COMPLIANCE COMMITTEE **CC/ERT/ARR/2017/16**
28 March 2017

Report of the individual review of the annual submission of Croatia submitted in 2016

Note by the secretariat

The report of the individual review of the annual submission of Croatia submitted in 2016 was published on 28 March 2017. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2016/HRV, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

United Nations FCCC/ARR/2016/HRV

Framework Convention on Climate Change

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

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual greenhouse gas (GHG) inventory covering emissions and removals of GHG emissions for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol, with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2016 annual submission of Croatia, conducted by an expert review team in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol". The review took place from 19 to 24 September 2016 in Bonn, Germany.

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

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I. Introduction[1]

1. This report covers the review of the 2016 annual submission of Croatia organized by the UNFCCC secretariat, in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1, as revised by decision 4/CMP.11) (hereinafter referred to as the Article 8 review guidelines). As indicated in the Article 8 review guidelines, this review process also encompasses the review under the Convention, as described in the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" (hereinafter referred to as the UNFCCC review guidelines) and particularly part III, "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention". The review took place from 19 to 24 September 2016 in Bonn, Germany, and was coordinated by Mr. Vitor Gois and Mr. Pedro Torres (UNFCCC secretariat). Table 1 provides information on the composition of the expert review team (ERT) that conducted the review of Croatia.

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

Area of expertise	*Name*	*Party*
Generalist	Mr. Riccardo De Lauretis	Italy
	Mr. Giorgi Mukhigulishvili	Georgia
Energy	Mr. Lawrence Kotoe	Ghana
	Mr. Takashi Morimoto	Japan
	Mr. Audace Ndayizeye	Burundi
	Ms. Regine Röthlisberger	Switzerland
IPPU	Ms. Marisol Bacong	Philippines
	Mr. Kent Buchanan	South Africa
	Mr. Roman Kazakov	Russian Federation
Agriculture	Mr. Sorin Deaconu	Romania
	Mr. Asaye Ketema Sekie	Ethiopia
LULUCF	Mr. Max Collett	Australia
	Ms. Paula Ollila	Finland
	Mr. Juan José Rincón Cristóbal	Spain
	Mr. Iordanis Tzamtzis	Greece
Waste	Ms. Violeta Hristova	Bulgaria

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

Area of expertise	*Name*	*Party*
	Mr. Gustavo Barbosa Mozzer	Brazil
Lead reviewers	Mr. Riccardo De Lauretis	
	Mr. Asaye Ketema Sekie	

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

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

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

4. Annex I shows annual greenhouse gas emissions for Croatia, including totals excluding and including the land use, land-use change and forestry sector, indirect carbon dioxide emissions and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and additional activities under Article 3, paragraph 4, of the Kyoto Protocol, if elected, by gas, sector and activity for Croatia.

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

6. The ERT notes that Croatia's 2015 annual submission was delayed, consistent with decision 6/CMP.9, paragraph 4. As a result, the review of the 2016 annual submission is being held in conjunction with the review of the 2015 annual submission, in accordance with decision 10/CMP.11, paragraph 1. To the extent that identical information is presented in both annual submissions, the ERT has reviewed this information only once, and, as appropriate, has replicated the findings below in both the 2015 and the 2016 annual review reports.

II. Summary and general assessment of the 2016 annual submission

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

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

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

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

Assessment				*Issue or problem ID#(s) in tables 3 and/or 5[a]*
Dates of submission	Original submission: 15 June 2016 (NIR), 15 June 2016, version 3 (CRF tables), 15 June 2016 (SEF tables) The values from the latest submission are used in this report			
Review format	Centralized			
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:			
	1.	Identification of key categories	Yes	L.12
	2.	Selection and use of methodologies and assumptions	Yes	E.12, I.7, I.9, I.10, I.13, L.5, L.6, L.8, L.10, L.12, KL.1, KL.2, KL.8
	3.	Development and selection of emission factors	Yes	E.15, A.3, A.7, A.8, A.9
	4.	Collection and selection of activity data	Yes	L.2, L.9, L.11
	5.	Reporting of recalculations	Yes	L.1
	6.	Reporting of a consistent time series	Yes	E.16
	7.	Reporting of uncertainties, including methodologies	No	
	8.	QA/QC	QA/QC procedures were assessed in the context of the national system (see below)	
	9.	Missing categories/completeness[b]	Yes	I.5, L.15, L.16, L.17, L.18, L.19, W.1, W.6, KL.6, KL.7, KL.9
	10.	Application of corrections to the inventory	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?		The Party did not report "NE" for any insignificant categories	
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?		Yes	
Supplementary information under the Kyoto Protocol	Have any issues been identified in the following areas:			
	1.	National system:		
		(a) The overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements	No	

Assessment			*Issue or problem ID#(s) in tables 3 and/or 5[a]*
	(b) Performance of the national system functions	No	
	2. National registry:		
	(a) Overall functioning of the national registry	No	
	(b) Performance of the functions of the national registry and the technical standards for data exchange	No	
	3. ERUs, CERs, AAUs and RMUs and on information on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, taking into consideration any findings or recommendations contained in the SIAR	No	
	4. Matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, including any changes since the previous annual submission	No	
	5. LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol:		
	(a) Reporting in accordance with the requirements of decision 2/CMP.8, annex II, paragraphs 1–5	No	
	(b) The Party has demonstrated methodological consistency between the reference level and reporting on forest management in accordance with decision 2/CMP.7, annex, paragraph 14	No	
	(c) The Party has reported information in accordance with decision 6/CMP.9	No	
	(d) Country-specific information has been reported to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34	No	
	(e) Other issues	No	
CPR	Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	The ERT accepts that the revised estimates submitted by Croatia in its 2016 submission can replace a previously applied adjustment in the compilation and accounting database	NA	
Response from the Party during	Has the Party provided the ERT with responses to the questions raised, including the data and information	Yes	

Assessment			*Issue or problem ID#(s) in tables 3 and/or 5*[a]
the review	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?		
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	No	
Questions of implementation	Did the ERT list questions of implementation?	No	

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

[a] The ERT identified additional issues in the energy, industrial processes and product use, agriculture, LULUCF and waste sectors as well as for LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol that are not specifically listed in table 2 but are included in tables 3 and/or 5.

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

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

8. Table 3 compiles all the recommendations made in the previous review report. Owing to the unique circumstances of the 2015 annual submission described in paragraph 6 above, the latest available review report was for the review of the 2014 annual submission, published on 15 June 2015. For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2016 annual submission and provided the rationale for its determination, taking into consideration the publication date of the previous review report and national circumstances.

Table 3
Status of implementation of issues and/or problems raised in the previous review report of Croatia

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
General			
G.1	Key category analysis (table 4, 2014) (table 4, 2013) Transparency*	Include more information in the NIR on how the key category analysis is used to prioritize the development and improvement of the inventory	Resolved. The NIR provides key category analyses for 2014 and the relevant information on how they are used to prioritize the development and improvement of the inventory

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
G.2	Follow-up to previous reviews (16, 2014) (18, 2013) Transparency	Provide, in the "recommendations from the last ARR with the status of implementation" table of the NIR, references including the section or paragraph number to indicate where the recommendations are covered within the NIR	Resolved. Croatia provided the status of implementation of the recommendations made in previous reviews in table 10.4-1 of the NIR (p.430), including a reference to the chapter of the NIR in which the recommendation is addressed
G.3	Commitment period reserve (107, 2014) Transparency*	Ensure that the calculation of the commitment period reserve is in accordance with decision 11/CMP.1	No longer relevant. The commitment period reserve was calculated in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18
G.4	National system (108, 2014) Transparency*	Report in the annual submission any changes in the national system in accordance with decision 15/CMP.1, annex, chapter I.F	Resolved. As reported in the NIR (chapter 1.1.5), there are no changes in the national system since the previous submission
G.5	National registry (109, 2014) Transparency*	Report in the annual submission any change(s) in the national registry in accordance with decision 15/CMP.1, annex, chapter I.G	Resolved. In the NIR, the Party reported the changes in the national registry (see table 1.1-4, chapter 1.1.6)
Energy			
E.1	Fuel combustion – reference approach – gaseous fuels – CO_2 (24, 2014) (24, 2013) (46, 2012) Transparency*	Provide a more detailed and transparent explanation for the observed CO_2 emission differences between the reference approach and the sectoral approach	Resolved. Although the difference in CO_2 emissions between the IPCC reference approach and the sectoral approach is less than 2 per cent (e.g. 0.66 per cent for 2014), Croatia provided in chapter 3.2.1 of the NIR an explanation for the observed differences
E.2	Fuel combustion – reference approach – gaseous fuels – CO_2 (24, 2014) Not an issue	Take steps to resolve the issue regarding the allocation of natural gas used as fuel and as non-energy use in the energy balance to improve the accuracy of the reporting	No longer relevant. In accordance with the 2006 IPCC Guidelines, the natural gas used as fuel and as feedstock is reported under the IPPU sector

