Report on the individual review of the inventory submission of Australia submitted in 2015*

Note by the expert review team

Contents

I. Introduction

1. This report covers the review of the 2015 inventory submission of Australia organized by the UNFCCC secretariat, in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" (hereinafter referred to as the UNFCCC review guidelines) and particularly Part III, "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention".[1] The review took place from 14 to 19 September 2015 in Canberra, Australia, and was coordinated by Mr. Vitor Góis Ferreira and Mr. Roman Payo (UNFCCC secretariat). Table 1 provides information on the composition of the expert review team (ERT).

Table 1
Composition of the expert review team

Area of expertise	Name	Party
Generalist	Ms. Melissa Weitz	United States of America
Energy	Ms. Duduzile Nhlengethwa-Masina	Swaziland
IPPU	Mr. Koen Smekens	Belgium
Agriculture	Mr. Marcelo Theoto Rocha	Brazil
LULUCF	Ms. Ana Blondel	Canada
Waste	Mr. Sabin Guendehou	Benin
Lead reviewers	Mr. Rocha	
	Ms. Weitz	

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

2. An overview of the total greenhouse gas (GHG) emissions[2] reported under the Convention for Australia is provided in annex I; table 6 shows total GHG emissions for selected years, and tables 7 and 8 show GHG emissions reported under the Convention by gas and by sector, respectively.

3. This report contains findings based on the assessment by the ERT of the 2015 inventory submission against the UNFCCC review guidelines. The ERT has made recommendations to resolve those findings related to issues.[3] Other findings and, if applicable, the ERT's encouragements to resolve them, are also included.

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[1] Annex to decision 13/CP.20.

[2] In this report, unless otherwise specified, "total GHG emissions" refers to the aggregated national GHG emissions expressed in carbon dioxide (CO_2) equivalent, excluding land use, land-use change and forestry, and including indirect CO_2 emissions if reported by the Party.

[3] "Issues" are defined in decision 13/CP.20, annex, paragraph 81.

II. Summary and general assessment of the 2015 inventory submission

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

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

Assessment		*Issue ID number(s) in tables 3 and/or 5[a]*
Dates of submission	Original submission: 27 May 2015 (NIR), 27 May 2015, version 3 (CRF tables)	
	The values from the original submission are used in this report	
Review format	in-country	
Adherence to the UNFCCC Annex I inventory reporting guidelines	Have any issues been identified in the following areas:	
	1. Identification of key categories	No
	2. Selection and use of methodologies and assumptions	Yes	I.2, I.29, I.30, L.27, L.28, L.36, L.37, L.38
	3. Development and selection of emission factors	Yes	E.17, E.18, I.7, I.17
	4. Collection and selection of activity data	Yes	E.14, L.25, L.29
	5. Reporting of recalculations	Yes	G.2, E.2, I.9, I.18, I.19, A.6, L.3
	6. Reporting of a consistent time series	Yes	G.3, E.12, E.13, I.7, I.15, I.17, I.34, L.28, L.29, L.32
	7. Reporting of uncertainties, including methodologies	Yes	G.6, W.4
	8. Quality assurance/quality control	Yes	G.4, E.15, I.5, I.6, I.17, I.22, I.23, I.26, L.7
	9. Other departures from the UNFCCC Annex I inventory reporting guidelines related to transparency, comparability, accuracy and adherence to the UNFCCC Annex I inventory reporting guidelines	In addition to the issues listed above, see additional issues related to transparency, comparability, accuracy and adherence to the UNFCCC Annex I inventory reporting guidelines in tables 3 and 5 below
Completeness	Is the inventory complete?	Energy: Yes
	Missing categories that affect completeness, if any, are included in annex II to this document	IPPU: No I.35
		Agriculture: Yes
		LULUCF: No L.24, L.29

Assessment			Issue ID number(s) in tables 3 and/or 5[a]
		Waste: No	W.7 (1990–1996)
	If one or more categories is not estimated because the Party determined that the estimated emissions would be insignificant, has the Party provided information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	Sufficient	I.20, W.8
Corrections	Have emissions been reported without corrections (e.g. related to climate variations or electricity trade)?	No	L.37, L.38
National inventory arrangements	Are the institutional, procedural and legal arrangements, including changes to the national inventory arrangements discussed by the Party during the review, effective and reliable for estimating GHG emissions?	Yes	
Implementation of previous recommendations	The ERT notes that the previous review report was published on 12 January 2015. On the basis of this publication date and taking into consideration the national circumstances, the ERT concludes that the Party has demonstrated sufficient progress in implementing improvements in its submission	General: Yes	
		Energy: No	E.2, E.12, E.13, E.14
		IPPU: No	I.2
		Agriculture: Yes	
		LULUCF: No	L.3, L.7, L.9, L.19, L.20, L.21
		Waste: No	W.1
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	

Abbreviations: CRF = common reporting format, ERT = expert review team, GHG = greenhouse gas, IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry, NIR = national inventory report, UNFCCC Annex I inventory reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories".
[a] Additional issues and findings may be included in tables 3 and/or 5.

III. Status of implementation of issues raised in the previous review report

5.   Table 3 compiles all the recommendations made in the previous review report. For each issue, the ERT specified whether it believes the issue has been resolved by the

conclusion of the review of the 2015 inventory submission and provided the rationale for its determination.

Table 3
Status of implementation of issues raised in the previous review report

ID#	Issue classification[a]	Recommendation made in previous review reports	ERT assessment and rationale
General			
G.1	QA/QC and verification (table 3, 2014). Transparency	Transparently describe the categories that have undergone additional tier 2 QC checks (e.g. verification of the IEFs)	Resolved. The NIR includes information on additional tier 2 QC checks in volume 1, page 16
Energy			
E.1	General (energy sector) (18, 2014) (25, 2013) (31, 2012). Transparency	Include more detailed information about fuel reallocation and emission changes resulting from recalculations in the NIR	Not relevant. The reallocation of fuel was not a major reason for the recalculations between the 2014 and the 2015 submissions
E.2	Reference approach – CO_2 (20, 2014) (30, 2013). Transparency	Prepare and revise the reference approach tables for the years prior to 2012 and present them in the NIR with explanations	Addressing. Australia reported in the NIR that it is proactively working on the revision. During the review, Australia indicated to the ERT that it is working on the revision of the time series and has recalculated two additional years (2006 and 2007) in comparison with the previous annual submission (where the recalculations covered the period 2008–2011). However, the ERT noted that in the 2015 submission there are still no tables or an explanation of the recalculations in the NIR
E.3	Reference approach – CO_2 (21, 2014). Transparency	Provide details of any relevant update on the collaboration with the Bureau of Resources and Energy Economics to clarify coal production data reported to the secretariat and IEA, as well as including a rationale for any differences observed between the CRF tables and the data reported to the IEA	Resolved. Australia reported in the NIR (volume 1, page 52) that the major reason for the difference in coal consumption reported in the CRF tables and reported to IEA is that coal production reported to IEA comprises black coal production only and does not include brown (lignite) coal production
E.4	International bunkers – CO_2, CH_4 and N_2O (22, 2014) (33, 2013) (35, 2012) (44, 2011). Accuracy, transparency	Continue to investigate why the data for domestic aviation are systematically lower in the CRF tables, by around 10% for most years, than the data reported to IEA, and include a detailed explanation of the results of this investigation in the NIR	Resolved. In the NIR (volume 1, page 52, section 3.2.6) Australia states that the data submitted to IEA are consistent with the data used in the inventory. During the review, Australia explained that the differences between the IEA data and the CRF tables are related to: a different calculation method used for conversion to

ID#	Issue classification[a]	Recommendation made in previous review reports	ERT assessment and rationale
			energy by IEA; accounting period inconsistencies; and revisions to the data published annually in the Australia Energy Statistics
E.5	International bunkers – CO_2, CH_4 and N_2O (23, 2014) (37, 2013). Accuracy, transparency	Investigate the underlying issues leading to inconsistencies between the CRF tables and the data reported to IEA regarding residual fuel oil consumption in international marine bunkers and reflect on these matters in the NIR	Resolved. See finding E.4 above
E.6	Stationary combustion: liquid fuels – CO_2 (25, 2014) (42, 2013). Transparency	Include initial AD information from the seven national petroleum refining operations in the annual submission as an additional level of QA	Resolved. The aggregated AD of petroleum refining operations is provided in table A6.4 of the NIR (volume 3, page 135)
E.7	Stationary combustion: solid fuels – CO_2, CH_4 and N_2O (26, 2014). Transparency	Transparently document in the NIR where emissions from consumption of refinery coke are reported	Resolved. On page 57 of the NIR (volume 1), Australia states that emissions reported under petroleum refining include emissions from the combustion of refinery coke to restore the activity of the catalyst during the refining process
E.8	Stationary combustion: solid fuels – CO_2, CH_4 and N_2O (27, 2014). Transparency	Include information in the NIR to describe the reporting of emissions from black coal in iron and steel production, specifically that although most black coal consumption is reported under metal production (industrial processes and product use sector), some minor use of black coal for combustion purposes continues to be reported under iron and steel production (energy sector)	Resolved. Australia included the explanation for the reporting of emissions from black coal under iron and steel production in section 3.4.3 of the NIR (volume 1, page 67) (see finding E.20 in table 5 below)
E.9	Stationary combustion: solid fuels – CO_2 (28, 2014). Transparency	Present information in the NIR to explain the inter-annual changes in CO_2 emissions from combustion of liquid fuels in other stationary combustion	Not relevant. The fluctuations identified in the previous inventory submission were the result of lubricant use, the emissions of which have now been moved to the IPPU sector in accordance with the 2006 IPCC Guidelines (NIR, volume 1, page 96)
E.10	Road transportation (1.A.3.b): liquid fuels – CH_4 (29, 2014). Transparency	Provide information in the NIR on the explanations for the inter-annual variability in the CH_4 IEF for gasoline consumed in road transport that were provided during the 2014 review	Resolved. The effect of changes in vehicle standards is explained on pages 75–80 of the NIR (volume 1), while the declining EFs of the various vehicle emission standards are presented in tables 3.A.6 to 3.A.8 of the NIR (volume 1, pages 140–143) and the AD for 2012 are presented in tables

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			3.A.16 to 3.A.18 of the NIR (volume 1, pages 150–152)
E.11	Coal mining and handling (1.B.1.a): solid fuels – CO_2 and CH_4 (30, 2014). Accuracy	Undertake verification of the developed CO_2 IEF for underground coal mines	Resolved. The ERT commends Australia for being one of the few countries to report CO_2 emissions from underground coal mining. The 2006 IPCC Guidelines state that CO_2 emissions should also be included in the inventory where data are available (volume 2, page 4.8). Responding to the ERT during the review, Australia stated that CO_2 emissions from underground mining result from direct measurements and are verified within the National Greenhouse and Energy Reporting Scheme (NGER). Australia has not yet reported in the NIR on the verification of the IEF with those of Kazakhstan, the Russian Federation and Ukraine, as it was encouraged to do in the previous annual report
E.12	Oil and natural gas and other emissions from energy production(1.B.2): gaseous fuels – CO_2 and CH_4 (31, 2014). Transparency, consistency	Improve the transparency of the discussion on the reasons underlying the following observed trends: large inter-annual changes in CH_4 emissions from natural gas production and processing; and the decline in CH_4 emissions from distribution while CO_2 emissions increased. Provide supporting data in the relevant chapter of the NIR	Addressing. In section 3.9.3 of the NIR (volume 1, page 126) Australia reported that NGER methodologies were designed to be consistent with pre-2009 methods. In the 2015 NIR (volume 1, page 128), Australia reported on a revised method for the recalculation of emissions from natural gas distribution, which resulted in a consistent time series for CO_2 and CH_4 emissions. However, the ERT considers that the NGER explanation does not provide the underlying reasons for the observed trends in CH_4 emissions from natural gas production and processing, which are still observed in the current annual inventory submission
E.13	Oil and natural gas and other emissions from energy production (1.B.2): liquid and gaseous fuels – CO_2 and CH_4 (32, 2014).	Identify appropriate methods to ensure a consistent time series when separating emissions from oil and gas flaring for the period 1990–2008 (and therefore completing the split for the complete time series) and present this information in the NIR	Not resolved. Australia has reported in the NIR (volume 1, page 119) that it is still considering disaggregating emissions from oil and gas flaring, but it could not fulfil the plans to correct this in the 2015 annual submission

