas transport and storage. However, the CRF tables allow only one type of AD unit to be included for the category. The ERT noted that, according to the 2006 IPCC Guidelines (vol. 2, chap. 4, table 4.2.2), fugitive emissions related to the transmission of liquefied natural gas should be reported under category 1.B.2.a.iii.3 (oil transport).	Yes. Comparability

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		The ERT recommends that the Party report emissions from transmission at liquefied natural gas terminals under category 1.B.2.a.iii.3 in accordance with the 2006 IPCC Guidelines in the next submission, or, if this is not possible, provide an explanation for the AD used for category 1.B.2.b.4 in the CRF documentation box.	
IPPU			
I.16	2.A.1 Cement production – CO_2	Australia has used facility-specific EFs for two facilities since 2016 on the basis of a recommendation from a previous ERT (see ID# I.2 in table 3). However, the current ERT noted that the CO_2 IEF for cement production decreased from 0.55 for 2015 to 0.54 for 2016 (t CO_2/t clinker). The Party explained that in 2016 two of the producers determined that the country-specific EF was no longer representative of their product and derived new facility-specific EFs based on the CaO and MgO content of their clinker, in accordance with the provisions set out in the NGER system regarding the determination of measurements, using the approach used to derive the country-specific EF and facility-specific EFs for cement production. The Party provided the country-specific EF and facility-specific EFs for cement production to the ERT and explained that the IEFs are also influenced by the amount of cement kiln dust recycled and the fraction of cement kiln dust calcined. The ERT encourages the Party to explain in the NIR why the facility-specific EFs for the two facilities are lower than the country-specific EF.	Not an issue/problem
I.17	2.A.2 Lime production – CO_2	The NIR (vol. 1, section 4.3.2, p.180) states that lime is intermittently produced for alumina production in alumina plants in Australia. The ERT notes that lime may be produced for domestic use not only in metal industry, but also in many other industries such as pulp and paper industry, as well as for sugar production. During the review, the Party explained that lime is produced exclusively in alumina plants in Australia. The ERT encourages the Party to explain that all lime in Australia is produced in domestic alumina plants in the next submission.	Not an issue/problem
I.18	2.A.4 Other process uses of carbonates – CO_2	The CO_2 IEF used for category 2.A.4.d (other) for 2016 showed an increase of 16.6 per cent compared with the value used for 2015. The Party explained in the NIR that this change was due to the operation of a new ceramics facility and stated that it has reported consumption of other carbonates (which have a fractional purity of 100 per cent and a default EF of 0.415 t CO_2/t carbonate) since 2016. However, the ERT noted that the CO_2 IEF for category 2.A.4.d of 0.47 t CO_2/t carbonate for 2016 is larger than the value reported by the new ceramics manufacturer. During the review, the Party explained that, following further analysis, it was determined that, since the fraction of calcination was incorrectly set at zero by the ceramics manufacturer, the facility's emissions were calculated as zero for 2014 and 2015. The ERT recommends that the Party determine the correct fraction of calcination for the new ceramics facility for 2014 and 2015 to obtain correct AD, and recalculate the CO_2 emissions for category 2.A.4.d for its next submission.	Yes. Accuracy
I.19	2.C.1 Iron and steel production – CO_2	The Party accounted for all carbon from coke, including carbon in blast furnace gas, as CO_2 emissions (excluding the small amount of carbon in steel and any non-oxidized carbon) and reported the emissions under the IPPU sector. However, according to the 2006 IPCC Guidelines (vol. 3, chap. 4, p.4.22), if blast furnace gas is recovered and used off-site as fuel for energy production, its emissions should be reported under the energy sector. During the review, the Party explained that it could not separate off the proportion of blast furnace gas used off-site as the data	Yes. Comparability