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
E.3	Comparison with international data – liquid fuels – CO_2 (26, 2014) Not an issue	Compare data on aviation bunker fuels between the International Energy Agency data and the data in the CRF tables, and explain the differences observed	No longer relevant. The ERT considers that providing a comparison between the International Energy Agency data and the data in the CRF tables is not a mandatory requirement
E.4	Feedstocks, reductants and other NEU of fuels – gaseous fuels – CO_2 (21, 2014) (28, 2013) Transparency	Explain the approach used to derive the amount of natural gas used as fuel in ammonia production	No longer relevant. In accordance with the 2006 IPCC Guidelines, the natural gas used as fuel and as feedstock is reported under the IPPU sector. Nevertheless, Croatia provided detailed information in chapter 4.3.1.2 of the NIR
E.5	Feedstocks, reductants and other NEU of fuels – gaseous fuels – CO_2 (27, 2014) (28, 2013) Not an issue	Continue with the measures to collect and report the data from the industrial plants on use of natural gas as fuel in ammonia production	No longer relevant. In accordance with the 2006 IPCC Guidelines, the natural gas used as fuel and as feedstock is reported under the IPPU sector. Nevertheless, Croatia provided information on the amount of natural gas used as fuel and as feedstock for ammonia production in table 4.3-1 of the NIR (p.180)
E.6	International bunkers and multilateral operations – liquid fuels – CO_2 (26, 2014) (27, 2013) Transparency*	Provide a detailed explanation of the factors contributing to decreases in bunker fuel consumption and associated CO_2 emissions	Not resolved. The ERT considers that no progress has been made in addressing the recommendation as a description of the factors contributing to the decrease in bunker fuel consumption and associated CO_2 emissions is not provided in the NIR
E.7	1.A.1.a Public electricity and heat production – gaseous, liquid and solid fuels – CO_2, CH_4 and N_2O (28, 2014) Accuracy	Take steps to obtain and use plant-specific CO_2 EFs to improve the accuracy of emission estimates	No longer relevant. Parties are not required to use plant-specific data to develop CO_2 EFs (see E.15 in table 5)
E.8	1.A.2 Manufacturing industries and construction –	Take steps to ensure the consistency of the AD for fuel use in manufacturing industries and construction, and of the type of AD used for the	Addressing. Croatia has partially addressed the recommendation by

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	gaseous, liquid and solid fuels – CO_2, CH_4 and N_2O (22, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	estimation of CO_2 emissions from gas transmission pipelines	estimating the emissions from gas transmission using AD expressed in cubic metres of marketable gas, in accordance with the 2006 IPCC Guidelines (see E.13 below). However, with regard to the consistency of the fuel use in manufacturing industries and construction, some inconsistencies between the fuel balance and the reporting of energy consumption in CRF table 1.A(a) have been found. For example, in 2014 the natural gas consumption for food processing, beverages and tobacco reported in CRF table 1.A(a) is 4,771.34 TJ, whereas the figure reported in the national energy balance is 2.13 PJ (about 2,130.00 TJ)
E.9	1.A.3.a Domestic aviation – liquid fuels – CO_2 (31, 2014) Comparability*	Adopt an approach in accordance with IPCC good practice, such as using aviation fuel use surveys, sales statistics and origin–destination statistics to obtain the actual jet kerosene consumption figures for domestic and international aviation	Resolved. Croatia states in the NIR that it has launched a project aimed at improving the methodology for data collection of energy consumption in households, services and transport. Under this project, Croatia determined the actual consumption of fuel from aviation on domestic and international routes and related emissions for the whole time series. However, the ERT considers that the methodology used to determine the actual consumption of fuel from aviation on domestic and international routes is not transparently described in the NIR (see also E.17 in table 5)

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
E.10	1.A.3.b Road transportation – gaseous fuels – CO_2 (32, 2014) Transparency*	Provide sufficient explanations in the NIR on the methodology used for estimating emissions from gaseous fuels	Not resolved. Croatia states in the NIR (p.134) that it uses a tier 1 method to calculate CO_2 emissions from liquid fuels. However, the method used to calculate emissions from gaseous fuels is not described in the NIR
E.11	Other (mobile) 1.A.5.b Mobile – liquid fuels – CO_2, CH_4 and N_2O (35, 2014) (34, 2013) (61, 2012) Transparency*	Indicate in the NIR the category under which military fuel use has been included	Not resolved. During the review, Croatia clarified that military fuel use is generally included in the transport sector but did not include any information in the NIR indicating under which category military fuel use is included
E.12	1.B.1.a Coal mining and handling – solid fuels – CH_4 (33, 2014) (31, 2013) (57, 2012) Accuracy*	Use actual coal production figures for estimating emissions from coal mining and handling	Not resolved. During the review, Croatia clarified that using actual coal production figures for estimating emissions from coal mining and handling is listed in the national improvement plan for 2017
E.13	1.B.2.b Natural gas – gaseous fuels – CO_2 (34, 2014) (33, 2013) (58, 2012) Accuracy	Take steps to use the gas pipeline length as the AD for CO_2 emission calculations	No longer relevant. Croatia updated the methodology to estimate emissions from transmission and storage of natural gas by using cubic metres of marketable gas throughput as AD, in accordance with the 2006 IPCC Guidelines
IPPU			
I.1	2. General (IPPU) – (44, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	Conduct an analysis for the key categories of the industrial processes sector	Resolved. An analysis for the key categories was conducted, including CO_2 emissions from lime production
I.2	2.A.2 Lime production – CO_2 (44, 2014) Accuracy*	Recalculate the CO_2 emissions from lime production using real data	Resolved. AD for 2012 are provided in table 4.2-4 of the NIR (p.168) and emissions were recalculated based on real data

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
I.3	2.B.1 Ammonia production – CO_2 (39, 2014) (39, 2013) (69, 2012) Accuracy*	Review the methodology used for calculating emissions from ammonia production and provide clearer justification for the implied emission factor estimation	Resolved. In the 2015 and 2016 GHG inventory submissions, Croatia moved to a tier 3 method for estimating CO_2 emissions from ammonia production. The resulting implied emission factor from the recalculations ranges from 1.989 t CO_2 to 2.267 t CO_2 per tonne of ammonia produced, which is within the range for the IPCC default EF (1.666–3.273 t CO_2 per tonne of ammonia produced)
I.4	2.C.2 Ferroalloys production – CO_2 (40, 2014) (40, 2013) Transparency*	Provide more details on the plans to increase the transparency and accuracy of the estimates by obtaining AD for ferroalloys production to replace the interpolated data for the years 1994–1996 and 1999–2001	Not resolved. During the review, Croatia explained that there are no plans for improvements in this category as it is not possible to replace the interpolated data with actual data or estimated data owing to the time that has elapsed. The ERT considers that the use of an interpolation method for resolving the data gaps in the production of coke from coal used as a reducing agent in ferroalloys production in the periods 1994–1996 and 1999–2001 is in accordance with the 2006 IPCC Guidelines. However, the Party should provide details in the NIR on how it applied such methods to estimate emissions from ferroalloys production. See I.10 in table 5
I.5	2.F. Product uses as substitutes for ozone-depleting substances – PFCs and HFCs (41, 2014) (41, 2013) Completeness*	Continue to conduct surveys on the status of disposal of refrigeration and air-conditioning equipment and include the results in the NIR	Not resolved. The NIR does not include information on the status of disposal of refrigeration and air-conditioning equipment. Croatia states in chapter 4.7.1.1 of the NIR (p.214) that the data will be collected for the next GHG inventory submission

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
Agriculture			
A.1	3. General (agriculture) – CO_2, CH_4 and N_2O (47, 2014) (48, 2013) (80, 2012) Transparency*	Provide detailed explanations in the NIR on the data sources and recalculations for the agriculture sector	Resolved. Croatia provided in chapter 10 of the NIR the impact of recalculations since its last GHG inventory submission for the years 1990 and 2013, by sector and by category, including the agriculture sector. In addition, Croatia provided sufficiently detailed explanations for the data sources and recalculations in each category-specific recalculation section of the agriculture chapter of the NIR
A.2	3.A Enteric fermentation – CH_4 (48, 2014) (46, 2013) (87, 2012) Accuracy*	Implement country-specific EFs to estimate CH_4 emissions from enteric fermentation	Resolved. Croatia implemented country-specific EFs for estimating CH_4 emissions from enteric fermentation for the entire time series
A.3	3.B Manure management – CH_4 and N_2O (48, 2014) (46, 2013) (89, 2012) Accuracy*	Implement country-specific EFs to estimate CH_4 and N_2O emissions from manure management	Addressing. Croatia implemented country-specific EFs for estimating CH_4 emissions from manure management for the entire time series, but not for estimating N_2O emissions
A.4	3. General (agriculture) – CH_4 and N_2O (49, 2014) (48, 2013) Transparency*	Improve the agricultural information provided in the inventory and explain the national conditions more thoroughly in the NIR including an explanation on the low milk yield in the country	Resolved. Croatia improved the information provided across the NIR on the agriculture sector, including a more thorough description of the national conditions
A.5	3.A Enteric fermentation – CH_4 (50, 2014) (48, 2013) Transparency*	Improve the transparency of recalculations and provide the references for AD for milk production	Resolved. Croatia provided information on the recalculations and on country-specific data and parameters in the NIR (pp.241 and 246)