ID#	Issue classification[a]	Recommendation made in previous review reports	ERT assessment and rationale
	Consistency		
E.14	Oil and natural gas and other emissions from energy production (1.B.2): liquid fuels – CO_2 and CH_4 (33, 2014). Accuracy	Update the AD for petroleum storage so that it truly reflects the actual AD that were applied to estimate emissions of petroleum storage since 2009	Not resolved. Responding to the previous review, Australia had stated its plans to correct this in the 2015 annual submission. However, in section 3.9.6 of the NIR (volume 1), Australia still reports that it will undertake work to refine inputs into the estimation of venting emissions from gas exploration in future annual submissions
IPPU			
I.1	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs (38, 2014). Transparency	Continue to increase the transparency for this category by providing a clear description of the AD, EFs and methodology used for estimating emissions	Resolved. In its 2015 submission, Australia has provided a more comprehensive description of the methodology, AD and EFs used (NIR volume 1, pages 201–238). However, the ERT concluded that further improvements can be made. See findings I.21 and I.31 in table 5 below
I.2	Electronics industry (2.E) – SF_6 (39, 2014) (65, 2013) (55, 2012). Comparability	Disaggregate and report separately emissions from the operation of electrical equipment and emissions from the disposal of electrical equipment	Not resolved. Australia reported in the 2015 NIR (volume 1, pages 220–227), that it still reports only aggregated operational emissions, owing to a lack of the required data
Agriculture			
A.1	General (agriculture) – CH_4 and N_2O (42, 2014) (74, 2013) (64, 2012) (82, 2011). Comparability	Include a pre-weaning class for cattle	Resolved. A pre-weaning period has been implemented for dairy cattle calves, reflecting the different CH_4 and N_2O emissions for these animals which are placed on milk, milk replacements and supplements until weaning. See sections 5.3.2.1 (volume 1, page 248) and 5.4.2.2 (page 262) of the NIR
A.2	Manure management (3.B) – CH_4 and N_2O (44, 2014) (77, 2013). Accuracy	Implement the upgraded country-specific model (PigBal) in the Australian inventory as soon as it has undergone appropriate QA/QC controls	Resolved. PigBal is a nutrient balance model for intensive piggeries in Australia. By entering typical animal characteristics, intakes, diet compositions and waste production rates, the model calculates the volatile solids in the animal manure and waste feed and the nitrogen retained by the animals. It includes information collected from pig industry

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			experts on average intakes and other relevant details for a typical herd. Additional information on the model is available in appendix 5.E of the NIR (volume 1, page 325)
A.3	Agricultural soils (3.D) – N_2O (45, 2014) (78, 2013). Transparency	Include a full explanation in the NIR regarding the assumption used for estimating N_2O emissions from the application of synthetic fertilizers to forest land	Resolved. Section 5.6.2 of the NIR (volume 1, page 281) provides relevant information. In particular, the Party stated that limited amounts of fertilizer are used in Australian forests. Currently, there are no data available to allocate fertilizer use specifically to forestry activities. Therefore, it is assumed that any fertilizer applied for forestry activities will fall under the non-irrigated systems and have an EF of 0.002 kg N_2O–N/kg N applied
A.4	Prescribed burning of savannas (2.E) – CH_4 and N_2O (48, 2014) (68, 2013), (59, 2012). Comparability	Use the appropriate values or notation keys to report additional information in some of the CRF table(s) (CRF tables 4.A and 4.E in the previous annual submission) where "0.00" is still reported	Not relevant. Additional information is not required under the new CRF table 3.E
A.5	Rice cultivation (3.C) – CH_4 (50, 2014). Consistency	Provide in the NIR the information provided to the previous ERT as to how time-series consistency is ensured for the reporting of emissions from rice cultivation ("the time series were ensured by using the same method and data sources in all years")	Resolved. Information was provided in section 5.5.3 of the NIR (volume 1, page 280)

LULUCF

ID#	Issue classification[a]	Recommendation made in previous review reports	ERT assessment and rationale
L.1	General (LULUCF) – CO_2, CH_4 and N_2O (52, 2014). Transparency	Include in the NIR information indicating that the model used to estimate emissions, starting in the 2014 inventory submission, no longer includes shedding and resprouting of leaves as a source of emissions	Resolved. Australia made further revisions to the forest land remaining forest land subclassification "other native forests" in its 2015 inventory submission. These changes, and the recalculations owing to these changes, are transparently explained in section 6.4 of the NIR
L.2	General (LULUCF) – CO_2, CH_4 and N_2O (52, 2014). Transparency	Further monitor, and provide information in the NIR, regarding the performance of the revised emission estimation model	Resolved. Chapter 6 of the NIR provides information on the revisions made to the estimation model for each land category and their impact on the recalculations
L.3	General (LULUCF) –	Provide detailed explanations on any recalculations in the NIR	Not resolved. The recalculations for the LULUCF sector are still

ID#	Issue classification[a]	Recommendation made in previous review reports	ERT assessment and rationale
	CO_2, CH_4 and N_2O (52, 2014). Transparency		not adequately explained in the NIR. In response to a question raised by the ERT in relation to the provision of a more detailed breakdown of the recalculations for forest land remaining forest land, Australia provided a table with the main drivers of the recalculations and their individual impacts on the estimates for each year. To fulfil the recommendation, the ERT encourages the Party to include in the NIR tables and charts similar to the ones provided to the ERT during the review, at the sector level and for each category where important recalculations have occurred
L.4	General (LULUCF) (53, 2014). Transparency	Include detailed information regarding the combination and harmonization of different data sources/databases to represent land-use categories and conversions, as well as the time frames used for these conversions and the associated changes to the soil carbon stocks in the annual submission	Resolved. Detailed information is provided in section 6.3 and appendix 6.A of the NIR
L.5	General (LULUCF) (54, 2014) (84, 2013). Transparency	Include, in the LULUCF chapter of the NIR, synthesized information related to land representation, including the methodology applied for the assessment of land use and land-use change, background data and transition periods applied	Resolved. Detailed information is provided in section 6.3 and appendix 6.A of the NIR
L.6	General (LULUCF) (54, 2014) (84, 2013). Transparency	Include, in the NIR, a confusion matrix for both land converted to grassland and land converted to cropland	Resolved. A confusion matrix is included in appendix 6.A of the NIR
L.7	General (LULUCF) (55, 2014). Adherence to the UNFCCC Annex I inventory reporting guidelines	Enhance the QA/QC measures and ensure full correspondence between the data reported in the NIR and the CRF tables regarding distribution on total land area per land-use category/subcategory	Not resolved. Several discrepancies were still identified (e.g. between the data presented in section 6.1 of the NIR and CRF tables 4, 4.1, 4.A and summary 2 in relation to land areas and estimates of emissions and removals). During the review, the Party acknowledged errors in the input of forest areas into the CRF Reporter and in the first paragraph of section 6.1 of the NIR
L.8	Forest land remaining forest land (4.A.1) – CO_2 (56, 2014) (85, 2013).	Present in the NIR more comprehensive information regarding wood harvesting, in line with the explanations provided in the previous review	Resolved. The data source for the wood harvesting AD has been updated for the 2015 inventory submission. The updated AD are presented in section 6.4.1 of the

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	Transparency		NIR
L.9	Forest land remaining forest land (4.A.1) (57, 2014). Transparency	Include in the NIR additional information regarding the mapping of plantations established/recorded from 1940 to 1989, and the associated estimates	Addressing. Australia informed the ERT during the review that it has a project under way to develop a map of the location of plantations established before 1990, which is planned to be finalized over the coming 12 months. The ERT welcomes this initiative
L.10	Forest land remaining forest land (4.A.1) – CO_2 (58, 2014). Transparency	Present in the NIR the methodology used to estimate emissions from fuelwood extractions from dead organic matter pools	Resolved. The description of the method used to estimate emissions from fuelwood consumption has been updated in the NIR (section 6.5.4). The data for fuelwood consumed are now obtained from production statistics from the Department of Industry and Science
L.11	Forest land remaining forest land (4.A.1) – CO_2 (59, 2014). Transparency	Provide in the NIR additional information regarding the mandate of the Australian National Forest Inventory, detailing the alternative means used to obtain and derive data on emissions and removals from the biomass and non-biomass pools in the subcategory forest land remaining forest land	Resolved. The response provided in the NIR (table 6.6(e) in volume 3, page 153) clarifies that for harvested forests, the AD are derived from the Australian Forest and Wood Production Statistics (AFWPS) which is published by the Australian Bureau of Agricultural and Resource Economics and Sciences, (ABARES),[b] the website of which publishes various data sets relating to Australia's forestry sector in its biannual AFWPS report, including the time series of data on forest and wood products. The data sources used are explained for each broad subdivision of forest land remaining forest land in section 6.4 of the NIR
L.12	Forest land remaining forest land (4.A.1) – CH_4 and N_2O (60, 2014). Adherence to the UNFCCC Annex I inventory reporting guidelines	Enhance the QA/QC activities and provide the correct data for non-CO_2 emissions from drainage of soils on forest land	Resolved. The specific issue in relation to inconsistency in the use of the notation key for non-CO_2 emissions from drainage of soils on forest land between the NIR and the CRF tables was resolved in the 2015 submission
L.13	Cropland remaining cropland (4.B.1) –	Provide soil carbon estimates, taking into account the changes to management practices	Resolved. Australia applied various improvements in the 2015 submission for this category,

ID#	Issue classification[a]	Recommendation made in previous review reports	ERT assessment and rationale
	CO_2 (62, 2014) (86, 2013). Accuracy		including: a change in the conceptual framework to ensure that net carbon stock changes are estimated by management practices; and the implementation of a spatially and temporally explicit agricultural species and management practices database. Details of the data and sources used are provided in appendices 6.B.4, 6.B.5 and 6.E.4 of the NIR, and information on the methodology used to include the management practices for the soils pool is provided in section 6.8.1 of the NIR
L.14	Cropland remaining cropland (4.B.1) – CO_2 (63, 2014). Adherence to the UNFCCC Annex I inventory reporting guidelines	Enhance the QA/QC activities to ensure the appropriate use of notation keys and full consistency between the data in the CRF tables and the NIR	Resolved. The specific issue in relation to inconsistency in the use of the notation key for biomass and soil pools between the data presented in the NIR and the CRF tables was resolved
L.15	Cropland remaining cropland (4.B.1) – CO_2 (63, 2014)	Separately report perennial woody crops in the CRF tables	Not relevant. The ERT notes that in accordance with the UNFCCC Annex I inventory reporting guidelines the use of a more detailed subdivision in the sectoral CRF background tables is not a mandatory requirement, and countries may decide whether and how to further subdivide their land categories as indicated by footnote 1 in CRF tables 4.A–4.F. Australia presents, in section 6.8 of the NIR, detailed information on the methodology and parameters used to estimate emissions and removals from perennial woody crops. However, the estimates are not presented separately in the NIR; therefore, a different recommendation related to this issue has been added in table 5 below (finding L.31)
L.16	Grassland remaining grassland (4.C.1) – CO_2 (64, 2014). Adherence to the	Enhance the QA/QC activities to ensure the appropriate use of notation keys and full consistency between the data in the CRF tables and the NIR	Resolved. The specific issue in relation to inconsistency in the use of the notation key for biomass and soil pools between the data presented in the NIR and the CRF