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		are highly uncertain. However, the ERT considers that reporting CO_2 emissions from blast furnace gas used off-site as fuel for energy production under the IPPU sector is not consistent with the tier 2 and 3 methods in the 2006 IPCC Guidelines (vol. 3, chap. 4, p.4.22). The ERT recommends that the Party collect AD for blast furnace gas transferred off-site from iron and steel producers to facilities that use blast furnace gas as fuel for production of electricity or heat, and account for the emissions under the energy sector only in order to avoid double counting.	
I.20	2.C.1 Iron and steel production – CO_2	In the NIR (vol. 1, section 4.5.1, pp.206–208) the methodology used for estimating emissions from blast furnace steel production is reported. However, according to the 2006 IPCC Guidelines, this category should cover emissions from electric furnaces in steel production. During the review, the Party explained that there are currently three facilities in the country using electric arc furnace technology, which reported the consumption of fuels as reductants (or as anode ingredients) under the NGER system, and that, therefore, the emissions were correctly reported under category 2.C.1. The Party also explained that any emissions from consumption of fuels at iron and steel plants for stationary energy purposes were reported under category 1.A.2 (manufacturing industries and construction). The ERT recommends that the Party explain in its NIR that there are currently three facilities in Australia using electric arc furnace technology and that these facilities reported the consumption of fuels used as reductants or anode ingredients under the NGER system.	Yes. Transparency
I.21	2.D.1 Lubricant use – CO_2	The Party reported all CO_2 emissions from lubricant use under this category, including use in two-stroke car engines. However, according to the 2006 IPCC Guidelines (vol. 3, chap. 5, p.5.9), emissions from lubricant use in two-stroke engines should be accounted for under the energy sector. The Party explained that emissions from the total consumption of lubricants in the country are based on data provided in the Australian energy statistics and are reported under category 2.D.1 (lubricant use). The ERT considers that the reporting of emissions for this category is not consistent with the 2006 IPCC Guidelines. The ERT recommends that the Party report emissions from lubricant use in two-stroke engines separately under category 1.A.3.b (road transportation) under the energy sector.	Yes. Comparability
Agriculture			
A.7	3. General (agriculture) – CH_4 and N_2O	Australia used the same number of animals to estimate emissions from enteric fermentation and manure management for other livestock (horses, camels, buffalo, deer, goats, mules and asses, ostriches and others) for 2016 and 2017. The ERT noted that the number of animals in the period before 2016 is not constant. During the review, but not in the NIR, Australia indicated that the data are from the Australian Bureau of Statistics, which updates the data every five years, when census data are provided to the Bureau. The Party explained that, since emissions for this category account for only 0.41 per cent of total emissions from enteric fermentation and 0.0033 per cent of emissions from manure management, it is not planning to update the AD annually. The ERT recommends that the Party report the number of animals used for the estimates for each category for the entire time series and include a brief description of how frequently the AD are collected (e.g. in tabular format or in a methodological annex to the NIR).	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
A.8	3.B Manure management – CH_4	In CRF table 3.B(a)s2 on emissions from manure management for volatile solids for feedlot cattle (temperate climate), swine (cool and temperate climate) and poultry (cool and temperate climate), the total shares allocated across the manure management systems exceed 100 per cent. During the review, Australia informed the ERT that the value exceeding 100 per cent reflects the fact that manure from intensive livestock industries may pass through multiple treatment stages. The same manure is therefore allocated to multiple categories of manure management systems in such cases. For example, 100 per cent of volatile solids will first pass through a primary system (feedpad – dry lot) before passing through secondary treatment (composting, solid storage or direct application) and tertiary treatment (effluent pond). The ERT recommends that the Party explain in the NIR why the total shares allocated across all manure management systems exceed 100 per cent.	Yes. Transparency
LULUCF			
L.8	4.B Cropland – CO_2	Australia used a tier 2 method for estimating carbon stock changes in living biomass for perennial woody vegetation on cropland, clarifying in the NIR (vol. 2, p.73) that it is based on a tier 1 calculation method. However, the Party reported additional subdivision by two of the values for the harvest cycles in NIR table 6.36, which is not in line with the tier 1 method. During the review, Australia explained that NIR tables 6.36–6.37 do not reflect the values used in the calculations, and provided the ERT with revised tables. The ERT acknowledges that for the revised tables the Party used the same approach as a tier 1 method. During the review, the Party confirmed that revised tables will be included in the next NIR. The ERT recommends that the Party report in the NIR the actual values of total biomass and the biomass accumulation rates for perennial woody vegetation on cropland used in the calculations.	Yes. Transparency
L.9	4.B Cropland – CO_2	Australia selected the EF for cool temperate zones (5 t carbon ha^{-1} $year^{-1}$) provided in the 2006 IPCC Guidelines (vol. 4, chap. 5, table 5.6) for estimating CO_2 emissions from cropland on organic soils on the basis of expert judgment of where these conversions occur. The ERT noted that most of Australia's territory is in temperate warm and tropical zones, for which the EFs are 10 and 20 t carbon ha^{-1} $year^{-1}$, respectively. During the review, Australia confirmed that this assumption was made according to the best available expert judgment; but improvements will be made for the next submission to define the distribution of permanent wetlands. The ERT welcomes Australia's efforts to improve the reporting of emissions from cropland on organic soils. The ERT recommends that the Party stratify cropland areas on organic soils by natural zone and calculate the CO_2 emissions by applying corresponding EFs, for example from the 2006 IPCC Guidelines (vol. 4, chap. 5, table 5.6).	Yes. Accuracy
L.10	4.B Cropland – CO_2	Australia provided in the NIR (vol. 2, annex 6.B, table 6.B.4) the ratio of yield-to-plant components of different agricultural crops. For most of these crops, the yield allocation to grains, buds or fruit (fraction) is not listed in the table, despite some crop types potentially containing significant amounts of grains, buds or fruit (e.g. maize, sunflowers). During the review, Australia informed the ERT that during the editing of the NIR an error occurred and the columns for grains, buds or fruits and stalks were exchanged. The Party provided the ERT with a revised table. The ERT recommends that the Party report in the corresponding table in its next NIR the actual crop partitioning used for the calculations.	Yes. Convention reporting adherence