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
A.6	3.B Manure management – CH_4 and N_2O (52, 2014) (53, 2013) (89, 2012) Accuracy*	Implement the results of the research project for estimating ammonia, CH_4 and N_2O emissions from manure management, including seeking data on the distribution of manure in manure management systems	Resolved. Croatia completed the research project on ammonia, CH_4 and N_2O emissions from manure management and implemented the relevant results in the inventory, moving to a higher tier for this category
A.7	3.D Direct and indirect N_2O emissions from agricultural soils – N_2O (59, 2014) Accuracy*	Correct the error concerning the nitrogen content of dry matter used to estimate emissions and improve QA/QC for the data received from the Croatian Environment Agency	Not resolved. Croatia continues to use a nitrogen content of 11.0 per cent of dry matter for the period 2005–2008, which was considered to be an unrealistically high value by the previous ERT
LULUCF			
L.1	4. General (LULUCF) (61, 2014) Transparency*	Explain the recalculations conducted in the LULUCF sector	Addressing. The ERT noted that in the forest land remaining forest land category the area reported for 1990 in the most recent submission is 2,310.49 kha (CRF table 4.A), whereas the area reported for 1990 in the 2014 submission is 2,298.93 kha (CRF table 5.A). No specific information on this recalculation was provided in the NIR. During the review, Croatia explained that the reason for the recalculation was the change in the area between the current and previous inventory submissions provided by the two consecutive forest management plans used as the data source, and the identification of forest land established before 1990, which Croatia allocated to the year 1990. The ERT considers that Croatia provided in the NIR information on most but not all of the recalculations performed since the previous inventory submission

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
L.2	4.A.1 Forest land remaining forest land – CO_2 (66, 2014) (70, 2013) (105, 2012) Accuracy*	Make significant efforts to use the results of the Croatian National Forest Inventory (CRONFI) to improve the LULUCF sector inventory	Addressing. Croatia follows the tier 1 approach for estimating carbon stock changes in the DOM and soil organic matter pools in the forest land remaining forest land category, assuming there is no change, and therefore uses the notation key "NO" in its reporting. The ERT notes that CRONFI could potentially provide more accurate data for estimating carbon stock changes in the DOM and soil organic matter pools and allow the use of a higher-tier method. During the review, Croatia explained that the results of CRONFI have not yet been taken into account in the GHG inventory because the exploration of the application of CRONFI results is not finished. The ERT considers that Croatia needs to make significant progress in addressing the recommendation. The ERT also considers that the reporting could be improved if Croatia provides detailed information in the NIR on the progress made in using CRONFI data for the GHG inventory
L.3	4.A.2 Land converted to forest land – CO_2 (67, 2014) Completeness*	Make significant efforts to use the results of CRONFI to improve the DOM estimates for the category land converted to forest land	Resolved. The Party has made progress on the issue, and is currently in the process of checking and confirming the usefulness of the CRONFI results. A new recommendation has been made (see L.16 in table 5)
L.4	4.A.2 Land converted to forest land – CO_2 (68, 2014) Comparability*	Report the notation key "NO" for AD and carbon stock changes for the subcategory other land converted to forest land	Resolved. Croatia has corrected the notation key used in the CRF tables for the subcategory other land converted to forest land

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
L.5	4.B.1 Cropland remaining cropland – CO_2 (69, 2014) (72, 2013) Accuracy*	Implement the tier 2 approach to perennial cropland remaining perennial cropland as soon as possible	Not resolved. Croatia continues to use a tier 1 method for estimating carbon stock changes in living biomass. During the review, Croatia explained that based on the available information and data, the use of a higher-tier method is not possible in a short time period, and that the issue has been identified and prioritized as one of the long-term goals for the improvement of inventory reporting
L.6	4.B.2 Land converted to cropland – CO_2 (70, 2014) Accuracy*	Improve the cropland biomass estimates to enable implementation of a tier 2 method for estimating cropland biomass in this category as soon as possible	Not resolved. The ERT recognizes that Croatia must firstly determine whether the biomass pool is significant in order to determine whether a tier 2 method is required. As Croatia has not made this determination, the ERT considers this issue as not resolved (see L.12 in table 5)
L.7	4.B.2 Land converted to cropland – CO_2 (71, 2014) Completeness*	Work towards using a higher-tier method for reporting estimates for DOM in land converted to cropland	No longer relevant. The ERT noted that Croatia continues to report the notation key "NO" for this pool (see L.17 in table 5). The ERT also noted that, in accordance with the 2006 IPCC Guidelines, the tier level approach to be used needs to be determined based on the significance analysis of the subcategories (see L.12 in table 5)
L.8	4.C.2 Land converted to grassland – CO_2 (72, 2014) Accuracy*	Improve the cropland biomass estimates to enable implementation of a tier 2 method for estimating cropland biomass under the land converted to grassland category as soon as possible	Not resolved. The ERT recognizes that Croatia must firstly determine whether the biomass pool is significant in order to determine whether a tier 2 method is required. As Croatia has not made this determination, the ERT considers this issue as not resolved (see L.12 in table 5)

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
L.9	4.E.2.1 Forest land converted to settlements – CO_2 (64, 2014) (65, 2013) (98, 2012) Transparency*	Improve the transparency of the NIR and the CRF tables by reporting DOM separately from living biomass for forest land converted to settlements and by separating the litter pool from the soils pool	Not resolved. Croatia continues to report carbon stock changes in the DOM pool, including dead wood, in the living biomass estimates, and continues to include litter in the soil organic matter estimates (see also L.11 in table 5)
L.10	4.E.2.2 Cropland converted to settlements – CO_2 (73, 2014) Accuracy*	Improve the cropland biomass estimates to enable implementation of a tier 2 approach for estimating cropland biomass estimates under the cropland converted to settlements category as soon as possible	Not resolved. The ERT recognizes that Croatia must firstly determine whether the biomass pool is significant in order to determine whether a tier 2 method is required. As Croatia has not made this determination, the ERT considers this issue as not resolved (see L.12 in table 5)
Waste			
W.1	5.A Solid waste disposal on land – CH_4 (77, 2014) (76, 2013) Completeness*	Provide information on the type of waste disposed to solid waste disposal sites and ensure that all types of solid waste, including industrial waste, sludge and construction and demolition waste, disposed to solid waste disposal sites are included in the emission estimates	Not resolved. Croatia has provided information on the types of solid waste disposal sites, the type of operation (managed or unmanaged, shallow or deep) and the status of activity (in operation or closed) (see table 7.2-2, p.390 of the NIR). Regarding the type of waste disposed to solid waste disposal sites, Croatia states in the NIR that the results of a recent project to determine the average composition of municipal waste will be used in the next GHG inventory submission (p.392 of the NIR). The ERT noted that information on the type of industrial waste and construction and demolition waste has not been clearly presented

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
W.2	5.A Solid waste disposal on land – CH_4 (78, 2014) Transparency*	Increase the transparency of the explanation of the trend in CH_4 recovery and flaring or revise the estimates in order to ensure the consistency of the time series	Not resolved. During the review, Croatia explained that accurate and reliable data on CH_4 recovery were obtained from the operators of the landfills, and that the amount of gas collected depends on the amount and composition of the waste that is disposed of in solid waste disposal sites as well as on the conditions of operation of the gas collection system. The ERT considers that no progress has been made in addressing this recommendation as no information to explain the trend in CH_4 recovery and flaring was provided in the NIR
W.3	5.D Wastewater treatment and discharge – CH_4 and N_2O (79, 2014) (77, 2013) (116, 2012) Transparency*	Provide more information on wastewater flows and treatment systems, using figure 5.3 of the IPCC good practice guidance as a guide, in order to understand all potential anaerobic treatment systems and discharge pathways (e.g. uncollected and discharged into the aquatic environment without treatment)	Resolved. Croatia provided additional information on wastewater flows and treatment systems in chapter 7.5.2.1 of the NIR. The Party also provided clarification regarding the data source for domestic wastewater AD as well as the methods used to close gaps in the data by interpolation
W.4	5.D Wastewater treatment and discharge – CH_4 and N_2O (80, 2014) Transparency*	Collect AD on domestic and commercial wastewater handling	Resolved. See W.3 above
W.5	5.C.1 Waste incineration – CO_2, CH_4 and N_2O (81, 2014) Accuracy*	Make all necessary corrections in the next annual submission regarding the quantity of hospital waste incinerated and perform recalculations of CO_2 emissions in order to ensure the consistency of the time series	Resolved. Croatia used revised AD (see table 7.4-1 of the NIR) and recalculated the estimates for emissions from waste incineration
W.6	5.C.1 Waste incineration – CO_2, CH_4 and N_2O (table 3 and 82, 2014) Completeness*	Extrapolate back in order to estimate CO_2 emissions from incineration of plastic waste between 1990 and 2006 to improve the consistency of the time series and transparency	Not resolved. Croatia did not make any progress to improve the consistency of the time series of CO_2 emissions from incineration of plastic waste

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
W.7	5.C.1 Waste incineration – N_2O (table 3 and 83, 2014) (79, 2013) (120, 2012) Not an issue	Identify the technologies applied in the incineration of hazardous waste and estimate N_2O emissions from waste incineration	No longer relevant. Reporting of N_2O emissions from hazardous waste is not required to be reported according to the 2006 IPCC Guidelines
KP-LULUCF			
KL.1	Afforestation and reforestation – CO_2 (93, 2014) Comparability*	Report the below-ground biomass pool separately from the above-ground biomass estimates	Not resolved. Croatia continues to include below-ground biomass carbon stock change estimates in above-ground carbon stock change estimates, using the notation key "IE"
KL.2	Deforestation – CO_2 (95, 2014) Comparability*	Report the below-ground biomass pool separately from the above-ground biomass estimates	Not resolved. Croatia continues to include below-ground biomass carbon stock change estimates in above-ground carbon stock change estimates, using the notation key "IE"
KL.3	Deforestation – N_2O (96, 2014) Comparability*	Indicate in CRF table NIR-1 that N_2O emissions from this source are reported by using the notation key "R" (reported) for this category	Resolved. Croatia corrected the notation key used in CRF table NIR-1
KL.4	Forest management – CO_2 (98, 2014) Transparency*	Report the below-ground biomass pool separately from the above-ground biomass estimates	Not resolved. Croatia continues to include below-ground biomass carbon stock change estimates in above-ground carbon stock change estimates, using the notation key "IE"