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	UNFCCC Annex I inventory reporting guidelines		tables was resolved
L.17	Grassland remaining grassland (4.C.1) – CO_2 (64, 2014). Transparency	Separately report perennial woody biomass in the CRF tables	Not relevant. Based on the same rationale provided in finding L.15 above, a slightly different recommendation has been added in table 5 below (finding L.33)
L.18	Grassland remaining grassland (4.C.1) – CO_2 (65, 2014). Transparency	Report in the NIR the changes made to the Full Carbon Accounting Model (FullCAM), as well as on the progress made regarding the relevant ongoing work to implement new data on management practices, crop yields and soil carbon stocks into a tier 3 method, with a view to submitting significantly improved estimates in the 2015 annual submission	Resolved. Australia made various improvements in the 2015 submission for this category, including changes in the conceptual framework to ensure that net emissions are estimated considering management practices, and implementation of a spatially and temporally explicit agricultural species and management practices database. Details of the data and sources used are provided in appendices 6.B.4, 6.B.5 and 6.E.4 of the NIR. The way the estimates of the carbon stock changes are calculated for the soils pool, by incorporating the impact of management practices, is described in section 6.9.1 of the NIR
L.19	Land converted to wetlands (4.D.2) – CO_2 (66, 2014). Comparability	Identify in the annual submission the conversions from forest land to wetlands, and provide separate AD and emission estimates (for cases where the emissions are associated with those from the conversion from forest land to grassland)	Addressing. Australia has commenced a project to enable the disaggregation of emissions and removals from forest land converted to wetlands from its emission estimates of forest conversion. The ERT encourages the Party to use methods from the Wetlands Supplement when implementing this project
L.20	Land converted to settlements (4.E.2) – CO_2 (67, 2014). Comparability	Distinguish the conversions from forest land to settlements, and provide separate AD and emission estimates (for cases where the emissions are associated with those from the conversion from forest land to grassland)	Addressing. Australia has commenced a project to enable the disaggregation of emissions and removals from forest land converted to settlements from its emission estimates of forest conversion
L.21	Biomass burning – CH_4 and N_2O (68, 2014). Transparency	Report in the CRF tables the AD for biomass burning on grassland remaining grassland	Addressing. In the 2015 submission, the AD for biomass burning on grassland remaining grassland is still reported as "IE" without an indication of where the

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			AD are reported because the version of the CRF Reporter used by Australia in its 2015 submission does not adequately display cell comments. However, section 6.9.1.3 of the NIR indicates that estimates of CO_2 emissions due to fires in grassland remaining grassland are reported under CRF table 4(V), while Australia noted during the review that these estimates are reported under CRF table 4.C as carbon stock changes. Therefore, the ERT concluded that there is a lack of consistency between the information in the NIR and the CRF tables that still needs to be resolved
Waste			
W.1	Incineration and open burning of waste (5.C) – CH_4 and N_2O (77, 2014). Transparency	If no new information is reported for clinical waste or solvents, replace the notation key "NA" with "NE"	Not resolved. Australia reported the notation key "NA" in CRF table 5.C for clinical waste and solvents. See also finding W.8 in table 5 below
W.2	Incineration and open burning of waste (5.C) – CO_2, CH_4 and N_2O (77, 2014). Transparency	For CO_2, CH_4 and N_2O emissions from MSW incineration, replace the notation key "NA" with "NO" for the years since 1996 and clearly document this information in the NIR	Resolved. The Party reported emissions using the notation key "NO". However, see finding W.7 in table 5 below

Abbreviations: 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, AD = activity data, CRF = common reporting format, EF = emission factor, ERT = expert review team, IE = included elsewhere, IEA = International Energy Agency, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry, MSW = municipal solid waste, NA = not applicable, NE = not estimated, NIR = national inventory report, QA/QC = quality assurance/quality control, UNFCCC Annex I inventory reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories", Wetlands Supplement = *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*.

[a] References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) where the issue was raised.

[b] Available online at: <http://www.agriculture.gov.au/abares/forestsaustralia>.

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

6. 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 or more successive reviews,

including the review of the 2015 inventory submission of Australia, and have not been addressed by the Party.

Table 4
Issues identified in three or more successive reviews and not addressed by the Party

ID#[a]	Issue identification	Number of successive reviews issue not addressed
General: no such general issues were identified		
Energy		
E.2	Prepare and revise the reference approach tables for the years prior to 2012 and present them in the NIR with explanations	3 (2013–2015)
IPPU		
I.2	Disaggregate and report separately emissions from the operation of electrical equipment and emissions from the disposal of electrical equipment	4 (2012–2015)
Agriculture: no such issues for the agriculture sector were identified		
LULUCF: no such issues for the LULUCF sector were identified		
Waste: no such issues for the waste sector were identified		

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

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

V. Additional findings made during the 2015 technical review

7.   Table 5 contains findings made by the ERT during the review of the 2015 inventory submission of Australia that are additional to those identified in table 3 above.

Table 5
Additional findings made during the 2015 technical review

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
General				
G.2	Transparency	Australia's inventory is generally transparent. In particular, the ERT noted that Australia has documented in the NIR: its approach for data collection, including agreements with other agencies and data providers, and its approach for QA/QC of the selected data; its consistent approach for the selection of methods and the QA of the selection; and its consistent approach for the development and selection of EFs, including the use of standards for measurements and QA of the selected EFs. However, potential areas of improvement to enhance the transparency of the NIR were identified by the ERT, including: information on recalculations (rationale, methodology, and impacts); information on trends; methodological descriptions; and additional and disaggregated information on AD and emission estimates (especially in the LULUCF sector)	Yes	Transparency
		The ERT recommends that the Party address the remaining areas for improvement (explained in the sector-level findings listed below)		
G.3	Time-series consistency	Australia generally reports consistent time series and reviews the National Greenhouse and Energy Reporting (NGER) emission data to ensure consistency over the time series. However, in some sectors, improvements to the time series are recommended	Yes	Consistency
		The ERT recommends that Australia improve the general consistency of its time series by implementing the recommendations on consistency provided in the sector-level findings listed below		
G.4	QA/QC and verification	Australia's QA/QC system implements many QA/QC and verification procedures at many steps in the inventory development process, including: the automation of the checks used in the Australian Greenhouse Emissions Information System (AGEIS) and the Full Carbon Accounting Model (FullCAM); the use of standard carbon balance; the QA of the estimates provided by the National Greenhouse Gas	Yes	Adherence to the UNFCCC Annex I inventory reporting guidelines,

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		Inventory Team,(NGGI) team, the National Inventory Users Group, external consultants for targeted review (e.g. the Agriculture Inventory Advisory Panel) and the public availability of information for review; checks against atmospheric measurements for some gases; and checks against the IEFs of other countries. However, a number of QA/QC issues were identified in the review, including: areas of inconsistency within the NIR and between the NIR and the CRF tables (noting that some inconsistencies are the result of errors in the CRF Reporter); errors (e.g. in the reference method calculations approach for verification purposes); and incorrect or missing descriptions of methodologies and typing errors. Further, the ERT found that the NIR did not contain sufficient information to evaluate the QA/QC procedures applied to the data from the NGER programme, which is a key data source of the inventory	transparency	
		The ERT recommends that Australia fully implement its QA/QC plans to minimize errors in its reporting and transparently describe in the NIR the QA/QC procedures applied to data received from NGER, including the results of any checks		
G.5	Transparency	Where reporting at a disaggregated level could lead to disclosure of confidential information, Australia has aggregated the data with other sectors before compilation and reporting. However, during the review week, in accordance with its policies and procedures to share confidential data, Australia shared relevant confidential data with the ERT, as needed. The ERT commends Australia for providing access to its data. However, the ERT notes that increased access to confidential data in the NIR would facilitate future reviews, especially those that are not in-country, and would improve transparency	No	
		The ERT encourages the Party to continue to find ways to disclose confidential information		
G.6	Uncertainty analysis	Australia generally implemented a tier 1 uncertainty approach, though it uses a Monte Carlo analysis (i.e. tier 2) to estimate uncertainty ranges for some categories. The NIR (volume 3, page 103) states the Party's plans to update to a tier 2 approach for all categories and to take into consideration refinements suggested by the Commonwealth Scientific and Industrial Research Organisation (CSIROin 2005. However, the ERT notes that there have been many recent updates to the methods and data used in the inventory since 2005 and the uncertainty analysis has not been updated to reflect these; an exception is for electricity generation where the uncertainty assessment has been updated to use uncertainty information from NGER. Additional category-based uncertainty estimates will be	Yes	Adherence to the UNFCCC Annex I inventory reporting guidelines

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		reported to NGER in October 2015. Australia intends to review the uncertainty estimates available through NGER on a sector-by-sector basis to ensure accuracy and completeness before potentially incorporating the new uncertainty information from NGER into the uncertainty estimates		
		The ERT recommends that Australia update its uncertainty assessment, and encourages the Party to continue with the planned updates to use the Monte Carlo method for the most significant categories		
G.7	Follow-up to previous reviews	Australia includes in the NIR (annex A6.3) a summary of responses to previous reviews. The ERT noted that most of the previous recommendations have been addressed, including all of the previous recommendations for the agriculture and waste sectors. However, several previous recommendations were not addressed in the energy, IPPU and LULUCF sectors	No	
G.8	National inventory arrangements	The information provided in the NIR and in the presentations made by the Party during the review week on establishing and maintaining institutional, legal and procedural arrangements is transparent. Australia has ensured sufficient capacity for the timely performance of functions (making use of efficiencies from AGEIS and FullCAM), and the technical competence of staff (including through encouraging staff to take UNFCCC reviewer tests and participate in reviews). The ERT concluded that these arrangements are effective and reliable for estimating GHG emissions	No	
G.9	Key category analysis	The Party has identified key categories using a more disaggregated approach than the calculated key category analysis in the CRF tables. In some cases, the Party's key categories do not match the CRF tables, but the Party has explained (in response to questions raised by the ERT during the review) how the increased disaggregation leads to the differences	Yes	Transparency
		The ERT recommends that the Party increase the transparency of its reporting of the key category analysis in the NIR		
Energy				
E.15	Reference approach: all fuels – CO_2	In CRF table 1.A(b), Australia multiplied the original apparent fuel consumption figures by a factor of 1,000 to convert the final values to terajoules (TJ), although this was not necessary because the original values were already expressed in TJ. This resulted in the reference approach CO_2 emissions being a factor of 1,000 higher than they should have been, resulting in a difference of 106,242.5% between the reference approach and the sectoral approach as reported in CRF table 1.A(c).	Yes	Comparability

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		The NIR (volume 3, annex 4, page 122) presents a different value for CO_2 emissions as reported under the reference approach (370.9 Mt) and a correct difference between the sectoral approach and the reference approach (0.9% difference). During the review, Australia acknowledged this error, which could have resulted from a technical error in the CRF Reporter		
		The ERT recommends that Australia correct its submission and thoroughly implement its QA/QC procedures to ensure the internal consistency of the entire annual submission and to ensure that such errors are identified prior to submitting the submission		
E.16	Carbon dioxide transport and storage (1.C): natural gas – CO_2	The ERT notes that Australia is currently implementing CCS projects, with the initial project (with nine injection wells) scheduled to start operations in 2016, as the Party explained during the review. The ERT commends the Party for the initiative to include information on this category in the NIR and for planning a long-term monitoring system to estimate emissions for this category. The ERT encourages Australia to ensure that all data that will be required for the reporting of fugitive emissions at all stages of the CCS project are collected, and to make any necessary amendments to NGER in time to facilitate reporting	No	
E.17	Oil and natural gas and other (1.B.2.b): natural gas – CO_2 and CH_4	A new liquefied natural gas plant recently started operations in Australia. The ERT noted that the key emission data and country-specific CO_2 and CH_4 EFs used to report the emissions for this category, which considers several plants, were developed before the opening of the new plant, and may therefore not be representative of emissions from this plant type	Yes	Accuracy
		The ERT recommends that Australia collect data on emissions from any new plant types, and update the country-specific CO_2 and CH_4 EFs, where appropriate		
E.18	Oil and natural gas and other (1.B.2.b): liquid and solid fuels – CO_2 and CH_4	During the review, Australia informed the ERT of the considerable projected growth in unconventional gas production (e.g. shale and coal bed methane) in Australia. The ERT notes that key EF data used in the inventory calculations are based on data from the United States of America and may not be representative of the emissions from well completion activities associated with the commissioning of new production	Yes	Accuracy
		The ERT recommends that Australia make efforts to improve the data for the emissions from this category, including the development of updated EFs that represent production activities in unconventional gas production		
E.19	Multilateral operations: all fuels – CO_2, CH_4 and	Australia reports the notation key "NE" for the AD and emissions from multilateral operations for the entire time series in CRF table 1.C and does not provide	Yes	Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type
	N$_2$O	information on these emissions in the NIR. During the review, the Party indicated that: fuel used for military operations conducted in Australia by foreign forces is aggregated with that used for domestic military operations and reported in the categories other sectors (1.A.4) and other (fuel combustion) (1.A.5); and that the estimates of emissions from military transport include emissions associated with aircraft and marine vessels leaving Australia for international ports. Australia also informed the ERT that it does not consider either of these activities to be multilateral operations. Instead, the Party considers multilateral operations to encompass bilateral operations conducted under the Charter of the United Nations. For the reporting period, no such operations were undertaken	
		The ERT recommends that Australia change the notation key to "NO" when reporting emissions from multilateral operations and make use of the documentation box, CRF table 9 and relevant sections of the NIR to explain the fuel aggregation. The ERT also encourages the Party to consider making plans to disaggregate military fuel in the future	
E.20	Iron and steel production (1.A.2.a): solid fuels – CO$_2$	The ERT commends Australia for implementing the recommendation made in the previous review report and explaining in the NIR that some black coal is still used for iron and steel production (1.A.2.a) (see finding E.8 in table 3 above)	Yes Transparency
		To further improve transparency in this regard, the ERT recommends that the Party report in the NIR the information on the AD for black coal and coke oven gas for both the category iron and steel production (1.A.2) and the category manufacture of solid fuels and other energy industries (1.A.1.c). The ERT notes that this could be done through the provision of an iron and steel carbon balance in the NIR, and encourages the Party to provide this	
IPPU			
I.3	General (IPPU) – CO$_2$, CH$_4$ and N$_2$O	The ERT noted that Australia did not report emissions from all categories or subcategories separately because of national legal restrictions on data confidentiality. Australia used the notation key "IE" in the CRF tables, where appropriate (note: the necessary additional explanation was not included because of problems with the CRF Reporter). Although the ERT recognizes that explanations are provided in category descriptions in the NIR, a clear overview of where the emissions from the (sub)categories concerned have been included would improve transparency	No
		Although the reporting in the NIR is transparent and complete, the ERT encourages Australia to include in its NIR an overview table indicating which categories and subcategories are reported as "IE" and where these emissions were	