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
L.11	Land representation	Australia provided information on the LULUCF reporting matrix in the NIR (vol. 3, annex 5, table A.5.1). The ERT found that the information in the table is inconsistent with that reported in CRF table 4.1 with regard to conversion of forest land to other land uses (e.g. for 2017, Australia reported "IE" in CRF table 4.1, but "reported" in table A.5.1 in annex 5 to the NIR). During the review, Australia informed the ERT that it chose to report aggregate (net) changes between forest and other land uses. Where, for example, the area of grassland converted to forest land exceeds the area of forest land converted to grassland in the source data (as in 2017), the net change in area is reported under grassland converted to forest land, and forest land converted to grassland is reported as "IE". Where the opposite scenario is observed (as in 2005), the net change in area is reported under forest land converted to grassland, and grassland converted to forest land is reported as "IE". With regard to table A.5.1 in annex 5 to the NIR, Australia stated that it reported both transition categories as "reported" in order to correctly identify all land-transition categories that are aggregated in the reporting at some point in the time series. The ERT recommends that the Party change the information reported in CRF table 4.1 from net changes to actual areas of conversion (e.g. report values for both the areas converted from forest land to grassland and the areas converted from grassland to forest land) to increase transparency and ensure consistency with the approach described by Australia in table A.5.1 of annex 5 to the NIR.	Yes. Transparency
Waste			
W.8	5.A Solid waste disposal on land – CH_4	In the NIR (vol. 2, section 7.3.1), in the source category description, it is stated that a landfill industry survey was conducted by the Waste Management Association of Australia in 2007, which found that a relatively small number of sites received the bulk of the waste landfilled in Australia. According to the description, the total number of landfills is 433, while in the same section of the NIR (p.279) 665 operating landfills in Australia are identified. During the review, the Party explained that it will update this information if it is provided in the subsequent national waste overview, and that an examination of national waste reports in 2010, 2013, 2016 and 2018 did not provide any information that could enable the estimates to be updated. The ERT encourages the Party to update the description of this category with up-to-date data on solid waste disposal sites in the country (e.g. the number and capacity of landfills).	Not an issue/problem
W.9	5.A Solid waste disposal on land – CH_4	Information on waste composition is provided in table 7.8 of the NIR (vol. 2) as a percentage and in table 7.9 as a weighted value. The percentages derived from table 7.9 are different from those reported in table 7.8. During the review, the Party clarified that the data in table 7.8 represent the percentage composition of waste in each of the three waste streams (municipal; commercial and industrial; and construction and demolition), while table 7.9 presents the total disposal in t across all three waste streams. This waste composition is derived from information reported by each facility (around 80 landfill facilities are tracked in the waste model). The data in table 7.9 represent a weighted average of the waste composition of all facilities. Facility-level waste composition data are used for the calculation of emissions, but are confidential and cannot be presented in the NIR. The ERT encourages the Party to explain why only the weighted average of the waste composition of all facilities is presented in table 7.9, and not the composition of waste per waste stream as in table 7.8, or to ensure consistent reporting in the two tables in its next submission.	Not an issue/problem