Abbreviations: AD = activity data, ARR = annual review report, CRF = common reporting format, CRONFI = Croatian National Forest Inventory, DOM = dead organic matter, EF = emission factor, ERT = expert review team, GHG = greenhouse gas, IE = included elsewhere, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NEU = non-energy use, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control, UNFCCC Annex I inventory reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories", 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

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

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

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

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

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

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

ID#[a]	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[b]
General		
	No such general issues were identified	
Energy		
E.6	Provide a detailed explanation of the factors contributing to decreases in bunker fuel consumption and associated CO_2 emissions	3 (2013–2015/2016)
E.11	Indicate in the NIR the category under which military fuel use has been included	4 (2012–2015/2016)
E.12*	Use actual coal production figures for estimating emissions from coal mining and handling	4 (2012–2015/2016)
IPPU		
I.4	Provide more details on the plans to increase the transparency and accuracy of the estimates by obtaining AD for ferroalloys production to replace the interpolated data for the years 1994–1996 and 1999–2001	3 (2013–2015/2016)
I.5*	Continue to conduct surveys on the status of disposal of refrigeration and air-conditioning equipment and include the results in the NIR	3 (2013–2015/2016)
Agriculture		
A.3*	Implement country-specific EFs to estimate CH_4 and N_2O emissions from manure management	4 (2012–2015/2016)
LULUCF		
L.5*	Implement the tier 2 approach to perennial cropland remaining perennial cropland	3 (2013–2015/2016)
L.9	Improve the transparency of the NIR and the CRF tables by reporting DOM separately from living biomass for forest land	4 (2012–2015/2016)

ID#[a]	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[b]
	converted to settlements and by separating the litter pool from the soils pool	
Waste		
W.1*	Provide information on the type of waste disposed to solid waste disposal sites and ensure that all types of solid waste, including industrial waste, sludge and construction and demolition waste, disposed to solid waste disposal sites are included in the emission estimates	3 (2013–2015/2016)
KP-LULUCF		
	No such issues for KP-LULUCF activities were identified	

Abbreviations: AD = activity data, CRF = common reporting format, DOM = dead organic matter, EF = emission factor, IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report.