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		included		
I.4	General (IPPU) – CO_2 and CH_4	Australia uses bottom-up data from facilities on the use of carbon-containing materials as information data for feedstocks. This enables the Party to separate feedstock consumption from consumption for energy use and to avoid double counting emissions between the energy and the IPPU sectors. Although these procedures are mentioned in the description for several subcategories, where applicable, the ERT considers that the provision of an overall description of this methodology in the NIR would improve the transparency of the reporting	No	
		The ERT encourages Australia to provide in the NIR a clear description of the methodology applied to separate data between feedstocks and energy consumption. This could include, for example, the explanation that NGER data, for the feedstock consumption of each fuel in particular subcategories, are subtracted from the total consumption of that fuel in that subcategory as reported in the Australia Energy Statistics (AES) while the remaining amount of fuel is used to estimate emissions allocated to the energy sector		
I.5	General (IPPU) – all gases	In its NIR, Australia does not report transparently on the procedures in place to verify and validate facility data entries into NGER. During the review, the Party explained that this responsibility does not lie with the Department of Industry and Science, which is a user of the NGER data, but with the Clean Energy Regulator (CER). The Party has also provided information to the ERT on the legal instruments in place that allow the working of NGER. In addition, during the review, CER explained which procedures, such as audits, are in place to perform verification and validation of the data provided by the reporting entities in NGER. The ERT notes that the additional information provided is important to assess the QA/QC performed on the source data	Yes	Transparency
		The ERT recommends that Australia improve the transparency of its reporting of the instruments supporting the performance of NGER and on the verification and validation procedures, in accordance with the information provided during the review		

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
I.6	Cement production (2.A.1) – CO_2	The ERT noted a possible inconsistency between the reported methodology and the AD in the NIR and in the CRF tables. In the CRF tables, the AD are described as being based on clinker production, while the NIR states that cement data were used. During the review, Australia clarified that it used a tier 2 methodology and that the AD are based on clinker production	Yes	Adherence to the UNFCCC Annex I inventory reporting guidelines
		The ERT recommends that Australia correct the identified inconsistency on the methodology and AD reported in the CRF tables and the NIR. The ERT also recommends that the Party enhance its QA/QC procedures to avoid the occurrence of such errors		
I.7	Cement production (2.A.1) – CO_2	Australia used constant CaO and MgO content ratios for the entire time series (1990–2013), based on a 1992 study. Although the use of constant values was not contested by the Party's cement industry, the ERT considers that the values used may not reflect conditions in the most recent years	Yes	Accuracy, consistency
		The ERT recommends that the Party confirm or update these content ratios in order to ensure the accuracy of the values for more recent years and to ensure the consistency of the time series		
I.8	Lime production (2.A.2) – CO_2	In estimating the emissions from lime production, Australia uses NGER data as the information source for the AD. However, it is not clear from the NIR whether the NGER data also include the amounts of lime produced in-house. During the review, the Party confirmed that this was the case	Yes	Transparency
		In order to improve transparency, the ERT recommends that Australia clarify, in the NIR, that the NGER data used in the inventory estimates include the amount of lime produced in-house		
I.9	Other process uses of carbonates (2.A.4) – CO_2	The recalculations performed between the 2014 and the 2015 submissions reported for the chemical industry (section 4.4.11 of the NIR) include a value for 2012 (1.8%) which is high in comparison with the remaining time series (all other values are less than 0.2%). During the review, Australia further explained that this outlying difference was caused by an unusually high amount of soda ash production (reported under other chemical production) in 2012. The emissions from soda ash production, previously reported under other uses of carbonates, have been reallocated to chemical industries for confidentiality reasons	Yes	Transparency
		The ERT recommends that the Party provide transparent explanations, particularly for recalculations in the NIR for specific years when they are significantly different from other years in the time series		

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
I.10	Ammonia production (2.B.1) – CO_2	Australia did not report disaggregated emissions from ammonia production; in the CRF tables these were reported as "C" and included under the subcategory confidential chemical industry emissions (other chemical industry (2.B.10)). However, in the key category analysis included in the NIR (volume 3, annex 1), Australia used a different emission disaggregation for the category chemical industry (2.B), including several value entries labelled as "2.B". During the review, Australia explained that, for the key category analysis, the disaggregated emissions for each subcategory were used, but the label for each subcategory could not be reported in the NIR. Australia also provided the ERT with access to the confidential data, and the ERT noted that the emission values used in the key category analysis were different from the ones included in the most updated CRF tables, and relying on outdated results from the AGEIS system	Yes	Transparency
		The ERT recommends that Australia improve the level of transparency used to report disaggregated subcategory emission data in ammonia production, while preserving the legally required confidentiality in its overall reporting of emissions. The ERT also recommends that the Party ensure consistency between the emission levels reported in the IPPU chapter of the NIR and in the key category analysis		
I.11	Ammonia production (2.B.1) – CO_2	The NIR reports information only on the range of CO_2 EFs (page 185 of the NIR), while all other information regarding ammonia production is reported to be confidential. The reported range is relatively wide, but the ERT could not assess its validity or check its origin because of the lack of supporting information in the NIR. During the review, Australia disclosed confidential data on the natural gas consumption used as feedstock as well as the temporary removals of CO_2 from ammonia production in other uses, and where these emissions are reported (e.g. uses in the food and beverage industry are reported under category 2.H.2; emissions from the production and use of urea are included together with emissions from ammonia production). Australia also provided information on the comparison of the plant-specific EF with the IPCC default value range and IEFs from other Annex I Parties. The NIR reports the use of a single plant-specific EF, while for the other plants the emissions are derived from natural gas input and NH_3 production. The ERT noted that the single plant EF is marginally higher than the IPCC default range. However, the ERT noted from the confidential data that for one other plant, where the data were derived from natural gas input and ammonia production, the calculated IEF is higher than the range reported. Therefore, although the ERT could confirm that the reported range is indeed based on individual plant data, some data in the NIR may not be reported consistently	Yes	Transparency
		The ERT recommends that Australia improve the transparency of the reporting of		

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		the EF range used in the country and its origin, namely by stating that it is based on data from an individual plant across several years. The ERT also encourages Australia to provide information on any comparative analysis of reported single plant EFs in this category, and other categories, where applicable		
I.12	Nitric acid production (2.B.2) – N_2O	Australia uses bottom-up facility data (NGER data) to estimate N_2O emissions from nitric acid production, which is a key category. The ERT noted that some of the facilities in the country have N_2O destruction techniques installed, causing the declining IEF over time, and that the 2006 IPCC Guidelines recommend appropriate measurement techniques for higher tiers (volume 3, chapter 3, pages 3.22 and 3.23). Nevertheless, it was not clear from the NIR which of the measurement techniques defined by the NGER reporting guidelines had been applied. The ERT also noted that, as temporary failures of the N_2O destruction facility can occur during operation, actual emissions may be underestimated when applying an annual average plant-specific EF assuming that destruction facilities are operating. During the review, Australia provided further information indicating that the majority of the plants applied NGER method 4, which prescribes periodic or continuous measurement. The other facilities applied NGER method 2, which prescribes periodically updated EFs	No	
		The ERT encourages Australia to explore the possibility of industrial plants reporting data on yearly operation profiles of the destruction facilities (considering anomalies in normal operations), so that the Party could adjust the periodic measurements and improve the accuracy of the EFs		
I.13	Soda ash production (2.B.7) – CO_2	Australia reports in the NIR that it used a mass balance approach to estimate CO_2 emissions from soda ash production. During the review, it also became evident that a single mass balance approach was not used for reporting; instead, to estimate the CO_2 emissions from soda ash production, the Party used direct reporting by facilities on emissions based on carbon input, product outputs and carbon contained in waste streams In addition, sodium bicarbonate, a by-product, is reported to be used in the food and beverage industry (under other (IPPU) (2.H.2)), but the ERT considers that the NIR does not provide sufficiently transparent information explaining that the CO_2 emissions from this use are allocated to that subcategory. During the review, Australia reported that the single soda ash producing facility ceased operation in late 2013	Yes	Transparency
		The ERT recommends that Australia report more transparently on the methodology applied and on the allocation of carbon-containing by-products (e.g. in the food and beverage industry) and the corresponding emissions for the years up to 2013		

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
I.14	Petrochemical and carbon black production (2.B.8) – NMVOCs	Australia reported in the NIR (table 4.12 of the NIR) on the EF ranges for NMVOCs for a few products, such as ethylene (0.25–1.5 kg/t) and polystyrene (0.1–5.4 kg/t). However, it was not transparent to the ERT how these ranges relate to the calculation of emission estimates. During the review, Australia provided details of the origin of these ranges: they are facility-dependent and are used to estimate emissions from individual facilities which are then aggregated into the total emissions reported under petrochemical and carbon black production (2.B.8); the EF ranges are provided in the NIR for information only	No	
		The ERT encourages Australia to enhance the transparency with which it reports on the origin of the reported EF ranges by indicating that they are based on plant data		
I.15	Iron and steel production (1.C.1) – CO_2	In the NIR, the ERT found two different EFs for coke use in the iron and steel sector. In the energy sector, a value of 105.6 kt CO_2/PJ is mentioned in table 3.2 of the NIR (page 46), while in the IPPU sector (and also annex table 4.14) a value of 107.7 kt CO_2/PJ is provided (table 4.14). During the review, Australia provided additional detailed data and explained how the correct EF (reported in the IPPU sector) was determined, namely that it is based on a carbon balance for coke ovens (NIR, page 64). However, no explanation on the origin of the EF value reported in the energy sector could be provided. In addition, the ERT noted that the coke oven carbon balance derived coke EF has been constant since 2011, although it fluctuated in earlier years	Yes	Consistency
		The ERT recommends that the Party verify whether the EF for 2011 has been used to determine the energy balance in recent years, make efforts to update EFs for the most recent years and improve the consistency of the time series. The ERT also recommends that Australia correct its reporting of the EFs used for coke used in the iron and steel industry as reported in the NIR for the energy sector (table 3.2)		
I.16	Iron and steel production (2.C.1) – CO_2	The ERT found that information on the AD for iron and steel production was not included in the CRF tables (only crude steel production and consumption of coke were reported), while other information was presented in the NIR. In addition to reporting coke used as a reducing agent in iron and steel production, Australia also reported the use of natural gas (up to 2004) and the use of pulverized coal in its NIR as a reducing agent (which consumption has been increasing over the years). During the review, Australia provided the ERT with the complete time series of the AD for the use of coke as a reducing agent as well as the energy content	Yes	Transparency
		The ERT recommends that Australia improve the transparency and consistency of its reporting between the CRF tables and the NIR by including the AD for natural		