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
W.10	5.A Solid waste disposal on land – CH_4	The waste composition provided in table 7.8 in the NIR (vol. 2, p.289) for 2017 was derived from studies conducted in 2008 by GHD professional services company and Hyder Consulting and remains constant. During the review, the Party clarified that the waste composition is not constant owing to percentages of paper and wood in the waste mix for landfill facilities using the NGER default. The waste mix is based on the annual output from the HWP model, and landfills reporting under the NGER system provide information on their waste mix on an annual basis. The landfills report a mix of default and facility-specific waste compositions. The data presented in table 7.8 are from 2008 and the Party confirmed that the waste composition is not constant. The ERT recommends that the Party explain how data from background studies conducted in 2008 were used to estimate the waste composition for the most recent years of the time series.	Yes. Transparency
W.11	5.B Biological treatment of solid waste – CH_4	In the NIR (vol. 2, p.299) and CRF table summary 3, the Party reported that a tier 1 method from the 2006 IPCC Guidelines was applied to derive estimates of emissions based on the total amount of material processed through composting and anaerobic digestion, whereby CH_4 emissions are calculated by multiplying the mass of organic waste treated (in Gg) by the EF (in g CH_4/kg waste treated) by 10^{-3}. According to the description in the NIR, Australia used a different method to estimate CH_4 emissions, that is multiplying annual waste amount treated (in kt dry matter) by the EF (in t CO_2 eq/t waste material processed). During the review, Australia explained that the EFs were derived from a study conducted by DHV consultancy company in 2000 using the appropriate global warming potentials to convert them into t CO_2 eq per t waste processed. The ERT recommends that the Party explain in the NIR the method used for calculating the CH_4 emissions and its adherence to the IPCC tier 1 method, and revise the reference to the method in the NIR and CRF table summary 3, as needed.	Yes. Transparency
W.12	5.B.1 Composting – CH_4 and N_2O	In the NIR (vol. 2, table 7.2) it is indicated that the method used for calculating CH_4 and N_2O emissions is tier 1 and that the EFs are country specific. According to the 2006 IPCC Guidelines, for tier 1 methods the default EFs provided in the Guidelines (vol. 5, chap. 4, table 4.1) should be used. The EFs were expressed in CO_2 eq in NIR table 7.16 (i.e. 0.019 for CH_4 and 0.03 for N_2O expressed in t CO_2 eq/t waste). During the review, the Party confirmed that the country-specific EFs were from a study conducted by DHV consultancy company in 2010 that proposed values of 750 g CH_4/t waste and 96 g N_2O/t waste for fresh organic waste (equivalent to wet-waste basis) on the basis of research conducted in eight countries (Austria, Belgium, Denmark, Germany, Japan, Netherlands, Switzerland and United Kingdom of Great Britain and Northern Ireland). The ERT encourages the Party to present the EFs for CH_4 and N_2O in the original units instead of converting them to CO_2 eq.	Not an issue/problem
W.13	5.B.2 Anaerobic digestion at biogas facilities – CH_4 and N_2O	In CRF table 5.B the annual waste amount treated and the emissions of CH_4 and N_2O were reported as "NO", but in the NIR (vol. 2, p.298) it was reported that there are three known facilities in operation in Australia that could be classed as anaerobic digestion facilities (see ID# W.2 in table 3). During the review, Australia explained that the annual emissions from the three facilities are well below the significance threshold for reporting, and that it would correct the notation key from "NO" to "NE" in its next submission.	Yes. Comparability

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
		The ERT recommends that the Party report emissions from anaerobic digestion at biogas facilities as "NE" instead of "NO" and justify the reporting of "NE" in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines in its next submission.	
W.14	5.B Biological treatment of solid waste – CH_4 and N_2O	In the NIR (vol. 2, p.298) emissions from biological treatment of solid waste were reported as 274 Gg CO_2 eq for 2017, but in CRF table summary 2 those emissions were reported as 276.95 Gg CO_2 eq for 2017. The ERT recommends that the Party ensure that consistent information on emissions from the biological treatment of solid waste is provided in the NIR and CRF table summary 2.	Yes. Convention reporting adherence
W.15	5.B Biological treatment of solid waste – CH_4 and N_2O	In CRF table 5.B the annual waste amounts treated should be reported in kt dry matter. The EFs applied for CH_4 and N_2O are on a wet-waste basis, implying that Australia used amounts of treated waste on a wet basis as well. During the review, Australia confirmed that the AD in CRF table 5.B refer to "raw material processed" and, as such, the amounts are not based on dry matter. Australia also noted that the units in CRF table 5.B could not be adjusted to waste "as received". The ERT encourages the Party to clarify the units of "raw material processed" in the NIR and provide information on the different units used for the AD and IEFs in the documentation box to CRF table 5.B in its next submission.	Not an issue/problem
W.16	5.D Wastewater treatment and discharge – CH_4	The Party reported that it applied a tier 2 or 3 method for calculating CH_4 emissions from wastewater in NIR table 7.2. The ERT noted that the approach differs from the method provided in the 2006 IPCC Guidelines, which uses biochemical oxygen demand rather than COD. During the review, the Party explained that COD was used as the data input as this is the parameter preferred by companies reporting under the NGER system. It is most closely aligned with domestic licencing provisions and is consistent with the 2006 IPCC Guidelines, which also provide a default factor in terms of COD. The EF for wastewater treated at wastewater plants and the EF for sludge treated at wastewater plants were derived by applying the MCF (for each facility) to the maximum CH_4-producing capacity of manure, in accordance with equation 6.2 of the 2006 IPCC Guidelines (see NIR, vol. 2, p.308). As Australia uses COD, the maximum CH_4-producing capacity is 0.25 kg CH_4/kg COD (as provided in table 6.2 of the 2006 IPCC Guidelines). According to the 2006 IPCC Guidelines, the parameter relating to the total amount of organically degradable material in wastewater is a function of human population and biochemical oxygen demand per person. The ERT recommends that the Party provide in its NIR additional information on its rationale for using COD rather than biochemical oxygen demand in the calculation, and specify how it determined the EFs for wastewater treated at wastewater plants and for sludge treated at wastewater plants for calculating CH_4 emissions from domestic wastewater, including information on how this approach is in accordance with the 2006 IPCC Guidelines.	Yes. Transparency
KP-LULUCF activities			
KL.5	Deforestation – CO_2	Australia reported "IE" for the area of forest conversion in CRF table 4(KP-I)A.2, but reported "NO" for carbon stock changes in the organic soils pool. During the review, Australia informed the ERT that the latter was an error and carbon stock changes in organic soils for deforestation of non-mangrove forests should be reported as "IE" because FullCAM does not estimate carbon stock changes in soils separately for mineral and organic soils. The ERT recommends that the Party correct the error in the reporting of forest conversion deforestation on organic soils.	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
KL.6	FM – CO_2	Australia reported in the NIR (section 11.6.4.3) that in the construction of the background level and margin for the application of the natural disturbance provision four years were excluded, namely 2003, 2007, 2009 and 2010. However, in NIR table 11.19, emissions for 2009 were reported to be included in the construction of the background level. During the review, Australia informed the ERT that an error had occurred in the editing of table 11.19, and that 2009 should be labelled as 2011, 2011 as 2012, and 2012 as "average of background group". The ERT recommends that the Party report a revised corresponding table in its next NIR.	Yes. Convention reporting adherence
KL.7	RV – CO_2	Australia reported in the NIR (section 11.9.3.4) that carbon stock changes under RV were estimated for five pools but reported under the living biomass pool owing to unfinalized improvements to FullCAM. However, in CRF table 4(KP-I)B.4 Australia reported "NA" for pools other than the living biomass pool. During the review, Australia informed the ERT that this was due to an error in the selection of the notation key since FullCAM takes into account the carbon stock changes in all pools. The ERT noted that, in response to a recommendation of the previous ERT (see ID# KL.3 in table 3), Australia has started to implement improvements in the reporting of RV. Considering future improvements, the ERT recommends that the Party report the carbon stock changes for different carbon pools separately and eliminate the error in the reporting of the notation key in CRF table 4(KP-I)B.4.	Yes. Comparability
KL.8	FM – CO_2	Australia reported emissions from natural disturbances (including information on emissions to be excluded from the accounting because they exceed the background level plus the margin) in the NIR (table 11.20). However, in CRF table 4(KP-I)B.1.3 in the column entitled "Emissions from areas subject to natural disturbances" Australia reported emissions after application of the natural disturbance provision. During the review, Australia provided the ERT with the table containing total emissions from wildfires, the background level and the emissions after application of the natural disturbance provision. The ERT commends Australia for the clarification and considers this to be valuable information. The ERT recommends that the Party report information on total emissions from wildfires before application of the natural disturbance provision in CRF table 4(KP-I)B.1.3, taking into account footnotes 4, 6 and 9 to the table.	Yes. Transparency