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

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

V. Additional findings made during the 2016 technical review

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

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

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
General			
		No additional general issues beyond those included in table 3 were identified	
Energy			
E.14	Fuel combustion – reference approach – liquid fuels – CO_2	The ERT noted that the difference between the IPCC reference approach and the sectoral approach for liquid fuels was 2.40 per cent in 2012. During the review, Croatia explained that the difference resulted from erroneously summing EFs and also from omitting the consumption of aviation gasoline (0.5 kt) in the reference approach while accounting for it in the sectoral approach. The Party informed the ERT that it will correct the errors in the next GHG inventory submission	Yes. Comparability*
		The ERT recommends that Croatia correct the errors made for liquid fuels when comparing the IPCC reference approach with the sectoral approach by taking into account the relevant fuel consumption figures by fuel type	
E.15	1.A.1.a Public electricity and heat production – gaseous, liquid and solid fuels – CO_2	The ERT noted that Croatia uses a tier 2 method together with default EFs to estimate CO_2 emissions from public electricity and heat production. The ERT considers that the use of IPCC default CO_2 EFs under the tier 2 method is not in line with the 2006 IPCC Guidelines. The ERT also considers that information to estimate country-specific CO_2 EFs should be available from the information collected under the EU ETS	Yes. Accuracy*
		The ERT recommends that Croatia estimate country-specific CO_2 EFs and use such EFs to estimate CO_2 emissions from public electricity and heat production	
E.16	1.A.2 Manufacturing industries and construction – gaseous, liquid and solid fuels – CO_2, CH_4 and N_2O	Croatia estimated emissions from manufacturing industries and construction in the period 1990–2000 using aggregated fuel consumption data (i.e. not divided by the appropriate industrial branches) for fuel consumption for the generation of electricity and heat in industry. During the review, the Party acknowledged the problem and informed the ERT that it is working on a project that will enable the correct distribution of energy consumption and emissions by the appropriate industrial branches	Yes. Consistency*
		The ERT recommends that, to ensure time-series consistency, Croatia distribute fuel consumption and emissions from the generation of electricity and heat in manufacturing industries and construction for the period 1990–2000, in accordance with the detailed industrial split for stationary combustion provided in the 2006 IPCC Guidelines	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
E.17	1.A.3.a Domestic aviation – liquid fuels – CO_2	Croatia states in the NIR that it has launched a project aimed at improving the methodology for data collection of energy consumption in households, services and transport. Under this project, Croatia determined the actual consumption of fuel from aviation on domestic and international routes and related emissions for the whole time series. However, the ERT noted that the methodology used to determine the actual consumption of fuel from aviation on domestic and international routes was not described in the NIR The ERT recommends that Croatia provide a description of the methodology used to determine the fuel consumption of domestic and international aviation in the NIR	Yes. Transparency*
IPPU			
I.6	2. General (IPPU)	The ERT noted that in table 1.5-1 of the NIR (p.83), the key categories summary table for 2014 is not correct. The contents of the table appear to pertain to the year 1990, rather than 2014 as stated in the table title The ERT recommends that Croatia ensure that the key categories summary table title and contents are aligned	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
I.7	2.A.4 Other process uses of carbonates – CO_2	The ERT observed that limestone use, dolomite use and soda ash use were reported under the category other process uses of carbonates, without an explanation of the purpose of the use of carbonates. The ERT considers that Croatia does not provide transparent information to show that emissions from the consumption of carbonates are reported under the category where the carbonates are consumed and the CO_2 is emitted, as recommended by the 2006 IPCC Guidelines. During the review, the Party explained that the emissions associated with limestone, dolomite and soda ash use reported in subcategory 2.A.4 include all emissions other than the emissions associated with carbonates used in iron and steel production (subcategory 2.C.1) and glass production (subcategory 2.A.3). The Party further stated that the explanation provided during the review will be included in the NIR of the next GHG inventory submission. The ERT notes that, according to the 2006 IPCC Guidelines (volume 3, chapter 2), the category other process uses of carbonates (2.A.4) should include only carbonate-related emission estimates resulting from the production of ceramics, other uses of soda ash, non-metallurgical magnesia production and other categories that are not explicitly listed in the 2006 IPCC Guidelines The ERT recommends that Croatia provide information in the NIR on the activities related to the consumption and emissions of carbonates that are reported under the category other process uses of carbonates (2.A.4) and report CO_2 emissions from the consumption of carbonates under the category in which the carbonates are consumed, in accordance with the	Yes. Comparability*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
		2006 IPCC Guidelines	
I.8	2.B.2 Nitric acid production – N_2O	The ERT noted that in the NIR Croatia did not provide information on the abatement technology, monitoring system and methodology used to assess the abatement of N_2O emissions from nitric acid production plants. During the review, the Party provided relevant information on the technology used, the monitoring system in place and the methodology used in the emission measurements. The 2006 IPCC Guidelines suggest that methods and sources of data used should be included in the inventory so that the reported emission estimates are transparent The ERT recommends that Croatia increase the transparency of its reporting by including a summary of the abatement technology, the monitoring system and methodologies used in the emission measurements in nitric acid production plants	Yes. Transparency*
I.9	2.B.8 Petrochemical and carbon black production – CO_2	The ERT noted that Croatia uses a tier 1 method to estimate CO_2 emissions from petrochemical and carbon black production. The ERT further noted that this category has been identified as a key category (table A1.3-14 of the annex to the NIR). During the review, the Party clarified that detailed information to use a higher-tier method is not available and it will consider whether it is possible to collect the necessary data for the entire time series. In accordance with decision 24/CP.19, annex I, paragraph 11, for categories that are determined to be key categories, the Party should make every effort to use a recommended method from the 2006 IPCC Guidelines and the corresponding decision trees The ERT recommends that Croatia move from a tier 1 method to a higher-tier method for estimating CO_2 emissions from petrochemical and carbon black production, in accordance with the corresponding decision trees in the 2006 IPCC Guidelines	Yes. Accuracy*
I.10	2.C.2 Ferroalloys production – CO_2	The ERT noted that CO_2 emissions from ferroalloys production have been calculated using the tier 1 approach, whereas in previous years Croatia used the tier 2 approach. The ERT also noted that ferroalloys production has been identified as a key category. During the review, the Party explained that the tier approach was changed to tier 1 in response to an issue raised by the previous ERT (see I.4 in table 3) relating to the lack of AD for the production of coke from coal used as a reducing agent in ferroalloys production in the periods 1994–1996 and 1999–2001. According to Croatia, complete data are available to estimate CO_2 emissions using the tier 1 approach. The ERT notes that, in accordance with decision 24/CP.19, annex I, paragraph 11, for categories that are determined to be key categories, the Party should make every effort to use a recommended method from the 2006 IPPC Guidelines and the corresponding decision trees. The ERT further notes that interpolation methods are available in the 2006 IPCC Guidelines for resolving data gaps	Yes. Accuracy*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
		The ERT recommends that Croatia estimate CO_2 emissions from ferroalloys production using a higher-tier method, in accordance with the corresponding decision trees in the 2006 IPCC Guidelines and pursuant to decision 24/CP.19, annex I, paragraph 11, in the next GHG inventory submission. Where this is not possible for the entire time series, the ERT encourages Croatia to explore the use of a combined approach using both tier 1 and tier 2 methods, with a tier 2 method used for the most recent year and a tier 1 method used to ensure consistency in the time series. The Party should compare the estimates from the tier 1 and 2 methods to support this approach	
I.11	2.C.3 Aluminium production – CO_2 and PFCs	The ERT noted that Croatia reports on CO_2 and PFC emissions from aluminium production for the years 1990 and 1991 using a tier 1 method. The ERT also noted that aluminium production is a key category. Croatia states in the NIR (chapter 4.4.3.6, p.202) that there are no plans for improving the estimates for this category because aluminium production in the country ceased in 1991	Not an issue
		The ERT encourages Croatia to adhere to the decision trees in figures 4.11 and 4.12 of the 2006 IPCC Guidelines (volume 3) and to implement a higher-tier method for estimating CO_2 and PFC emissions from aluminium production, recognizing that this would require the Party to investigate historical AD on anode consumption and anode effect performance	
I.12	2.D Non-energy products from fuels and solvents use – CO_2	The ERT noted that CO_2 emissions from lubricant use and paraffin wax use are aggregated and reported under the category lubricant use (category 2.D.1). During the review, Croatia explained that obtaining more detailed information on lubricant use and paraffin wax use is listed as a long-term goal and is planned to be investigated for future GHG inventory submissions	Not an issue
		The ERT encourages Croatia to collect the necessary AD and report AD and emissions from lubricant use and paraffin wax use separately	
I.13	2.F.2 Foam blowing agents – HFCs	Croatia states in the NIR (chapter 4.7.2.2, p.219) that a tier 1a method was used to estimate emissions from HFC-152a from foam blowing agents. The ERT noted that these emissions were reported under foam blowing agents, closed cell. During the review, the Party explained that no information is available on the type of foam (open cell or closed cell) and that it assumes all emissions are from closed-cell foam. However, the ERT noted that in CRF table 2(II)B-H, the HFC-152a emissions are equal to the total amount of HFC-152a stock use, meaning that the generic calculation method for emissions from open-cell foam was used (table 7.8 of the 2006 IPCC Guidelines)	Yes. Accuracy*
		The ERT recommends that the Party estimate HFC-152a emissions in accordance with the type of foam (open cell or closed cell) where HFC-152a is used, consistent with the	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
		methodology prescribed in the 2006 IPCC Guidelines (volume 3, chapter 7.4.2), and report such emissions under the appropriate subcategory	
Agriculture			
A.8	3.A.1 Cattle – CH_4	The ERT noted a significant inter-annual change between 2013 and 2014 (–3.9 per cent) in the CH_4 IEF from the enteric fermentation of mature dairy cattle (category 3.(I).A.1). The ERT further noted that this inter-annual change was not explained in the NIR. During the review, Croatia explained that the inter-annual change is due to an error in the EF calculation for the year 2014; namely, incorrect values were used for the methane conversion factor (Y_m) (6.0 per cent rather than 6.1 per cent) and the digestibility of feed (70.0 per cent rather than 69.0 per cent). Although the ERT accepted the Party's reporting for the 2016 submission, the ERT believes that this issue should be considered further in future reviews to confirm that there is not an underestimation of emissions	Yes. Accuracy*
		The ERT recommends that Croatia use the correct values for the methane conversion factor (Y_m) and digestibility of feed when estimating the CH_4 EF from the enteric fermentation of mature dairy cattle	
A.9	3.A.1 Cattle – CH_4	The ERT noted a significant inter-annual change between 2013 and 2014 (–5.8 per cent) in the CH_4 IEF from the enteric fermentation of other mature cattle (category 3.(I).A.1). The ERT further noted that this inter-annual change was not explained in the NIR. During the review, Croatia explained that the inter-annual change is due to an error in the EF calculation for the year 2014; namely, incorrect values were used for the methane conversion factor (Y_m) (6.55 per cent rather than 6.57 per cent) and the digestibility of feed (58.0 per cent rather than 56.181 per cent). Although the ERT accepted the Party's reporting for the 2016 submission, the ERT believes that this issue should be considered further in future reviews to confirm there is not an underestimation of emissions	Yes. Accuracy*
		The ERT recommends that Croatia use the correct values for the methane conversion factor and digestibility of feed when estimating the CH_4 EF from the enteric fermentation of other mature cattle	
A.10	3.B Manure management – CH_4	CRF table 3.B(a), on additional information, does not contain specific information and data on the allocation of livestock manure to different manure management systems and on the methane conversion factors used for estimating CH_4 emissions; instead, the notation key "NE" was used	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
		The ERT encourages Croatia to use the available data and information and improve its reporting of CRF table 3.B(a) for the livestock types whose CH_4 emissions from manure	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
		management were estimated based on a tier 2 method	
A.11	3.D.a.2 Organic N fertilizers – N_2O	In table 5.5-2 of the NIR, Croatia included values for the average nitrogen content of sewage sludge applied to soils, but did not include clear information on the source of the data. During the review, the Party clarified the source of the data as "Wastewater purification sludge management for the sludge used in agriculture", a report published annually by the Croatian Environment Agency. The report contains AD (tonnes of sludge applied) and the average composition of the sludge applied. Croatia explained that reporting on sludge use is required by all producers and users according to the regulation on wastewater purification and sludge management for the sludge used in agriculture set out in the *Official Gazette* of the Republic of Croatia 38/08	Yes. Transparency*
		The ERT recommends that Croatia improve the transparency of its reporting by including in the NIR the source of the data for sewage sludge applied to soils, and the additional information provided to the ERT during the review, namely, the source of the average nitrogen content of sewage sludge applied to soils, the type of information contained therein and a reference to the applicable regulation	
A.12	3.D.a.3 Crop residues – N_2O	In table 5.5-5 of the NIR, Croatia reported the dry matter fraction of different harvested crops that were used to estimate emissions from crop residues. According to the NIR, the values reported in table 5.5-5 were obtained from the NIRs of Slovenia, Portugal and Hungary. The ERT noted that Croatia did not include in its NIR a rationale for using these values. During the review, Croatia informed the ERT that the NIRs of Slovenia, Portugal and Hungary were selected as the source for the dry matter fraction because of the similarities of growing conditions for the selected crops for which national information on the dry matter fraction is not available in Croatia	Yes. Transparency*
		The ERT recommends that Croatia improve the transparency of its reporting by including in the NIR the rationale for using the dry matter fraction of harvested crops from the NIRs of Slovenia, Portugal and Hungary	
LULUCF			
L.11	4. General (LULUCF) – CO_2	Croatia used data from the scientific project Geological Maps of Croatia, conducted in the period 1997–2003, for calculating carbon stock changes in the soil organic matter pool in the categories cropland and grassland converted to forest land, and forest land converted to cropland and settlements. According to the sampling method applied for estimating carbon stocks in the different land-use categories, the complete organic humus layer (Ol, Of, Oh) is included in the sample. Therefore, the ERT considers that Croatia includes carbon stock changes from the litter pool in its soil organic matter estimates. During the review, Croatia	Yes. Transparency*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
		explained that separation of the litter stocks from the soil organic matter stocks is not possible at the moment but informed the ERT that a new project has been implemented that is expected to deliver the necessary data upon its completion The ERT recommends that Croatia make an effort to report separately carbon stock changes in the litter and organic soils pools in the land-use change categories, and report on the progress made in the project currently under way	
L.12	4. General (LULUCF)	Croatia conducted a key category analysis for the LULUCF sector and included the results in annex I to the NIR. However, no information was reported in the NIR on which carbon pools and subcategories are significant in each key category. The ERT notes that it is good practice to use the significance of carbon pools and subcategories to determine the level of the tier method to estimate GHG emissions and removals from sources and sinks. During the review, Croatia explained that the determination of significant carbon pools and subcategories has not been performed yet, and expressed its intention to do so and to report the results in the next GHG inventory submission The ERT recommends that Croatia determine which carbon pools and subcategories are significant in each key category based on the guidance provided in the 2006 IPCC Guidelines, and provide detailed information on the results of such determination in the NIR	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
L.13	4. General (LULUCF)	The ERT identified several inconsistencies in the information reported within the NIR and between the NIR and the CRF tables, specifically: (1) the category analysis between the LULUCF chapter of the NIR and the key category chapter of annex 1 to the NIR; (2) information in tables 6.4-1 and 6.1-2 of the NIR and the corresponding CRF tables; (3) incomplete and incorrect information in table 6.1-4 of the NIR for the land-use matrices (e.g. the area of cropland remaining cropland presented in the table is incorrect for the entire period 1990–2014 and does not match the information reported in CRF table 4.1, and for the year 2014, no value is presented for forest land converted to cropland although such land-use conversion occurs); and (4) production quantities of the three HWP between table 6.10-2 of the NIR and the FAOSTAT database. In response to a question raised by the ERT during the review, Croatia explained that all these inconsistencies result from erroneous reporting of the relevant information during the preparation of the NIR. During the review, Croatia provided the ERT with complete and correct data on the issues identified The ERT recommends that Croatia correct all the inconsistencies identified within the NIR and between the NIR and the CRF tables, and further improve its QA/QC system effectiveness by enhancing related QA/QC procedures such as internal audits, and corrective and preventive activities following the national QA/QC plan, in order to be able to identify	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
		and correct such inconsistencies during the inventory preparation process in the future	
L.14	Land representation	The ERT noted that Croatia uses a 20-year transition period for the land-use changes (NIR, p.277). The ERT identified several inconsistencies in the areas reported in the sectoral background data of CRF tables 4.A–4.F. For example, although the total country area is constant across the period 1990–2014 and is 5,659.4 kha in CRF table 4.1, this is not the case for the total country area as reported in the sectoral background CRF tables 4.A–4.F, in which it increases from 5,677 kha in 1990 to 5,715 kha in 2014. During the review, Croatia explained that such inconsistencies arose as a result of errors in the compilation of the CRF tables; namely, the total area of settlements was used for the settlements remaining settlements category in CRF table 4.E, and the organic soils area in the grassland remaining grassland category was included in the mineral soils area reported in CRF table 4.C, resulting in double counting of the organic soils area. Croatia further explained that these errors pertain only to the reporting of land area in the CRF tables and do not affect the final estimates reported for the associated net emissions	Yes. Transparency*
		The ERT recommends that Croatia correct the land-use matrices for the different land use and land-use change categories. The ERT also recommends that Croatia pay special attention to the consistency of the land area reporting across the time series, ensuring that the total country area reported is constant for the entire inventory period both in CRF table 4.1 and in CRF tables 4.A–4.F. The ERT further recommends that Croatia provide in the NIR information on the 20-year land use and land-use change area by including a set of 20-year land-use matrices from 1990 to the latest inventory year	
L.15	4.A.1 Forest land remaining forest land – CO_2, CH_4 and N_2O	Croatia uses the notation key "NO" for biomass losses in the 'out of yield' forest type (maquis and shrub forests) in forest land remaining forest land. According to the national definition, in maquis and shrub forests, apart from trees, bushes are presented in the same crown layer. In accordance with information provided by Croatia, this forest type extends to the Mediterranean and Dinaric (karst) regions, and the vegetation includes typical sub-Mediterranean and Eu-mediterranean species such as oak and pine trees (NIR, p.492). During the review, Croatia explained that the primary role of these forests is protection from wildfires and soil erosion, and that because no harvesting takes place in them, Croatia assumes that carbon losses do not occur in the living biomass pool. However, the ERT considers it very unlikely that losses do not occur in this forest type, for example as a result of wildfires, because the Mediterranean region and forested areas covered with maquis and shrub forests are considered to be very vulnerable to disturbances such as forest fires	Yes. Completeness*
		The ERT recommends that Croatia collect data in order to estimate and report carbon stock losses from the living biomass pool in 'out of yield' forest land remaining forest land	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
L.16	4.A.2 Land converted to forest land – CO_2	Croatia used the notation key "NO" to report carbon stock changes in the dead wood pool, and therefore did not report associated emissions and removals for that pool for which methodological guidance is provided in the 2006 IPCC Guidelines. During the review, Croatia explained that the Ministry of Agriculture has agreed that the inventory team should use the data from CRONFI for the DOM pool; however, the data need to be checked and confirmed for their usefulness for the GHG inventory The ERT recommends that Croatia estimate and report emissions and removals associated with carbon stock changes in the dead wood pool, provide detailed information on the analysis of the data from CRONFI to check their usefulness for the GHG inventory, and clarify whether the CRONFI data cover both the dead wood and litter pools	Yes. Completeness*
L.17	4.B.2 Land converted to cropland – CO_2	Croatia uses the notation key "NO" to report on carbon stock changes in the DOM pool. However, in accordance with the 2006 IPCC Guidelines, the tier 1 approach involves estimating carbon stock changes in the dead wood and litter pools, using equation 2.23 of the 2006 IPCC Guidelines (volume 4, chapter 2). During the review, Croatia explained that for grassland converted to cropland it uses the tier 1 assumption for the DOM pool, assuming that the pool is zero in both land-use categories, which results in zero net emissions. For forest land converted to cropland, Croatia explained that is not in a position to estimate and report carbon stock changes in the dead wood pool owing to the lack of data at the national level, and informed the ERT that the necessary data for the DOM pool from CRONFI are being checked and assessed for their usefulness, but this process has not yet been completed. In response to further questions raised by the ERT on the reason for not using data for dead wood stocks already available in the NIR (table 11.3-3) and on whether the Party has examined the option of using data from a neighbouring country with a similar ecology and climate and similar management practices, Croatia explained that, according to the analysis conducted, there is no alternative source of data for dead wood at the national level at the moment, and that data from neighbouring countries cannot be considered reliable for Croatia's national conditions The ERT recommends that Croatia estimate and report carbon stock changes in the dead wood pool in forest land converted to cropland by using national data (as a preference) or by using data from neighbouring countries with a similar ecology and climate and similar management practices. The ERT also recommends that the Party provide detailed information in the NIR on the progress made in using the DOM pool data from CRONFI in the GHG inventory	Yes. Completeness*
L.18	4 (IV) Indirect N_2O emissions from	Croatia uses the notation key "IE" to report indirect N_2O emissions from managed soils in CRF table 4(IV), and makes a comment that these emissions are included in the agriculture	Yes. Completeness*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue[a] and/or a problem[b]? If yes, classify by type
	managed soils – N_2O	sector. During the review, Croatia clarified that the notation key "IE" refers to N_2O emissions in the cropland remaining cropland category, which are reported in the agriculture sector. However, the Party reports direct N_2O emissions from nitrogen mineralization/immobilization associated with loss/gain of soil organic matter resulting from a change in land use or management of mineral soils under various subcategories in CRF table 4(III). The ERT notes that in accordance with footnote 4 to CRF table 4(IV), indirect N_2O emissions from nitrogen mineralization associated with loss of soil organic matter resulting from a change in land use or management of mineral soils in all land-use categories except for cropland remaining cropland must be estimated and reported in CRF table 4(IV) The ERT recommends that Croatia estimate indirect N_2O emissions associated with the loss of soil organic matter resulting from a change in land use or management of mineral soils and report these emissions in CRF table 4(IV), following the guidance in footnotes 2 and 4 of that table as well as in the 2006 IPCC Guidelines	
L.19	4 (V) Biomass burning – CO_2	Croatia uses the tier 1 approach for estimating biomass losses from biomass burning in forest land and the notation key "IE" for reporting CO_2 emissions associated with biomass burning, on the assumption that biomass losses due to disturbances are included in the biomass losses due to felling. During the review, Croatia explained that in accordance with national legislation, one of the yield types is the 'random yield', which is part of the total yield from forest land that results from different ND events in which the affected biomass is included. However, the ERT considers that in the case of biomass burning, part (if not all) of the biomass affected is oxidized and thus cannot be included in felling. In addition, in accordance with the 2006 IPCC Guidelines, under the tier 1 approach it is assumed that all annual biomass losses from disturbances are emitted in the year of the disturbance The ERT recommends that Croatia estimate and report CO_2 emissions from biomass burned and combusted in forest land, following the guidance provided in the 2006 IPCC Guidelines, in order to avoid the underestimation of emissions from biomass burning	Yes. Completeness*
Waste			
W.8	5.A Solid waste disposal on land	The ERT noted that Croatia did not describe in the NIR the practices adopted for the disposal of solid waste from construction and demolition (see W.1 in table 3). During the review, Croatia made a reference to the national regulation on construction waste and asbestos-containing waste, which stipulates the management objectives and handling practices of construction and asbestos-containing waste and also gives special attention to measures related to waste prevention, separation at the construction site and reuse (*Official Gazette* of the Republic of Croatia 69/16). Croatia further stated in its response that landfilling is prescribed in the regulation on the methods and conditions for the landfilling of waste and	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
		categories and operational requirements for waste landfills (*Official Gazette* of the Republic of Croatia 114/15), and in Council decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and annex II to directive 1999/31/EC The ERT recommends that Croatia include information in the NIR on national regulations governing the treatment of management and handling of solid waste disposal from construction and demolition sites	
W.9	5.A Solid waste disposal on land – CH_4	The ERT noted that the procedures associated with solid waste separation are not clearly presented in the NIR. During the review, Croatia provided the ERT with additional information on municipal solid waste. The Party informed the ERT that the municipal solid waste generated in 2014 amounted to 1,637,371 t, of which 24 per cent (396,594 t) was separately collected fractions. The largest separately collected fraction was paper and cardboard waste (30 per cent) followed by bulky waste (19 per cent). Croatia stated that in 2014, the recovery rate of municipal solid waste was 17 per cent, and that 1,802,438 t of waste was landfilled, of which 1,308,122 t was municipal waste. The largest share in the total amount of landfilled municipal waste was mixed municipal waste (about 91 per cent), followed by bulky waste (about 5 per cent). Croatia explained that landfill operators report data on each waste type landfilled (waste codes are harmonized with Commission decision 2000/532/EC, the European List of Waste) and that additional information on separate collection and landfilling (by waste code) is available in a 2014 report on municipal waste in Croatia[c] The ERT recommends that Croatia include information on the fractions of municipal solid waste collected by type along with information on national regulations guiding the reporting of data from landfill operators	Yes. Transparency*
W.10	5.A Solid waste disposal on land – CH_4	The ERT noted that Croatia is taking steps to improve the technical standards at its landfills, with the support of the Environmental Protection and Energy Efficiency Fund (EPEEF), in order to comply with the European Union landfill directive (Council directive 1999/31/EC). However, no information is provided in the NIR on the measures that have been implemented and their impacts on emissions from the solid waste disposal sector. During the review, the Party explained that in the period 2005–2014, a total of 313 landfill locations were registered and were having data collected from them. At the end of 2014, 143 of these locations were active landfills, while 170 sites had been closed. Of the closed landfills, 71 have been subjected to total waste removal (by *ex situ* remediation). By the end of 2014, a remediation process had been completed at 20 active municipal landfills, was ongoing at 43 landfills and was at the preparatory stage at 69 landfills. For the closed municipal landfills, by the end of 2014,	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue[a] and/or a problem[b]? If yes, classify by type
		remediation had been completed at 100 locations, was ongoing at 10 locations and was at the preparatory stage at 60 locations The ERT recommends that Croatia include information on technical standards and remediation at landfills	
W.11	5.A Solid waste disposal on land – CH_4	The ERT noted a fluctuating trend for solid waste disposal by type at solid waste disposal sites during the period 1990–2014. For example, there was a decrease in the fraction of solid waste disposed from 96 per cent in 2007 to 82 per cent in 2014 (NIR table 7.2-2). During the review, Croatia explained that AD for municipal solid waste were acquired from several sources and that the fluctuation observed was due to multiple factors such as the financial crisis and measures undertaken to avoid or reduce solid waste disposal The ERT recommends that Croatia include an explanation for the trend of AD on municipal solid waste disposal in the NIR	Yes. Transparency*
KP-LULUCF			
KL.5	General (KP-LULUCF)	The ERT identified inconsistencies in the information reported by Croatia within the NIR and between the NIR and the CRF tables, namely: (1) the minimum land area for defining forest under the Kyoto Protocol reported in CRF table NIR-1 is 0.01 ha, while the minimum land threshold as reported in the NIR and the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol is 0.1 ha; (2) the EFs reported in the NIR (p.378), which have been used for estimating emissions for the different gases as a result of wildfires in afforestation/reforestation and forest management activities under the Kyoto Protocol, are not consistent with the EFs listed in table 2.5 of the 2006 IPCC Guidelines; and (3) the notation key "NO" is used in CRF tables NIR-1 and 4(KP-I)A.1 for the dead wood pool in afforestation/reforestation activities under Article 3, paragraph 4, of the Kyoto Protocol, while this activity occurs but Croatia does not report the associated net emissions on the basis that it provides information in the NIR demonstrating that this pool is not a net source of anthropogenic GHG emissions. During the review, Croatia explained that all these inconsistencies result from the erroneous reporting of the relevant information during the preparation of the NIR. During the review, Croatia provided the ERT with complete and correct data on the issues identified The ERT recommends that Croatia: (1) correct the minimum land area value for defining forest under the Kyoto Protocol in CRF table NIR-1 to 0.1 ha; (2) report the correct EFs used for estimating emissions for the different gases as a result of wildfires in afforestation/reforestation and forest management activities, which can be found in table 2.5 of the 2006 IPCC Guidelines; and (3) use the notation key "NR" (not reported) in CRF table NIR-1 and the notation key "NE" in CRF table 4(KP-I)A.1 for the dead wood pool in	Yes. Transparency*