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]		Is the finding an issue? If yes, classify by type
		gas and for pulverized coal used as reducing agents in CRF table 2(I).A-H		
I.17	Iron and steel production (2.C.1.a) – CH_4	The ERT noted that the reported CH_4 IEF value for crude steel production for 2009 (0.00046 t/t) is much higher than the constant value reported for other years (0.00044 t/t). During the review, Australia informed the ERT that this apparent inconsistency in the time series was due to an erroneous entry of AD (5,274.08 t crude steel (BF/BOF) produced for that particular year) in the CRF Reporter, instead of the correct AD value (5,528.60 t crude steel (BF/BOF) produced)	Yes	Consistency
		The ERT recommends that Australia correct the AD for steel production in the CRF tables and improve the QA/QC tests for its reporting in the NIR and the CRF tables in order to avoid such data entry errors		
I.18	Iron and steel production (2.C.1) – CH_4 and N_2O	Australia stated in the NIR that the differences between its 2014 and 2015 submissions were caused only by the update of the GWP values and CO_2 oxidation factors in the 2015 inventory submission and that no other recalculations were performed. However, the ERT found some differences in the estimates of CH_4 and N_2O emissions for the iron and steel industry (2.C.1) between the 2014 and 2015 submissions (effects on physical units, therefore not affected by GWP values). During the review, Australia stated that some updates of coal AD had also occurred, as well as updates to the CH_4 and N_2O EFs in the iron and steel industry	Yes	Transparency
		The ERT recommends that Australia perform a more thorough analysis of recalculations and report more transparently on recalculations and underlying changes		
I.19	Non-energy products from fuels and solvent use (2.D) – CO_2	For the recalculations, Australia reported in the NIR (page 200): the result of the adoption of the 2006 IPCC Guidelines (the application of a 20% oxidation factor for lubricants and greases affecting default EFs for CO_2 emission estimates); revised GWP values; and some changes in AD for a limited number of years for the CO_2 emissions from lubricants and greases (2.D.1). However, in table 4.23 of the NIR, the differences reported do not correspond to this rationale for the recalculations. During the review, the Party explained that the differences were due to the rounding of parameters and should have been avoided	Yes	Adherence to the UNFCCC Annex I inventory reporting guidelines
		The ERT recommends that the Party make efforts to avoid reporting recalculation changes that are only due to rounding		
I.20	Electronics industry (2.E) – NF_3	The NIR provides information on the AD related to this category: it reports on a facility consuming NF_3 in its production process; it also reports on other uses in consumer products. The ERT concludes that the amount of emissions could be considered insignificant in accordance with the UNFCCC Annex I inventory	Yes	Adherence to the UNFCCC Annex I inventory reporting

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		reporting guidelines. However, in the CRF tables no information is provided for this category or its subcategories. During the review, Australia provided more evidence on the amount of NF_3 concerned (20 kg) underpinning the criteria for defining it as insignificant in accordance with the UNFCCC Annex I inventory reporting guidelines. Moreover, the Party reported that this amount is destroyed after use by the facility itself and does not result in emissions		guidelines
		The ERT recommends that the Party use the correct notation key ("NE") and provide in the NIR the reasons why such emissions or removals have not been estimated in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines		
I.21	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs	In order to estimate emissions of F-gases, Australia uses a combination of bottom-up and top-down approaches. The top-down approach is based on import and export data per substance, in bulk or in pre-filled applications. The bottom-up approach uses a stock-based method. The NIR indicates that, depending on the subcategory, three different methods are used. However, although the NIR mentioned a fourth method (volume 1, page 205), no further information is provided on this method. Also, for each application, the NIR provides the assumptions for the main parameters, but the information provided does not indicate which method has been applied to each subcategory	Yes	Transparency
		Therefore, the ERT recommends that Australia improve the transparency and complement the table containing the key assumptions per subcategory (table 4.24) with an indication of which method has been applied to estimate the emissions from each subcategory		
I.22	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs	The ERT noted some differences between the values of bulk and pre-filled imports allocated to the different subcategories reported in the overview table (NIR table 4.25) and the values reported in the text of the NIR. During the review, the Party explained that the values in the text are the correct ones for 2013 and that the values in the overview table were from the 2014 submission and with reference to the year 2012	Yes	Adherence to the UNFCCC Annex I inventory reporting guidelines
		Therefore, the ERT recommends that Australia improve the consistency of its reporting in the NIR by ensuring that consistent values are presented in both the tables and the text. This can be achieved by enhancing the QA/QC procedures for the NIR		
I.23	Product uses as substitutes for ozone-depleting	In CRF table 2(II).B-H, the ERT found that the emission estimates based on the amounts of F-gases remaining in products at decommissioning, the AD, the IEF disposal loss factor and the recovery reported were not internally consistent for	Yes	Transparency, Comparability

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type
	substances (2.F) – HFCs	subcategories such as refrigeration and air conditioning (2.F.1) and fire protection (2.F.3). During the review, the Party informed the ERT that an error had occurred in reporting the AD resulting from adding the amount recovered to the amount remaining in products at decommissioning. In addition, in contrast to what is described in the NIR and to what broadly reflects the methodology provided in the 2006 IPCC Guidelines, the emissions were calculated using direct outputs of a "vintage stock" model and an EF was derived for each component of the reported emissions (production, operation and decommissioning). The ERT concluded that the emission estimates are correct, and only the AD and IEFs are not accurately reported in the CRF tables	
		The ERT recommends that the Party correct the AD for the amounts remaining in products at decommissioning, and include in its methodological description in the NIR a more accurate description of the methodology used, in particular the use of the vintage stock model	
I.24	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs	The NIR states that only 70% of the amount remaining in products at decommissioning in the subcategory domestic and commercial refrigeration (2.F.1) is emitted at disposal and that, on average, 8% of HFCs is recovered at disposal for destruction. This led the ERT to conclude that about 22% of the emissions at disposal were not allocated and accounted for. During the review, the Party explained to the ERT that 30% of the emissions at disposal were recovered, and that this 30% corresponds to 8% of the total amount of HFCs recovered for destruction	Yes	Transparency
		The ERT recommends that the Party enhance the transparency of its reporting of disposal emission percentages and recovery percentages of HFC emissions in the NIR	
I.25	Product uses as substitutes for ozone depleting substances (2.F) – HFCs and SF$_6$	For a number of subcategories, such as domestic refrigerators/freezers (2.F.1.2) and electrical equipment (2.G.1), identical stock (equipment) figures are reported in the NIR tables for 2012 and 2013 (tables 4.27 and 4.39 of the NIR), although the gas stocks and emissions differ. During the review, the Party explained that, owing to the fact that, at the time of the preparation of the submission, no 2013 data were available for these stocks, the Party used 2012 stock data as a first approximation in its vintage stock model. However, the ERT noted that this explanation was not included in the NIR	Yes	Transparency
		The ERT recommends that, when provisional data for AD are used or reported in the NIR (e.g. identical data as for the previous year), the Party provide transparent information that it is doing so and on the rationale for doing so	

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
I.26	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs	The ERT found that in the NIR (volume 1, table 4.29), the data on the stock and emissions for packaged air-conditioning equipment for domestic use were not consistent with equivalent information in CRF table 2(II).B-H. During the review, Australia confirmed that the values reported in the NIR were not correct and provided the ERT with the correct data resulting from the vintage stock model The ERT recommends that the Party improve the consistency of its reporting by ensuring that the values presented in the tables in the NIR are consistent with the data in the CRF tables and with data from the underlying vintage stock model. This could be achieved by applying more thorough QA/QC procedures to the NIR	Yes	Transparency, adherence to the UNFCCC Annex I inventory reporting guidelines
I.27	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs	The NIR (volume 1, page 213) states that a constant average charge of light vehicle air conditioners (2.F.1.5) is used in the vintage stock model, which is used by the Party to estimate emissions. The ERT asked the Party if this charge would not have increased following the increase in car size, because recent trends usually show an increase in the number of larger vehicles in the fleet. The Party responded that the analysis it has undertaken showed that the charge in pre-filled units did not differ much over the years, indicating that despite car size, an increase in air-conditioning equipment charge is offset by more efficient equipment The ERT recommends that the Party include such information in the NIR, justifying the assumptions made	Yes	Transparency
I.28	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs	For the category foam blowing agents (2.F.2), the NIR includes information on assumptions for both open and closed cell foams (page 217, volume 1). However, in CRF table 2(II).B-Hs2, only emissions from closed cell foam are estimated, while emissions from open cell foams are reported as "IE". Considering the reported production loss rate (60%, constant for all years), the ERT concluded that a mixture of open and closed cells is included in the estimates reported as closed cells, since the loss rates for production of closed cells and open cells are 100% and 10%, respectively. As such, the ERT concluded that no underestimations had occurred However, the ERT recommends that Australia report more transparently on the method and assumptions applied for estimating emissions from foam blowing	Yes	Comparability, transparency
I.29	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs	For the category metered dose inhalers (MDI) (F.4.1), decreasing stocks of aerosols are reported in NIR table 4.38, although the ERT considers that the stock would be expected to be linked to population growth and, consequently, to have increased. The NIR does not contain an explanation for the decrease. In addition, the ERT used the information reported by the Party and calculated that the operational loss factor would be higher than 100% (105.27%). During the review,	Yes	Comparability, transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		Australia provided the ERT with access to the vintage stock model it uses to estimate emissions, and subsequently informed the ERT that, in order to accommodate the rules in the CRF Reporter, all emissions from use of MDIwere combined in CRF table 2(II).B-Hs2 as emissions from stocks, leading to the apparent operational loss factor being higher than 100%. The ERT concluded that the total emissions for this category are probably not underestimated		
		The ERT recommends that Australia find ways to improve the reporting of the AD and emissions for this category, or improve the transparency of the reporting by including the explanation of the above 100% operational loss factor		
I.30	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs	The ERT attempted to reconstruct the inter-annual stock change of F-gases used as solvents (2.F.5), but found inconsistencies between the information provided in the NIR (under "definition" and "parameters") and the values reported in CRF table 2(II).B-H. Australia provided the ERT with access to the vintage stock model used to estimate its emissions, and the ERT concluded that the operational emissions lasted longer than the defined lifetime reported in the NIR. According to the model, the operational emissions were calculated as being half of the operational loss (i.e. 50% divided by 2) in the first year and a loss of 50% of the remaining stock for subsequent years, effectively causing trailing emissions to occur forever, although the definition in the NIR assumes only a two-year lifetime	Yes	Accuracy
		The ERT recommends that the Party align the calculation method with the definition in the NIR, and apply an operational loss of 25%, 50% and 25%, respectively, for use of F-gases as solvents		
I.31	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs	The ERT noted that there is no methodology description for the category solvents (2.F.5) in the NIR	Yes	Transparency
		The ERT recommends that Australia include the methodology description for this category in the NIR		
I.32	General (IPPU) – CO_2	Overview figures are provided in the NIR for several categories, including most key categories, where the range of Australia's IEFs is compared with those of other Annex I Parties (e.g. volume 1, figure 4.2)	No	
		The ERT welcomes this additional analysis and commends Australia for providing it and reporting thereon. The ERT encourages Australia to continue to provide such comparative analysis in its NIR		
I.33	Other process uses of carbonates (2.A.4) – CO_2	The NIR includes an overview carbonate balance, allowing for the cross-checking of flows across subcategories using carbonates	No	

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		The ERT commends Australia for this reporting approach and encourages the Party to continue to provide such carbonate balances in the NIR		
I.34	Metal industry (2.C) – CO_2	Australia reports in the NIR that it assumes a constant consumption of carbon-containing materials in the period 1990–2008 to estimate emissions for several subcategories under metal production: lead production (2.C.5), zinc production (2.C.6) and other (metal production). The reason for this approach is that data collection on the amount of carbon-containing material used started in 2009 only. The Party considers this approach to be conservative	Yes	Consistency
		The ERT recommends that the Party investigate whether other drivers could be applied to estimate emissions for the period 1990–2008, such as production volumes		
I.35	N_2O from product uses (2.G.3) – N_2O	Emissions of N_2O from product uses are reported as "IE" in the CRF tables and emissions are included in the category other (chemical production) (2.B.10). The emissions for this category are estimated based on domestic production provided by industrial gas manufacturers. During the review, the Party could not confirm whether there were imports of N_2O as no data on imports are available. The ERT concludes that the emissions could be underestimated	Yes	Completeness
		The ERT recommends that the Party investigate if indeed no imports occur and to report these emissions, if appropriate		
I.36	Electrical equipment (2.G.1) – SF_6	In order to estimate emissions of SF_6 from electrical equipment, Australia uses NGER data on SF_6 stocks from about 300 companies. For 15 of these companies, NGER includes detailed information on emissions and, from this information, country-specific EFs were calculated and applied to the total stock	No	
		The ERT commends Australia for developing and applying these country-specific EFs and encourages the Party to continue collecting additional detailed data from selected facilities to improve the country-specific EF		
I.37	Other product manufacture and use (2.G) – SF_6	Australia has been investigating the possibility that SF_6 emissions occur from military radar aircraft. During the review, Australia reported to the ERT on the work undertaken so far; the conclusion is that SF_6 is not used in this application	No	
		The ERT commends Australia for undertaking this analysis		
I.38	General (IPPU) – HFCs	Australia presents information in the NIR regarding a study it has performed examining the consistency between estimated HFC emissions in the inventory and backcasted emissions from atmospheric observations at Cape Grim. A comparative analysis shows that there is good overall correspondence regarding the level, but	No	