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

VI. Application of adjustments

11. The ERT did not identify the need to apply any adjustments to the 2019 annual submission of Australia.

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

12. Australia has elected annual accounting for AR. Annex I shows the accounting quantities for KP-LULUCF activities as reported by the Party and the final values after the review. The final quantities of units to be issued and cancelled are presented in the same annex.

13. Australia has elected commitment period accounting for FM, CM, GM and RV and therefore the issuance and cancellation of units for KP-LULUCF activities is not applicable to the 2019 review.

VIII. Questions of implementation

14. No questions of implementation were identified by the ERT during the individual review of the Party's 2019 annual submission.

Annex I

Overview of greenhouse gas emissions and removals for Australia for submission year 2019 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as submitted by Australia in its 2019 annual submission

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

Table 1
Total greenhouse gas emissions for Australia, base year[a]–2017
(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*	*FM*
FMRL								4 700.00
Base year	604 903.78	420 315.32	NA	NA	148 163.36		31 979.52	
1990	604 903.78	420 315.32	NA	NA				
1995	482 594.24	434 912.95	NA	NA				
2000	536 153.69	485 018.62	NA	NA				
2010	585 955.43	537 275.25	NA	NA				
2011	567 659.99	538 280.61	NA	NA				
2012	558 726.01	540 615.86	NA	NA				
2013	537 737.35	530 433.52	NA	NA		9 312.85	21 043.49	–22 950.98
2014	533 056.36	524 957.10	NA	NA		10 982.03	21 342.73	–25 183.08
2015	531 635.84	535 173.67	NA	NA		1 730.49	14 193.49	–23 044.07
2016	530 430.53	546 771.76	NA	NA		821.04	8 796.11	–26 457.04
2017	534 695.45	554 126.56	NA	NA		–3 278.26	5 608.39	–25 615.79

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

[a] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year for CM, GM and RV under Article 3, para. 4, of the Kyoto Protocol is 1990 for Australia. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

[b] The Party did not report indirect CO_2 emissions in CRF table 6.

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

[d] Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.