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue[a] and/or a problem[b]? If yes, classify by type*
		afforestation/reforestation activities	
KL.6	Forest management – CO_2, CH_4 and N_2O	Croatia uses the notation key "NO" for biomass losses in the 'out of yield' forest type (maquis and shrub forests) for forest management activity reporting. According to the national definition, in maquis and shrub forests, apart from trees, bushes are presented in the same crown layer. In accordance with the information provided by Croatia, this forest type extends to the Mediterranean and Dinaric (karst) regions, and the vegetation includes typical sub-Mediterranean and Eu-Mediterranean species such as oak and pine trees (NIR, p.492). During the review, Croatia explained that the primary role of these forests is protection from wildfires and soil erosion, and that because no harvesting takes place in them, Croatia assumes that carbon losses do not occur in the living biomass pool. However, the ERT considers it very unlikely that losses do not occur in this forest type, for example as a result of wildfires, because the Mediterranean region and forested areas covered with maquis and shrub forests are considered to be very vulnerable to disturbances such as forest fires The ERT recommends that Croatia collect data in order to estimate and report carbon stock losses from the living biomass pool in 'out of yield' forests under forest management activity	Yes. Completeness*
KL.7	Biomass burning – CO_2	Croatia uses the tier 1 approach for estimating biomass losses from biomass burning in land under forest management and the notation key "IE" for reporting CO_2 emissions associated with biomass burning in CRF table 4(KP-II)4, on the assumption that biomass losses due to disturbances are included in the biomass losses due to felling. During the review, Croatia explained that in accordance with national legislation, one of the yield types is the 'random yield', which is part of the total yield from forest land that results from different ND events in which the affected biomass is included. However, the ERT considers that in the case of biomass burning, part (if not all) of the biomass affected is oxidized and thus cannot be included in felling. In addition, in accordance with the 2006 IPCC Guidelines, under the tier 1 approach it is assumed that all annual biomass losses from disturbances are emitted in the year of the disturbance The ERT recommends that Croatia estimate and report CO_2 emissions from biomass burned and combusted in land under forest management, following the guidance provided in the 2006 IPCC Guidelines, in order to avoid the underestimation of emissions from biomass burning	Yes. Completeness*
KL.8	Harvested wood products – CO_2	Croatia applies the production approach for estimating and reporting the contribution of the HWP pool under the Kyoto Protocol following the provisions of decision 2/CMP.7 and the 2006 IPCC Guidelines. However, the ERT identified that: (1) Croatia reports gains and losses in CRF table 4(KP-I)C from land under deforestation (in 2014 net CO_2 removals are reported), without providing any information in the NIR on the origin of the HWP from these	Yes. Accuracy*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue[a] and/or a problem[b]? If yes, classify by type
		lands; and (2) no specific information is provided in the NIR on how emissions from HWP already accounted for during the first commitment period of the Kyoto Protocol on the basis of instantaneous oxidation have been excluded from the estimation. During the review, Croatia explained that the estimation of HWP resulting from deforestation events has been performed on the basis of instantaneous oxidation, and that emissions from HWP already accounted for during the first commitment period on the basis of instantaneous oxidation have not been excluded The ERT recommends that Croatia exclude from the reporting of the HWP those HWP originating from deforestation events on the basis of instantaneous oxidation (to 'zero' the net contribution to the national net CO_2 emissions), and exclude emissions from HWP already accounted for during the first commitment period of the Kyoto Protocol on the basis of instantaneous oxidation, in accordance with decision 2/CMP.7, annex, paragraphs 16 and 31	
KL.9	Deforestation – CO_2	Croatia includes in table 11.1-1 of the NIR the correspondence between the LULUCF categories and Kyoto Protocol activities under Article 3, paragraphs 3 and 4. In this table, deforestation includes all the forest conversions to other land uses detected in the country, namely forest land converted to cropland (perennial) and forest land converted to settlements. In the case of forest land converted to cropland, for carbon stock changes in the DOM pool Croatia uses the notation key "NO" in CRF table 4.B.2.1, whereas in CRF table 4(KP-I)A.2 the notation key "IE" is reported for the dead wood pool. However, the tier 1 approach involves estimating carbon stock changes in the dead wood and litter pools, using equation 2.23 of the 2006 IPCC Guidelines (volume 4, chapter 2). During the review, Croatia explained that in the case of forest land converted to cropland it is not in a position to estimate and report carbon stock changes in the dead wood pool owing to the lack of data at the national level, and informed the ERT that the necessary data for the DOM pool from CRONFI are being checked and assessed for their usefulness, but this process has not yet been completed. In response to further questions raised by the ERT on the reason for not using data for dead wood stocks already available in the NIR (table 11.3-3) and on whether the Party has examined the option of using data from a neighbouring country with a similar ecology and climate and similar management practices, Croatia explained that, according to the analysis conducted, there is no alternative source of data for dead wood at the national level at the moment, and that data from neighbouring countries cannot be considered reliable for Croatia's national conditions The ERT recommends that Croatia estimate carbon stock changes in the dead wood pool in all lands subject to deforestation by using national data (as a preference) or by using data from neighbouring countries with a similar ecology and climate and similar management practices, and report the results	Yes. Completeness*