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		that the trend shows some elements that may trigger further analysis. In earlier years, the emission inventory lies above the backcasted data, while in more recent years, it is the opposite		
		The ERT commends Australia for having conducted this additional analysis on its HFC emissions, using other data sources. The ERT encourages the Party to investigate if such further analysis (of the discrepancies in the trends) can be performed and to report on it when results are available		
I.39	Product uses as substitutes for ozone-depleting substances (2.F) – HFCs	In its NIR (figure 4.12), Australia reported on a sensitivity analysis which it has performed on the level of HFC emissions for 2008. The sensitivity analysis examined the effects of applying different allocation rates for bulk gas data over the different applications, as well as the effects of applying different replenishment rates. The results of this analysis show that, in the short term, there are shifts in emission level, both above and below the inventory level, but that in the longer term emissions converge to the same level	No	
		The ERT commends Australia for performing the sensitivity analysis and for reporting on it in its NIR. The ERT encourages Australia to continue to perform such analyses and to report thereon in its NIR		
Agriculture				
A.6	General (agriculture)	The ERT noted that several changes were introduced for the first time in the 2015 inventory submission for the agriculture sector, beyond those related to the application of the new UNFCCC Annex I inventory reporting guidelines, including: the new country-specific EF for enteric fermentation; the use of a mass flow approach for manure management; new EFs for inorganic fertilizers based on the analysis of measurement data from the Nitrous Oxide Research Program; and the National Agricultural Nitrous Oxide Research Program; and the new stratification of savannas into three broad vegetation zones. Australia has listed all of these changes in the NIR and has made the necessary recalculations, but no information is provided on the qualitative impact of each individual change in the overall recalculations	Yes	Transparency
		The ERT recommends that, when multiple changes are applied in a single category, Australia provide information on at least the qualitative impact of each individual change in the overall result of the recalculations		
A.7	General (agriculture)	The uncertainties for the agriculture sector were estimated using a tier 1 approach. The ERT noted that, owing to the extensive list of changes in the methods applied to estimate emissions from the agriculture sector, the tier 1 approach is not the	No	

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		most appropriate method for estimating the uncertainties of the sector, since it does not reflect changes in methodological approaches		
		During the review, Australia recognized the need to develop and apply a Monte Carlo analysis to update the uncertainty values in the light of the changes in methodologies, but indicated that it will not be possible to introduce such improvements in the short term because of resource constraints		
		The ERT encourages Australia to develop and apply a tier 2 approach reflecting the methods that were used to estimate emissions		
A.8	Enteric fermentation: dairy cattle (3.A.1.1) – CH_4	Emissions from the subcategories dairy cattle and fed beef – pasture (Australia uses option C (country-specific) to report on CH_4 enteric fermentation emissions from cattle) were estimated using an updated country-specific method based on the work of Charmley et al. (2014),[b] which resulted in a reduction in estimated emissions from this category in comparison with the 2014 inventory submission. The updated method has being assessed by an external review and is undergoing an additional peer review process, which had not been concluded at the time of the review. The average CH_4 conversion rate for dairy cattle/beef feed-pasture under the new method is around 6.4%, which is consistent with the default value provided in the 2006 IPCC Guidelines. The ERT agrees that the updated method is accurate and is in accordance with the 2006 IPCC Guidelines	No	
		The ERT encourages Australia to report in the NIR the results of the peer review once it has been finalized		
A.9	Manure management (3.B) – CH_4 and N_2O	Australia has used a mass-flow approach to estimate volatile solids and nitrogen inputs and losses for each animal waste management system and the associated CH_4, N_2O and NH_3 emissions for feedlot cattle, pigs and poultry, but notes that the NIR does not contain all the necessary information on the approach used. During the review, additional information on the approach was presented to the ERT, complementing the information provided in the NIR. The ERT commends the Party for using this methodological approach	Yes	Transparency
		The ERT recommends that Australia include additional information on the approaches used (e.g. using a flow chart) in the NIR		
LULUCF				
L.22	General (LULUCF)	The ERT commends Australia for the notable improvements in its current reporting of GHG emissions/removals from the LULUCF sector since the 2014 submission, especially regarding enhancements implemented and explained in the	No	

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type
		NIR on the carbon cycling ecosystem model (FullCAM) and on the remote-sensing based land monitoring systems, and also for its plan to continue its efforts to further improve the inventory. The ERT considers that Australia's inventory system for the LULUCF sector is well developed, although it could still benefit from improvements in AD and the use of more advanced methods	
		The ERT encourages the Party to continue to enhance its inventory for the LULUCF sector	
L.23	General (LULUCF)	The uncertainty analysis for the LULUCF sector has been carried out using approach 1 from the 2006 IPCC Guidelines. The estimated uncertainties are relatively high in the categories forest land remaining forest land (4.A.1) for all gases, but especially for non-CO_2, cropland remaining cropland (4.B.1) and grassland remaining grassland (4.C.1), and tend to be lower in the categories forest conversion to other land and land converted to forest land (4.A.2). During the review, Australia stated that it is considering the implementation of approach 2 based on the Monte Carlo analysis for all sectors including LULUCF	No
		The ERT welcomes this plan and encourages the Party to implement this improvement	
L.24	General (LULUCF) – CO_2	Some land-use changes in carbon pools for subcategories for which specific methodologies to estimate carbon stock changes are provided in the 2006 IPCC Guidelines were reported as "NE": cropland and grassland converted to settlements (4.E.2.2 and 4.E.2.3). Australia explains in the NIR that systems are under development to enable the disaggregation of estimates for land converted to settlements	Yes	Completeness
		Other categories/subcategories and pools which are not mandatory or for which there is no methodology in the 2006 IPCC Guidelines are reported as "NE", including: all pools in wetlands and settlements converted to cropland (4.B.2.3 and 4.B.2.4) and to grassland (4.B.2.3 and 4.B.2.4); flooded land remaining flooded land (4.D.1.2); other wetlands remaining other wetlands (4.D.1.3); land converted to other wetlands (4.D.2.3); settlements remaining settlements (4.E.1); wetlands converted to settlements (4.E.2.4); and net CO_2 emissions/removals from harvested wood products in SWDS. During the review, Australia mentioned its plans to estimate emissions and removals for these categories/subcategories in the future	
		The ERT welcomes the planned improvements and recommends that the Party estimate emissions/removals for categories/subcategories and pools for which guidance is provided in the 2006 IPCC Guidelines or provide justifications in the next NIR for the exclusions made in terms of the likely level of emissions in	

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		accordance with the UNFCCC Annex I inventory reporting guidelines, paragraph 37(b)		
		The ERT encourages the Party to further assess the occurrence/non-occurrence of the non-mandatory categories/subcategories and pools currently reported as "NE" and, for those categories/subcategories and pools related to wetlands, encourages the Party to use methods from the Wetlands Supplement, to the extent possible		
L.25	General (LULUCF) – CO_2	Australia has reported aggregated AD and carbon gains and losses for several categories. For example, for 2013, Australia reported: 14,761.04 kha as AD and 36,520.75 kt CO_2 equivalent (eq) for net emissions of CO_2 under the category forest land converted to grassland (4.C.2.1), but these values correspond to all forest conversions to land uses other than cropland; also, the Party reported under cropland remaining cropland 35,021.27 kha and 2,216.22 kt CO_2 eq of net removals, but these quantities also include grassland converted to cropland (reported as "IE" in CRF table 4.B)	Yes	Comparability
		The ERT recommends that Australia improve transparency and comparability by providing separate AD and estimates for all those categories currently reported as "IE" for which suitable data and estimation methodologies are available		
L.26	Forest land remaining forest land (4.A.1) – CO_2	The area of organic soils was reported as "NE" for the period 1990–2013 for this category. Australia informed the ERT of a planned improvement to report organic soils in future annual submissions	No	
		The ERT welcomes the planned improvement and encourages the Party to implement this improvement. The ERT further encourages Australia to consider the use of a different notation key (e.g. "IE") if the AD currently available do not allow the disaggregation of activity into organic and mineral soils		
L.27	Forest land remaining forest land (4.A.1) – CO_2	Australia uses a five-year assumption for subsequent regrowth after a fire event, which seems, to the ERT, to be too short, considering the time required by some forest types to regenerate to a state previous to the fire event. The draft report[c] provided by the Party to the ERT during the review recognizes that the five-year recovery period is too short and proposes a calculation of this period based on an Olson curve and using state/territory-based parameters	Yes	Accuracy
		The ERT welcomes the efforts of the Party to improve the accuracy of its estimates of forest fires and recommends that Australia implement these improvements		
L.28	Land converted to forest land (4.A.2) – CO_2, CH_4 and	The ERT noted that the allocation by Australia of the AD and emissions/removals from forest conversion events that occurred before 1990 and that are followed by natural regeneration of the forest after 1990 within a time period shorter than the	Yes	Consistency, comparability

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
	N_2O	country-specific land-use change transition period of 50 years are not reported in a consistent manner: the units of land are initially classified as forest land, then grassland following land-use change and return to forest land following the regrowth of forest		
		In response to questions raised by the ERT and to the list of provisional main findings, the Party clarified that the allocation of carbon stock changes and non-CO_2 emissions for these lands to the correct land-use classification is a significant data analysis challenge, but that Australia has a project to improve the allocation of lands in these complex circumstances. The ERT welcomes the planned improvement and recommends that Australia implement the planned improvement to allocate the AD and emissions/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. The ERT also recommends that, in the specific case of subsequent land-use changes within a period shorter than 50 years, the rule for the allocation of AD and estimates in each reporting year be based on the end-use category of the land in that year		
L.29	Land converted to forest land (4.A.1) – CO_2, CH_4 and N_2O	The emissions/removals from land converted to forest land due to natural regeneration before 1990 are not reported. During the review, the Party confirmed that conversions to forest before 1990 owing to natural regeneration have not been considered in the 2015 inventory and stated that this is part of an ongoing project	Yes	Completeness, consistency
		The ERT welcomes the planned improvement and recommends that Australia report emissions/removals occurring throughout the reporting period owing to natural forest regeneration before 1990 to improve time-series consistency and completeness		
L.30	Cropland remaining cropland (4.B.1) – CO_2	The trends in net emissions/removals from cropland remaining cropland are not clearly explained in the NIR. During the review, the Party presented more detailed information that provided the necessary explanations	Yes	Transparency
		The ERT recommends that Australia include in the NIR charts showing the impact of the main drivers of the trends in the estimates, similar to those presented during the review week		
L.31	Cropland remaining cropland (4.B.1) – CO_2	The previous review report recommended that the Party separately report perennial woody biomass in the CRF tables (see finding L.15 in table 3 above), but the ERT considers that, although the use of an additional breakdown in the subdivision column of the CRF tables is not mandatory in accordance with the UNFCCC Annex I inventory reporting guidelines and that Parties have the option to present such disaggregation either in the CRF tables or in the NIR, the 2006 IPCC	Yes	Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		Guidelines consider such disaggregation to be good practice. Therefore, the ERT recommends that Australia report the carbon stock changes and emissions/removals using an appropriate subdivision (e.g. land management practices) in the CRF tables or in the NIR		
L.32	Grassland remaining grassland (4.C.1) – CO_2	The trend of net CO_2 emissions/removals from this land use shows different patterns in different periods that are not adequately explained in the NIR. During the review, Australia acknowledged a time-series inconsistency caused by the way it considered the fire history before 1988, leading to a potential overestimation of recovery areas at the beginning of the period, and in the use of different data sources relating to pasture/grass species between the periods 1990–1999 and 2000–2013. Australia also stated that this issue will be addressed in the next inventory submission	Yes	Consistency
		The ERT welcomes Australia's plans and recommends that the Party use the guidance provided in the 2006 IPCC Guidelines to ensure the consistency of the time series		
L.33	Grassland remaining grassland (4.C.1) – CO_2	The previous review report recommended that the Party separately report perennial woody biomass in the CRF tables (see finding L.17 in table 3 above). The ERT considers that, although the use of an additional breakdown in the subdivision column of the CRF tables is not mandatory in accordance with the UNFCCC Annex I inventory reporting guidelines and that Parties have the option to present such disaggregation either in the CRF tables or in the NIR, the 2006 IPCC Guidelines consider such disaggregation to be good practice. Therefore, the ERT recommends that Australia report the carbon stock changes and emissions/removals using an appropriate subdivision (e.g. land management practices) in the CRF tables or in the NIR in order to improve transparency	Yes	Transparency
L.34	Emissions and removals from drainage and rewetting and other – CH_4 and N_2O	Non-CO_2 emissions from drainage of soils on forest land are reported as "NE" in CRF table 4(II)	No	
		The ERT encourages the Party to use methods from the Wetlands Supplement, to the extent possible, and to further assess the occurrence, or non-occurrence, of these management practices and report estimates in future submissions or use a more appropriate notation key (e.g. "NO") for cases where these soil management activities have not been observed in the country		
L.35	Biomass burning – CO_2	The ERT noted that Australia reports CO_2 emissions as "IE" in CRF table 4(V) for all land uses except land converted to forest land with the rationale that the Party wishes to report removals occurring on these areas during the post-fire recovery years, but that CRF table 4(V) does not accept negative values. The ERT considers	Yes	Comparability, transparency