Table 2
Greenhouse gas emissions by gas for Australia, excluding land use, land-use change and forestry, 1990–2017
(kt CO_2 eq)

	CO_2[a]	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3
1990	278 424.38	120 080.86	15 557.84	1 424.68	4607.01	NO	220.56	NO
1995	305 409.80	111 415.61	15 236.46	1 004.03	1530.84	NO	316.21	NO
2000	350 194.58	112 760.68	18 949.91	1 613.95	1287.06	NO	212.43	NO
2010	406 425.94	102 500.68	19 311.91	8 610.66	283.32	NO	142.74	NO
2011	404 263.70	104 377.89	20 048.27	9 148.67	301.30	NO	140.79	NO
2012	406 986.98	103 741.19	20 385.22	9 060.09	294.88	NO	147.50	NO
2013	398 051.59	102 966.82	19 213.96	9 867.32	192.00	NO	141.83	NO
2014	393 288.53	100 888.75	19 647.37	10 784.75	192.54	NO	155.17	NO
2015	402 537.56	101 348.20	19 144.00	11 801.65	171.32	NO	170.94	NO
2016	413 157.39	102 048.50	19 172.50	11 982.60	224.92	NO	185.85	NO
2017	417 041.28	103 602.32	20 851.18	12 252.94	202.63	NO	176.22	NO
Per cent change 1990–2017	**49.8**	**–13.7**	**34.0**	**760.0**	**–95.6**	**NA**	**–20.1**	**NA**

Note: Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions.
[a] Australia did not report indirect CO_2 emissions in CRF table 6.

Table 3
Greenhouse gas emissions by sector for Australia, 1990–2017
(kt CO_2 eq)

	Energy	IPPU	Agriculture	LULUCF	Waste	Other
1990	294 010.18	26 031.43	80 247.70	184 588.46	20 026.01	NO
1995	318 838.24	25 201.91	72 018.34	47 681.28	18 854.46	NO
2000	364 291.34	26 683.68	78 382.35	51 135.08	15 661.25	NO
2010	420 136.76	35 645.61	66 279.92	48 680.18	15 212.96	NO
2011	416 731.04	36 250.99	70 754.36	29 379.38	14 544.22	NO
2012	422 237.87	33 406.34	71 987.57	18 110.14	12 984.08	NO
2013	414 450.48	31 503.37	72 114.95	7 303.83	12 364.73	NO
2014	408 686.07	31 158.89	72 622.02	8 099.26	12 490.12	NO
2015	420 302.60	32 837.43	70 084.51	–3 537.84	11 949.14	NO
2016	432 094.82	32 995.17	69 273.94	–16 341.23	12 407.84	NO

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
2017	435 648.63	33 686.46	73 003.95	–19 431.11	11 787.52	NO
Per cent change 1990–2017	**48.2**	**29.4**	**–9.0**	**–110.5**	**–41.1**	**NA**

Notes: (1) Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions. (2) Australia did not report indirect CO_2 emissions in CRF table 6.

Table 4

Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year[a]–2017, for Australia

(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[b]	*Activities under Article 3, paragraph 3, of the Kyoto Protocol*		*FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol*				
	Land-use change	*AR*	*Deforestation*	*FM*	*CM*	*GM*	*RV*	*WDR*
FMRL				4 700.00				
Technical correction				–3 540.51				
Base year	148 163.36				18 125.97	13 576.63	276.93	NA
2013		–25 913.08	35 225.94	–22 950.98	1 840.25	19 169.13	34.11	NA
2014		–25 932.14	36 914.18	–25 183.08	2 861.00	18 441.66	40.07	NA
2015		–25 004.46	26 734.96	–23 044.07	–333.30	14 476.80	49.99	NA
2016		–28 289.11	29 110.15	–26 457.04	–2 392.04	11 185.62	2.53	NA
2017		–29 354.62	26 076.36	–25 615.79	–2 246.19	7 844.65	9.93	NA
Per cent change base year–2017					**–112.4**	**–42.2**	**–96.4**	**NA**

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

[a] The base year for CM, GM and RV under Article 3, para. 4, of the Kyoto Protocol is 1990 for Australia. For activities under Article 3, para. 3, of the Kyoto Protocol, and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

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

2. Table 5 provides information on the accounting quantities for reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 5

Accounting quantities for activities under Article 3, paragraph 3, and forest management and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol for Australia

(kt CO_2 eq)