Abbreviations: AD = activity data, CRF = common reporting format, CRONFI = Croatian National Forest Inventory, DOM = dead organic matter, EF = emission factor, ERT = expert review team, EU ETS = European Union Emissions Trading System, FAOSTAT = statistical database of the Food and Agriculture Organization of the United Nations, GHG = greenhouse gas, HWP = harvested wood products, IE = included elsewhere, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol Supplement = *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*, LULUCF = land use, land-use change and forestry, ND = natural disturbance, NE = not estimated, NIR = national inventory report, NO = not occurring, NR = not reported, QA/QC = quality assurance/quality control, UNFCCC Annex I inventory reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories", 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

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

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

[c] Available at <http://www.azo.hr/lgs.axd?t=16&id=5819>.

VI. Application of adjustments

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

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

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

VIII. Questions of implementation

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

Annex I

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

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

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

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions including indirect CO_2 emissions[c]*		*Land-use change (Article 3.7 bis as contained in the Doha Amendment)[d]*	*KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)[e]*	*KP-LULUCF activities (Article 3.4 of the Kyoto Protocol)*	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*			*CM, GM, RV, WDR*	*FM*
FMRL								–6 289.00
Base year	24 556.80	31 204.63	24 556.80	31 204.63	NA		NA	
1990	24 556.80	31 204.63	24 556.80	31 204.63				
1995	13 166.12	22 296.17	13 166.12	22 296.17				
2000	17 038.09	25 172.96	17 038.09	25 172.96				
2010	20 121.71	27 280.23	20 121.71	27 280.23				
2011	20 507.77	26 773.83	20 507.77	26 773.83				
2012	18 561.01	24 734.65	18 561.01	24 734.65				
2013	17 300.52	23 770.55	17 300.52	23 770.55		–136.72	NA	–7 083.65
2014	16 383.76	22 898.88	16 383.76	22 898.88		–197.73	NA	–6 967.05

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

[a] Base year refers to the base year under the Kyoto Protocol, which is 1990 for all gases except nitrogen trifluoride, for which the base year is 2000. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

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

[c] The Party has not reported indirect carbon dioxide emissions in common reporting format table 6.