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		that this reporting approach is not consistent with the UNFCCC Annex I inventory reporting guidelines, is not transparent and is not comparable with the inventories of other Parties		
		The ERT recommends that the Party find ways to report CO_2 immediate emissions resulting from fires in CRF table 4(V) and report subsequent carbon stock changes on these areas as carbon stock changes in CRF tables 4.A-4.E, where appropriate		
L.36	Biomass burning – CO_2, CH_4 and N_2O	In its 2015 submission, Australia estimated emissions/removals in temperate regions owing to wildfires in forest land (4.A) using a methodology based on the provisions for natural disturbance for the second commitment period of the Kyoto Protocol (decision 2/CMP.7, annex, paragraph 33) and using guidance provided in section 2.3.9 of the Kyoto Protocol Supplement, in particular by calculating a background level and margin using the IPCC default method (pages 2.48–2.50). During the review, the Party justified this decision based on the fact that its landscape is prone to significant non-anthropogenic fire events and the adoption of a transparent, data-intensive monitoring system supporting the use of a more complex method for the estimation of wildfire emissions in temperate forests. Australia further informed the ERT of a plan to implement updates for its 2016 and 2017 inventory submissions, including using the tier 3 approach capabilities of FullCAM. During the review, Australia also provided more detailed data and information clarifying the impact of the application of this approach on its estimates of wildfires in temperate forests	Yes	Comparability accuracy, transparency
		Acknowledging that non-anthropogenic emissions/removals occur in some managed lands in Australia, the ERT considers that the approach used by Australia to remove estimates of these net emissions/removals could be considered to be in accordance with the 2006 IPCC Guidelines, but provided the submission can be improved in terms of accuracy and transparency. The ERT further considers that Australia could find more effective ways to differentiate and remove the impact of non-anthropogenic emissions/removals from its forest estimates, and document in the NIR in a more transparent way the effects of natural disturbances on the carbon dynamics on their forests, consistent with the good practice contained in the 2006 IPCC Guidelines (volume 4, section 4.2.4.3). In addition, the ERT is of the view that the transparency of the rationale and the results described in the NIR could be further enhanced		
		The ERT recommends that Australia make further efforts to find more effective ways to differentiate the impact of non-anthropogenic emissions/removals on the forest carbon dynamics in accordance with the 2006 IPCC Guidelines. The ERT also recommends that the Party clearly demonstrate that: the approach is unbiased,		

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type
		scientifically sound and transparent; the definitions and assumptions are applied consistently; and any subsequent removals are also excluded and emissions from salvage logging are included in the final estimates. In addition, the ERT encourages Australia to use the current procedures (natural disturbances) as a basis for a tier 3 method	
		The ERT further recommends that Australia include a more detailed rationale and tables (e.g. an elaborated version of table 6.25 in the NIR) clarifying the application of this provision and its impact on the final forest estimates throughout the reporting period	
L.37	Biomass burning – CO_2, CH_4 and N_2O	Australia has applied a five-year moving average to the annual estimates of wildfires in forest land (4.A) in temperate regions, after having applied the natural disturbance provision mentioned in the previous finding (L.36 above) with the purpose of enabling long-term trends in emissions to be more clearly presented (volume 2, page 31 of the NIR)	Yes	Comparability accuracy, transparency
		During the review, the ERT informed Australia that it considers that this procedure is not consistent with the UNFCCC Annex I inventory reporting guidelines, specifically with decision 24/CP.19, annex I, paragraph 47: "Inventories shall be reported without corrections relating, for example, to climate variations or trade patterns of electricity", and not consistent with the principle in the 2006 IPCC Guidelines (volume 1, page 1.4) in relation to the inventory year and time series, which state that national inventories contain estimates for the calendar year during which the emissions/removals occur, suggesting the use of methods such as averaging only in those cases where suitable data to follow this principle are missing	
		On the other hand, the ERT also noted the guidance in the 2006 IPCC Guidelines (volume 1, chapter 2, page 2.11), which states that "Countries should, where possible, avoid using multi-year averaging of data that would result in over- or under-estimates of emissions over time, increased uncertainty, or reduced transparency, comparability or time-series consistency of the estimates, while acknowledging that in in some specific cases described for specific sectors in volumes 2–5 multi-year averaging may be the best or even the only way to estimate data for a single year	
		Responding to the list of provisional findings and to the draft of this review report, Australia stated that it considers the procedure it has used to be a national methodology that does not over- or under-estimate emissions, does not introduce bias and reduces uncertainty, and therefore considers that this method should not	

		be viewed as a 'correction' of estimates	
		The ERT concluded that Australia needs to more clearly justify and document in the NIR the use of the multi-year moving average on its estimates of wildfires in forests and recommends that the Party either: report the actual emissions/removals in the year in which they occur; or find ways to demonstrate in the NIR that the averaging procedure applied does not represent a correction of estimates (e.g. by using text from the various responses to the ERT as a starting point) and how the quality (i.e. accuracy), transparency and comparability of its estimates of forest fires could be improved and the uncertainty reduced by the application of this procedure, in which case the ERT further recommends that Australia include in the NIR the entire time series of both raw (not averaged) and final estimates to ensure transparency and comparability	
L.38	Biomass burning – CO_2, CH_4 and N_2O	Australia has applied a five-year moving average to the annual estimates of fires in grassland remaining grassland (4.C.1) with the purpose of reducing the extent to which the climate variability is captured (volume 2, page 68 of the NIR). During the review, the ERT informed Australia that considers that this procedure is not consistent with the UNFCCC Annex I inventory reporting guidelines (see finding L.37 above), and is also not consistent with the principle in the 2006 IPCC Guidelines (volume 1, page 1.4) in relation to the inventory year and time series (see finding L.37 above)	Yes	Comparability, accuracy, transparency
		Responding to the list of provisional findings and to the final draft of the review report, Australia stated that it considers the procedure it has used to be consistent with the 2006 IPCC Guidelines, particularly in cases of high and uncertain variability – as in cases of vegetation growth – where there is higher confidence in the average annual growth rate over a period of years, in which its situation could fit, and therefore considers that this method should not be viewed as a 'correction' of estimates. In the response to the final draft report, the Party further provided a rationale to justify the application of this averaging procedure to its estimates of grassland fires	
		The ERT concludes that Australia needs to improve the transparency by which it justifies and documents in the NIR the use of the multi-year moving average on its estimates of emissions from grassland fires, and recommends that the Party either report actual emissions/removals in the year in which they occur, or find ways to demonstrate in the NIR that the averaging procedure applied does not represent a correction of estimates (e.g. using the rationale contained in the response from Australia to the final draft report as a starting point) and how the quality (i.e. accuracy), transparency and comparability of the fire estimates on grassland can be	

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		improved and the uncertainty reduced by the application of this procedure, in which case the ERT further recommends that Australia include in the NIR the entire time series of both raw (not averaged) and final estimates to ensure transparency and comparability		
L.39	Harvested wood products (4.G) – CO_2	Australia reported carbon losses from the harvested wood products pool in CRF table 4.G as "IE" for "sawnwood" and "wood panels" and no further information is provided in the NIR. During the review, the Party explained to the ERT that the carbon losses are reported along with the carbon gains	Yes	Comparability, transparency
		The ERT recommends that Australia report separately the carbon gains and losses in CRF table 4.G		
L.40	Harvested wood products (4.G) – CO_2	Fuelwood consumed is not reported in CRF table 4.G. During the review, the Party explained to the ERT that fuelwood is included in the gains, losses and stock changes reported in CRF table 4.G, but is not explicitly identified	Yes	Transparency
		The ERT recommends that Australia improve the transparency of its reporting of harvested wood products by explicitly reporting these carbon losses in CRF table 4.G (e.g. by using an appropriate subdivision under other (4.G.3)) or alternatively in the NIR		
L.41	Harvested wood products (4.G) – CO_2	Net emissions/removals from harvested wood products in SWDS are reported as "NE" in CRF table 4.G. Australia informed the ERT, during the review, that estimating these emissions and removals is part of a planned improvement to balance carbon waste in landfills between the LULUCF and waste sectors (see finding W.6 below)	No	
		The ERT welcomes this planned improvement and encourages the Party to report these AD and associated estimates in CRF table 4.G		
L.42	Harvested wood products (4.G) – CO_2	Section 6.1 of the NIR states: "As the reporting tables do not account for transfers of carbon stocks between forests and harvested wood products, this leads to an apparent, but not real, emission from forest land and a 3.8 Mt CO_2 'sink' in harvested wood products". In response to a request by the ERT for further clarification during the review, the Party explained that: "This transfer is implicitly recorded as a stock change in living biomass and therefore is an emission of CO_2. At the same time, the associated amount of carbon is recorded as an increase in harvested wood products stocks and is therefore an equivalent sink. These two items cancel each other out in the short term. However, over the long term, subsequent losses from the harvested wood products carbon stock will be recorded as emissions."	Yes	Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		The ERT recommends that Australia improve the transparency of the reporting by reporting separately these carbon losses in CRF table 4.A (e.g. by using an appropriate subdivision) and by more clearly explaining in the NIR the reporting artefact used to avoid double counting between CRF tables 4.A and 4.G		
Waste				
W.3	General (waste) – CO_2, CH_4 and N_2O	The information provided by Australia in the NIR and CRF tables was sufficiently transparent for the ERT to understand the data sources, data collection process, confidential database and methodologies used to estimate the emissions	No	
		The ERT commends Australia for the quality of its inventory and encourages the Party to continue to keep the data and information transparent		
W.4	General (waste) – CO_2, CH_4 and N_2O	The uncertainty data reported in some categories (e.g. 50% for CH_4 emissions and 50% for N_2O emissions from wastewater treatment and discharge) do not reflect the improvement in data quality implemented by Australia in the 2015 submission in comparison which previous submissions	Yes	Accuracy
		The ERT recommends that Australia implement a new uncertainty analysis in line with the 2006 IPCC Guidelines and update the information and data on its uncertainty analysis		
W.5	Solid waste disposal (5.A.1.a) – CH_4	Australia applied the FOD model to estimate CH_4 emissions from solid waste disposal on land in accordance with the 2006 IPCC Guidelines. Australia used the IPCC default delay time of six months and implemented the assumption that all waste was delivered in landfill at the midpoint of the year, which means that the decay was set to start, on average, on the first day of the year following deposition. The ERT notes that this assumption may lead to the misallocation of emissions between consecutive years. Australia agreed with the ERT suggestion to test the impact of monthly data as input to the FOD model on the accuracy of its emission estimates using data from a few landfills first	No	
		The ERT encourages Australia to assess the possibility of using monthly data in the FOD model in order to improve the accuracy of its estimates		
W.6	Solid waste disposal (5.A.1.a) – CO_2 and CH_4	Australia reported the long-term storage of carbon in waste disposal sites and the annual change in long-term carbon storage in the harvested wood products pool waste as "NE". During the review, Australia provided information on the databases and outputs of its harvested wood products model showing that data are available from databases and outputs of the model to enable the reporting of these pools	No	