		Net emissions/removals							
GHG source and sink activities	*Base year*[a]	*2013*	*2014*	*2015*	*2016*	*2017*	*Total*[b]	*Accounting parameters*	*Accounting quantity*[c]
A.1. AR		–25 913.084	–25 932.141	–25 004.465	–28 289.106	–29 354.617	–134 493.412		–134 493.412
Excluded emissions from natural disturbances[d]		NA	NA	NA	NA	NA	NA		NA
Excluded subsequent removals from land subject to natural disturbances		NA	NA	NA	NA	NA	NA		NA
A.2. Deforestation		35 225.939	36 914.175	26 734.959	29 110.151	26 076.361	154 061.585		154 061.585
B.1. FM		NA	NA	NA	NA	NA	NA		NA
Net emissions/removals		NA	NA	NA	NA	NA	NA		
Excluded emissions from natural disturbances[d]		NA	NA	NA	NA	NA	NA		NA
Excluded subsequent removals from land subject to natural disturbances		NA	NA	NA	NA	NA	NA		NA
Any debits from newly established forests		NA	NA	NA	NA	NA	NA		NA
FMRL[e]								4 700.000	
Technical corrections to FMRL								–3 540.508	
FM cap								117 214.453	117 214.453
B.2. CM (if elected)	NA	NA	NA	NA	NA	NA	NA		NA
B.3. GM (if elected)	NA	NA	NA	NA	NA	NA	NA		NA
B.4. RV (if elected)	NA	NA	NA	NA	NA	NA	NA		NA
B.5. WDR (if elected)	NA	NA	NA	NA	NA	NA	NA		NA

[a] Net emissions and removals from CM, GM, RV and/or WDR, if elected, in the Party's base year as established in decision 9/CP.2.
[b] Cumulative net emissions and removals for all years of the commitment period reported in the current submission.
[c] The accounting quantity is the total quantity of units to be issued or cancelled for a particular activity.
[d] The Party indicated that it is excluding emissions from natural disturbances at the end of the commitment period.
[e] FMRL as inscribed in the appendix of the annex to decision 2/CMP.7 in kt CO_2 eq per year.

3. Table 6 provides an overview of key relevant data from Australia's reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 6
Key relevant data for Australia under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in its 2019 annual submission

Key parameters	*Values*
Periodicity of accounting	(a) AR: annual accounting (b) Deforestation: annual accounting (c) FM: commitment period accounting (d) CM: commitment period accounting (e) GM: commitment period accounting (f) RV: commitment period accounting (g) WDR: not elected
Election of activities under Article 3, paragraph 4	CM, GM and RV
Election of application of provisions for natural disturbances	Yes, for FM
3.5% of total base-year GHG emissions, excluding LULUCF	14 651.806 kt CO_2 eq (117 214.453 kt CO_2 eq for the duration of the commitment period)
Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for:	
1. AR	Issue 86 951 068 RMUs
2. Deforestation	Cancel 43 673 498 units
3. FM	NA
4. CM	NA
5. GM	NA
6. RV	NA
7. WDR	NA

Note: The values in this table reflect the difference in the accounting quantities for activities under Article 3, para. 3, and FM and any elected activities under Article 3, para. 4, of the Kyoto Protocol as reported in table 5 above between this report and the Party's previously published review report.

Annex II

Information to be included in the compilation and accounting database

Tables 1–5 include the information to be included in the compilation and accounting database for Australia. Data shown are from the original annual submission of the Party, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table 1
Information to be included in the compilation and accounting database for 2017, including on the commitment period reserve, for Australia
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
CPR	4 060 457 844	–	–	4 060 457 844
Annex A emissions for 2017	–	–	–	–
CO_2[a]	417 041 278	–	–	417 041 278
CH_4	103 602 316	–	–	103 602 316
N_2O	20 851 184	–	–	20 851 184
HFCs	12 252 937	–	–	12 252 937
PFCs	202 626	–	–	202 626
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	176 220	–	–	176 220
NF_3	NO	–	–	NO
Total Annex A sources	**554 126 561**	**–**	**–**	**554 126 561**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2017	–	–	–	–
AR	–29 354 617	–	–	–29 354 617
Deforestation	26 076 361	–	–	26 076 361
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2017	**–**	**–**	**–**	**–**
FM	–25 615 792	–	–	–25 615 792
CM	–2 246 186	–	–	–2 246 186
CM for the base year	18 125 965	–	–	18 125 965
GM	7 844 647	–	–	7 844 647
GM for the base year	13 576 626	–	–	13 576 626
RV	9 927	–	–	9 927
RV for the base year	276 927	–	–	276 927

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 2
Information to be included in the compilation and accounting database for 2016 for Australia
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2016	–	–	–	–
CO_2[a]	413 157 392	–	–	413 157 392
CH_4	102 048 500	–	–	102 048 500
N_2O	19 172 497	–	–	19 172 497
HFCs	11 982 601	–	–	11 982 601

	Original submission	*Revised estimate*	*Adjustment*	*Final*
PFCs	224 924	–	–	224 924
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	185 847	–	–	185 847
NF_3	NO	–	–	NO
Total Annex A sources	**546 771 760**	**–**	**–**	**546 771 760**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2016	–	–	–	–
AR	–28 289 106	–	–	–28 289 106
Deforestation	29 110 151	–	–	29 110 151
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2016	**–**	**–**	**–**	**–**
FM	–26 457 041	–	–	–26 457 041
CM	–2 392 037	–	–	–2 392 037
CM for the base year	18 125 965	–	–	18 125 965
GM	11 185 619	–	–	11 185 619
GM for the base year	13 576 626	–	–	13 576 626
RV	2 533	–	–	2 533
RV for the base year	276 927	–	–	276 927