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

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

Table 7
Greenhouse gas emissions by gas for Croatia, excluding land use, land-use change and forestry, 1990–2014[a]
($kt CO_2 eq$)

	CO_2[b]	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3
1990	23 390.08	3 770.72	2 793.15	NO	1 240.24	NO	10.45	NO
1995	16 992.80	2 986.64	2 248.33	57.28	NO	NO	11.12	NO
2000	19 789.12	2 785.34	2 387.67	199.21	NO	NO	11.62	NO
2010	21 183.71	3 243.51	2 300.07	543.95	0.03	NO	8.95	NO
2011	20 614.44	3 230.32	2 356.55	563.13	0.02	NO	9.37	NO
2012	18 776.38	3 167.15	2 216.92	564.96	0.03	NO	9.21	NO
2013	18 359.50	3 129.73	1 697.40	577.71	0.06	NO	6.15	NO
2014	17 607.32	3 080.41	1 621.47	582.77	0.06	NO	6.84	NO
Per cent change 1990–2014	**–24.7**	**–18.3**	**–41.9**	**NA**	**–100.0**	**NA**	**–34.5**	**NA**

Abbreviations: NA = not applicable, NO = not occurring.
[a] Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.
[b] Croatia did not report indirect carbon dioxide emissions in common reporting format table 6.

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

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	21 750.39	4 628.76	4 171.47	–6 647.83	654.01	NO
1995	16 066.24	2 468.46	3 021.94	–9 130.05	739.53	NO
2000	18 267.58	3 178.81	2 837.53	–8 134.87	889.04	NO
2010	19 813.76	3 480.34	2 593.75	–7 158.52	1 392.39	NO
2011	19 419.76	3 250.60	2 668.09	–6 266.06	1 435.38	NO
2012	17 726.79	2 976.65	2 597.52	–6 173.64	1 433.69	NO
2013	17 187.29	2 706.65	2 432.52	–6 470.03	1 444.09	NO
2014	16 241.44	2 871.32	2 300.11	–6 515.12	1 486.00	NO
Per cent change 1990–2014	**–25.3**	**–38.0**	**–44.9**	**–2.0**	**127.2**	**NA**

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

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

[b] Croatia did not report indirect carbon dioxide emissions in common reporting format table 6.

Table 9

Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year[a, b]– 2014, for Croatia

(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[c]	*Article 3.3 of the Kyoto Protocol*		*Forest management and elected Article 3.4 activities of the Kyoto Protocol*				
	Land-use change	*Afforestation and reforestation*	*Deforestation*	*Forest management*	*Cropland management*	*Grazing land management*	*Revegetation*	*Wetland drainage and rewetting*
FMRL				–6 289.00				
Technical correction				904.83				
Base year	NA				NA	NA	NA	NA
2013		–204.44	67.71	–7 083.65	NA	NA	NA	NA
2014		–235.39	37.66	–6 967.05	NA	NA	NA	NA
Per cent change base year–2014					**NA**	**NA**	**NA**	**NA**

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

[a] Base year refers to the base year under the Kyoto Protocol, which is 1990 for all gases except nitrogen trifluoride, for which the base year is 2000. Croatia has not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol. For activities under Article 3, paragraph 3, of the Kyoto Protocol, and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

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

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

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

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

Key parameters	*Values*
Periodicity of accounting	(a) Afforestation/reforestation: commitment period accounting
	(b) Deforestation: commitment period accounting
	(c) Forest management: commitment period accounting
	(d) Cropland management: not elected
	(e) Grazing land management: not elected
	(f) Revegetation: not elected
	(g) Wetland drainage and rewetting: not elected
Election of activities under Article 3, paragraph 4	None
Election of application of provisions for natural disturbances	Yes, for afforestation and reforestation and forest management
3.5% of total base-year GHG emissions, excluding LULUCF	1 092.162 kt CO_2 eq (8 737.296 kt CO_2 eq for the duration of the commitment period)
Cancellation of AAUs, ERUs, CERs and/or issuance of RMUs in the national registry for:	
1. Afforestation and reforestation in 2014	NA
2. Deforestation in 2014	NA
3. Forest management in 2014	NA
4. Cropland management in 2014	NA
5. Grazing land management in 2014	NA
6. Revegetation in 2014	NA
7. Wetland drainage and rewetting in 2014	NA

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

Annex II

Information to be included in the compilation and accounting database

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

Table 11
Information to be included in the compilation and accounting database for 2014, including the commitment period reserve, for Croatia
($t CO_2$ eq)

	Original submission	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	146 043 978			146 043 978
Annex A emissions for 2014				
CO_2	17 607 322			17 607 322
CH_4	3 080 409			3 080 409
N_2O	1 621 473			1 621 473
HFCs	582 773			582 773
PFCs	60			60
Unspecified mix of HFCs and PFCs	NO			NO
SF_6	6 842			6 842
NF_3	NO			NO
Total Annex A sources	**22 898 878**			**22 898 878**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014				
3.3 Afforestation and reforestation	–235 385			–235 385
3.3 Deforestation	37 657			37 657
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014				
3.4 Forest management for 2014	–6 967 052			–6 967 052

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, NO = not occurring.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

Table 12
Information to be included in the compilation and accounting database for 2013, for Croatia
(t CO_2 eq)

	Original submission	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2013				
CO_2	18 359 500			18 359 500
CH_4	3 129 725			3 129 725
N_2O	1 697 403			1 697 403
HFCs	577 711			577 711
PFCs	60			60
Unspecified mix of HFCs and PFCs	NO			NO
SF_6	6 153			6 153
NF_3	NO			NO
Total Annex A sources	**23 770 553**			**23 770 553**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013				
3.3 Afforestation and reforestation	–204 435			–204 435
3.3 Deforestation	67 715			67 715
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013				
3.4 Forest management for 2013	–7 083 647			–7 083 647

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, NO = not occurring.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

Annex III

Additional information to support findings in table 2

Missing categories that may affect completeness

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

(a) Hydrofluorocarbon (HFC) and perfluorocarbon (PFC) emissions from the disposal of refrigeration and air-conditioning equipment (see I.5 in table 3);

(b) Carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) emissions from carbon stock losses from living biomass in forest land remaining forest land (see L.15 in table 5);

(c) CO_2 emissions from carbon stock changes from dead organic matter in land converted to forest land (see L.16 in table 5);

(d) CO_2 emissions from carbon stock changes from dead organic matter in land converted to cropland (see L.17 in table 5);

(e) Indirect N_2O emissions associated with the loss of soil organic matter resulting from a change in land use or management of mineral soils (see L.18 in table 5);

(f) CO_2 emissions from biomass burned and combusted in forest land (see L.19 in table 5);

(g) CH_4 emissions from industrial waste, sludge and construction and demolition waste (see W.1 in table 3);

(h) CO_2 emissions from incineration of plastic waste between 1990 and 2006 (see W.6 in table 3);

(i) CO_2, CH_4 and N_2O emissions from carbon stock losses from living biomass in forest management (see KL.6 in table 5);

(j) CO_2 emissions from biomass burned and combusted in forest management (see KL.7 in table 5);

(k) CO_2 emissions from carbon stock changes from dead organic matter in deforestation (see KL.9 in table 5).

Annex IV

Documents and information used during the review

A. Reference documents

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at <http://unfccc.int/resource/webdocs/agi/2015.pdf>.

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

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

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

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

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

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

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

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

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

"Implications of the implementation of decisions 2/CMP.7 to 4/CMP.7 and 1/CMP.8 on the previous decisions on methodological issues related to the Kyoto Protocol, including those relating to Articles 5, 7 and 8 of the Kyoto Protocol, part I: implications related to accounting and reporting and other related issues". Decision 3/CMP.11. Available at <http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf#page=5>.

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

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

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

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

Standard independent assessment report, part 1, for Croatia for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_hrv_1_2.pdf>.

Standard independent assessment report, part 2, for Croatia for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_hrv_2_2.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Vlatka Palčić (Ministry of Environmental and Nature Protection), including additional material on the methodology and assumptions used.

Annex V

Acronyms and abbreviations

AAU	assigned amount unit
AD	activity data
ARR	annual review report
CER	certified emission reduction
CH_4	methane
CM	cropland management
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
CRONFI	Croatian National Forest Inventory
DOM	dead organic matter
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU ETS	European Union Emissions Trading System
FAOSTAT	statistical database of the Food and Agriculture Organization of the United Nations
FM	forest management
FMRL	forest management reference level
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
kha	kilohectare
KP-LULUCF	LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
kt	kilotonne
LULUCF	land use, land-use change and forestry
N	nitrogen
NA	not applicable
ND	natural disturbance
NE	not estimated
NEU	non-energy use
NF_3	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
N_2O	nitrous oxide
PFC	perfluorocarbon
PJ	petajoule
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
t	tonne

TJ	terajoule
UNFCCC	United Nations Framework Convention on Climate Change
WDR	wetland drainage and rewetting