ID#	Finding classification	Description of the finding with recommendation or encouragement[a]	Is the finding an issue? If yes, classify by type	
		The ERT encourages Australia to report long-term storage of carbon in waste disposal sites, and annual changes in long-term carbon storage in the harvested wood products pool waste as information items in the waste sector		
		The ERT also encourages Australia to report on the carbon balance between the waste and LULUCF sectors with regard to harvested wood products		
W.7	Waste incineration (5.C.1) – CH_4	Incineration of MSW occurred in Australia in the period 1990–1996. Australia reported CO_2 and N_2O emissions only. CH_4 emissions were not estimated. During the review, Australia provided the ERT with estimates of CH_4 emissions using country-specific data on the amount of MSW and energy content and the IPCC default EF for MSW (non-biogenic) from the 2006 IPCC Guidelines (volume 2, table 2.2, page 2.17). This results in an increase in emissions from incineration by 3.65%	Yes	Completeness
		The ERT recommends that Australia report CH_4 emissions from the incineration of MSW for each year of the period 1990–1996		
W.8	Waste incineration (5.C.1) – CH_4 and N_2O	Australia reported only CO_2 emissions from incineration of clinical wastes and solvents. Australia highlighted that CH_4 and N_2O emissions were not estimated because the 2006 IPCC Guidelines do not provide default EFs for these categories. During the review, Australia applied the higher default EF provided by the 2006 IPCC Guidelines for incineration in general and demonstrated that the resulting estimates were below the 0.05% threshold, meaning that these emissions were considered insignificant. Australia emphasized that the Party is investigating the possibility of including these emissions in future submissions by using country-specific EFs	Yes	Adherence to the UNFCCC Annex I inventory reporting guidelines
		The ERT recommends that Australia report these emissions as "NE" and provide in the NIR of the next inventory submission the reasons why such emissions or removals have not been estimated in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, or report emissions from these categories when data are available		
W.9	Wastewater treatment and discharge (5.D) – N_2O	Sludge from wastewater is used in land application. During the review, Australia clarified that N_2O emissions from land application are reported in the agriculture sector	Yes	Transparency
		The ERT recommends that Australia correct the statement in the NIR (volume 2, page 182) that reads: "Emissions of N_2O from land application are not included in the agriculture sector but are included within the wastewater sector itself"		

Abbreviations: 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, AD = activity data, Annex I Parties = Parties included in Annex I to the Convention, BF = blast furnace, BOF = basic oxygen furnace, C = confidential, CCS = carbon dioxide capture and storage, CRF = common reporting format, EF = emission factor, ERT = expert review team, F-gases = fluorinated gases, FOD = first-order decay, GHG = greenhouse gas, GWP = global warming potential, IE = included elsewhere, IEF = implied emission factor, IPPU = industrial processes and product use, IPCC = Intergovernmental Panel on Climate Change, Kyoto Protocol Supplement = *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*, LULUCF = land use, land-use change and forestry, MSW = municipal solid waste, NE = not estimated, NIR = national inventory report, NMVOCs = non-methane volatile organic compounds, NO = not occurring, QA/QC = quality assurance/quality control, SWDS = solid waste disposal sites, UNFCCC Annex I inventory reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories", Wetlands Supplement = *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*.

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

[b] Charmley E, Williams SRO, Moate PJ, Hegarty RS, Herd RM, Oddy VH, Reyenga P, Staunton KM and Anderson A. 2014. Running Head: Methane Production and DMI in Cattle. A Unified Relationship between Methane Emissions and Dry Matter Intake for Australian Cattle Receiving Over 70% of Their Diet as Forages. Canberra: CSIRO Agriculture Flagship.

[c] Roxburgh SH, Volkova L, Surawski N, Meyer M and Weston CJ. 2015. Review of Fuel Loads, Burn Efficiencies, Emissions Factors and Recovery Functions Used to Estimate Greenhouse Gas Emissions and Removals Associated with Wildfire on Temperate Forested Lands. Report for the Department of the Environment. Canberra: CSIRO. (Draft).

Annex I

Overview of greenhouse gas emissions and removals for Australia for submission year 2015

Table 6 shows total greenhouse gas (GHG) emissions, including and excluding land use, land-use change and forestry and, for Parties that have decided to report indirect carbon dioxide (CO_2) emissions, with and without indirect CO_2. Tables 7 and 8 show GHG emissions reported under the Convention by Australia by gas and by sector, respectively.

Table 6
Total greenhouse gas emissions for Australia, base year[a] to 2013
(kt CO_2 eq)

	Without indirect CO_2		With indirect CO_2	
	Total with LULUCF	Total without LULUCF	Total with LULUCF	Total without LULUCF
Base year (1990)	531 591.98	428 291.49	531 591.98	428 291.49
1990	531 591.98	428 291.49	531 591.98	428 291.49
1995	484 349.97	444 506.16	484 349.97	444 506.16
2000	554 790.99	496 981.99	554 790.99	496 981.99
2010	574 495.06	546 399.98	574 495.06	546 399.98
2011	547 819.47	549 075.37	547 819.47	549 075.37
2012	544 676.11	549 755.53	544 676.11	549 755.53
2013	537 964.24	541 923.59	537 964.24	541 923.59

Note: If emissions from the sector "other" are reported, they are excluded from total greenhouse gas emissions. Australia chose not to report indirect carbon dioxide emissions.
Abbreviation: LULUCF = land use, land-use change and forestry.
[a] "Base year" refers to the base year for the Party under the Convention specified in decision 24/CP.19, annex, paragraph 8.

Table 7
Greenhouse gas emissions by gas, base year[a] to 2013
(kt CO_2 eq)

	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3
Base year (1990)	278 220.35	126 928.48	16 899.94	1 424.68	4 607.01	211.02	NO
1990	278 220.35	126 928.48	16 899.94	1 424.68	4 607.01	211.02	NO
1995	304 924.64	119 058.79	17 685.56	1 004.03	1 530.84	302.31	NO
2000	349 884.01	122 341.48	21 665.59	1 613.20	1 287.06	190.65	NO
2010	404 773.91	110 707.69	22 330.49	8 166.07	283.32	138.50	NO
2011	404 866.33	112 318.56	22 623.36	8 837.85	301.30	127.96	NO
2012	405 836.38	111 243.59	22 899.67	9 353.07	294.88	127.94	NO
2013	398 527.89	110 581.50	22 529.47	9 964.79	192.00	127.94	NO
Per cent change base year–2013	43.2%	–12.9%	33.3%	599.4%	–95.8%	–39.4%	NA

Note: CO_2, CH_4 and N_2O emissions do not include emissions and removals from the land use, land-use change and forestry sector. Australia does not report indirect CO_2 emissions in common reporting format table 6.
Abbreviations: NA = not applicable, NO = not occurring.

Table 8
Greenhouse gas emissions by sector, base year*a* to 2013
(kt CO_2 eq)

	Energy	IPPU	Agriculture	LULUCF	Waste	Other
Base year (1990)	292 820.72	26 108.52	88 569.10	103 300.49	20 793.15	NO
1990	292 820.72	26 108.52	88 569.10	103 300.49	20 793.15	NO
1995	316 926.94	25 261.35	82 522.14	39 843.81	19 795.73	NO
2000	362 751.70	26 751.98	90 642.72	57 809.00	16 835.58	NO
2010	415 556.06	35 537.81	78 897.66	28 095.08	16 408.44	NO
2011	414 541.51	36 030.61	82 701.81	−1 255.90	15 801.44	NO
2012	418 815.37	33 110.42	83 718.67	−5 079.42	14 111.07	NO
2013	411 012.01	32 528.21	85 023.74	−3 959.35	13 359.64	NO
Per cent change base year–2013	40.4%	24.6%	−4.0%	−103.8%	−35.7%	NA

Note: Australia does not report indirect carbon dioxide emissions in common reporting format table 6.

Abbreviations: IPPU= industrial processes and product use, LULUCF = land use, land-use change and forestry, NA = not applicable, NO = not occurring.

a "Base year" refers to the base year for the Party under the Convention specified in decision 24/CP.19, annex, paragraph 8.

Annex II

Additional information to support findings in table 2

A.   Missing categories that affect completeness

The following categories were reported as "NE" (not estimated) or the expert review team (ERT) otherwise determined that there is an issue with the completeness of reporting in the Party's inventory:

- Nitrous oxide (N_2O) from product uses (2.G.3) (imports) (see finding I.35 in table 5 above);
- Land converted to forest land (natural regeneration) (4.A.2) (see finding L.29 in table 5 above);
- Cropland converted to settlements (4.E.2.2) (see finding L.24 in table 5 above);
- Grassland converted to settlements (4.E.2.3) (see finding L.24 in table 5 above);
- Waste incineration (5.C.1) – carbon dioxide, methane and N_2O emissions from municipal solid waste for the period 1990–1996 (see finding W.7 in table 5 above).

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

The ERT does not recommend that an exceptional in-country review be carried out.

Annex III

Documents and information used during the review

A. Reference documents

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

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories". Annex to decision 24/CP.19. Available at <http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=4>.

"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention". Annex to decision 13/CP.20. Available at <http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf#page=6>.

Annual status report for Australia for 2015. Available at <http://unfccc.int/resource/docs/2015/asr/aus.pdf>.

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

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

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

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Rob Sturgiss (Department of the Environment, Australian Government), including additional material on the methodology and assumptions used. The following documents[1] were also provided by Australia:

Charmley, E.; Williams, S. R. O.; PMoate, P.J.; Hegarty, R.S.; Herd, R.M.; Oddy, V.H.; Reyenga, P.; Staunton, K. M. and A. Anderson. (2014) Running head: Methane production and DMI in cattle. A unified relationship between methane emissions and dry matter intake for Australian cattle receiving over 70% of their diet as forages. CSIRO Agriculture Flagship

CSIRO. 1996 Methane Emissions from Coal Mining. Report Number PH2/5. CSIRO Division of Coal and Energy Technology.

CSIRO. 2005. *Australian Greenhouse Emissions Information System: Quantitative Estimates of Uncertainty.* Aspendale. CSIRO Agriculture Flagship

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[1] Reproduced as received from the Party.

ES. 2005. Review of methodology for estimating Australia's Unaccounted for Gas (UAFG) as calculated in the NGGI. Energy Strategies (submitted to the Australian Greenhouse Office)

NWC. 2011. *Water trading in the rice industry.* National Water Commission

Roxburgh, S., Volkova, L., Surawski, N., Meyer, N. and Christopher Weston. 2015. Review of fuel loads, burn efficiencies, emissions factors and recovery functions used to estimate greenhouse gas emissions and removals associated with wildfire on temperate forested lands. CSIRO the Agriculture Flagship (prepared for the Department of the Environment)

Saghafl, D.J.W, Lange, A.L. and M.S. Drummond. 1993. *Methane emissions from open-cut mines and post-mining emissions from underground coal. Investigation report CET/IR173.* North Ryde. CSIRO (report to Department of Environment, Sports and Territories)

Todd, J.J. 2011. *Estimating Greenhouse Gas Emissions from Residential Firewood Use: Australia 1989/90 to 2010/11.* Eco-Energy Options Pty Ltd (Report Prepared for Australian Department of Climate Change)

Annex IV

Acronyms and abbreviations

AD	activity data
BF	blast furnace
BOF	basic oxygen furnace
C	confidential
CaO	calcium oxide
CCS	carbon dioxide capture and storage
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
F-gases	fluorinated gases
FOD	first-order decay
GHG	greenhouse gas; unless indicated otherwise, total GHG emissions are the sum of CO_2 (including indirect CO_2 emissions if reported by the Party), CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
GWP	global warming potential
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
kg	kilogram (1 kg = 1,000 grams)
kha	kilohectare
kt	kilotonne (1 kt = 1 gigagram (Gg))
LULUCF	land use, land-use change and forestry
MgO	magnesium oxide
MSW	municipal solid waste
Mt	million tonnes
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NF_3	nitrogen trifluoride
NIR	national inventory report
NMVOCs	non-methane volatile organic compounds
NO	not occurring
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
SF_6	sulphur hexafluoride
SWDS	solid waste disposal sites
t	tonne
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change

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