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 3

Information to be included in the compilation and accounting database for 2015 for Australia

($t\ CO_2\ eq$)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2015	–	–	–	–
CO_2[a]	402 537 565	–	–	402 537 565
CH_4	101 348 199	–	–	101 348 199
N_2O	19 143 996	–	–	19 143 996
HFCs	11 801 652	–	–	11 801 652
PFCs	171 324	–	–	171 324
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	170 938	–	–	170 938
NF_3	NO	–	–	NO
Total Annex A sources	**535 173 674**	**–**	**–**	**535 173 674**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015	–	–	–	–
AR	–25 004 465	–	–	–25 004 465
Deforestation	26 734 959	–	–	26 734 959
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015	**–**	**–**	**–**	**–**
FM	–23 044 067	–	–	–23 044 067
CM	–333 300	–	–	–333 300
CM for the base year	18 125 965	–	–	18 125 965
GM	14 476 798	–	–	14 476 798
GM for the base year	13 576 626	–	–	13 576 626
RV	49 994	–	–	49 994
RV for the base year	276 927	–	–	276 927

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 4
Information to be included in the compilation and accounting database for 2014 for Australia
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2014	–	–	–	–
CO_2[a]	393 288 532	–	–	393 288 532
CH_4	100 888 746	–	–	100 888 746
N_2O	19 647 367	–	–	19 647 367
HFCs	10 784 753	–	–	10 784 753
PFCs	192 536	–	–	192 536
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	155 168	–	–	155 168
NF_3	NO	–	–	NO
Total Annex A sources	**524 957 101**	**–**	**–**	**524 957 101**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014	–	–	–	–
AR	–25 932 141	–	–	–25 932 141
Deforestation	36 914 175	–	–	36 914 175
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014	**–**	**–**	**–**	**–**
FM	–25 183 076	–	–	–25 183 076
CM	2 860 999	–	–	2 860 999
CM for the base year	18 125 965	–	–	18 125 965
GM	18 441 663	–	–	18 441 663
GM for the base year	13 576 626	–	–	13 576 626
RV	40 068	–	–	40 068
RV for the base year	276 927	–	–	276 927

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 5
Information to be included in the compilation and accounting database for 2013 for Australia
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2013	–	–	–	–
CO_2[a]	398 051 591	–	–	398 051 591
CH_4	102 966 818	–	–	102 966 818
N_2O	19 213 958	–	–	19 213 958
HFCs	9 867 318	–	–	9 867 318
PFCs	192 001	–	–	192 001
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	141 832	–	–	141 832
NF_3	NO	–	–	NO
Total Annex A sources	**530 433 519**	**–**	**–**	**530 433 519**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013	–	–	–	–
AR	–25 913 084	–	–	–25 913 084
Deforestation	35 225 939	–	–	35 225 939
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013	**–**	**–**	**–**	**–**
FM	–22 950 979	–	–	–22 950 979
CM	1 840 246	–	–	1 840 246
CM for the base year	18 125 965	–	–	18 125 965

	Original submission	*Revised estimate*	*Adjustment*	*Final*
GM	19 169 131	–	–	19 169 131
GM for the base year	13 576 626	–	–	13 576 626
RV	34 114	–	–	34 114
RV for the base year	276 927	–	–	276 927

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Annex III

Additional information to support findings in table 2 in this report

Missing categories that may affect completeness

No mandatory categories from the 2006 IPCC Guidelines were identified as missing.

Annex IV

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 2000. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. J Penman, D Kruger, I Galbally, et al. (eds.). Hayama, Japan: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency/Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/gp/english/.

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl.

IPCC. 2014. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/kpsg.

IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva: IPCC. Available at http://www.ipcc-nggip.iges.or.jp/public/wetlands/.

B. UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2013, 2014, 2015, 2016 and 2017 annual submissions of Australia, contained in documents FCCC/ARR/2013/AUS, FCCC/ARR/2014/AUS, FCCC/ARR/2015/AUS, FCCC/ARR/2016/AUS and FCCC/ARR/2017/AUS, respectively.

Other

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at https://unfccc.int/sites/default/files/resource/AGI%202019.pdf.

Annual status report for Australia for 2019. Available at https://unfccc.int/sites/default/files/resource/ASR%202019%20AUS_complete.pdf.

C. Other documents used during the review

Responses to questions during the review were received from Robert Sturgiss (International Climate Change and Energy Innovation Division of the Department of Industry, Science, Energy and Resources of Australia), including additional material on the methodology and assumptions used.