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Report of the individual review of the annual submission of Greece submitted in 2012*

* In the symbol for this document, 2012 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

1. This report covers the in-country review of the 2012 annual submission of Greece, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 1 to 6 October 2012 in Athens, Greece, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Ms. Anna Romanovskaya (Russian Federation); energy – Mr. Fernando Farias (Chile); industrial processes – Mr. Menouer Boughedaoui (Algeria); agriculture – Mr. Steen Gyldenkaerne (Denmark); land use, land-use change and forestry (LULUCF) – Ms. Marina Vitullo (Italy); and waste – Ms. Maryna Bereznytska (Ukraine). Ms. Romanovskaya and Mr. Boughedaoui were the lead reviewers. The review was coordinated by Mr. Bernd Hackmann and Mr. Vitor Góis Ferreira (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1), a draft version of this report was communicated to the Government of Greece, which made no comment on it.

3. In 2010, the main greenhouse gas (GHG) in Greece was carbon dioxide (CO_2), accounting for 82.4 per cent of total GHG emissions[1] expressed in CO_2 equivalent (CO_2 eq), followed by methane (CH_4) (8.3 per cent) and nitrous oxide (N_2O) (6.2 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 3.1 per cent of the overall GHG emissions in the country. The energy sector accounted for 78.8 per cent of total GHG emissions, followed by the industrial processes sector (8.9 per cent), the agriculture sector (7.8 per cent), the waste sector (4.2 per cent) and the solvent and other product use sector (0.3 per cent). Total GHG emissions amounted to 118,275.17 Gg CO_2 eq and increased by 10.3 per cent between the base year[2] and 2010. Based on a detailed description provided by Greece in its national inventory report (NIR) and additional information obtained during the review week, the expert review team (ERT) concluded that the trends for GHG emissions and removals are reasonable for all sectors.

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

5. Tables 3–5 provide information on the most important emissions and removals and accounting parameters that will be included in the compilation and accounting database.

[1] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from Annex A sources only.

Table 1
Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year [a] to 2010

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2008*	*2009*	*2010*	*Base year–2010 (%)*
Annex A sources		CO_2	83 301.00	83 301.00	86 800.09	103 210.17	113 407.80	110 707.29	104 472.44	97 468.85	17.0
		CH_4	10 336.13	10 336.13	10 594.64	10 831.14	10 161.68	10 000.99	9 743.40	9 806.91	–5.1
		N_2O	10 243.65	10 243.65	9 001.51	8 541.97	7 915.61	7 489.64	7 034.00	7 333.74	–28.4
		HFCs	3 304.78	935.06	3 304.78	4 345.18	4 086.28	2 956.54	3 356.11	3 557.92	7.7
		PFCs	53.97	163.37	53.97	105.09	69.89	89.12	69.87	101.61	88.3
		SF_6	3.59	3.07	3.59	3.99	6.45	7.53	5.26	6.14	71.1
KP-LULUCF	Article 3.3[b]	CO_2						–340.20	–343.65	–348.53	
		CH_4						NA	NA	NA	
		N_2O						NA	NA	NA	
	Article 3.4[c]	CO_2	NA					–1 855.51	–1 855.51	–1 855.51	NA
		CH_4	NA					8.17	8.91	0.67	NA
		N_2O	NA					0.83	0.90	0.08	NA

Abbreviations: KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation, the base year and the inventory years of the commitment period must be reported.

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2010

			Gg CO_2 eq							*Change*
		Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2008*	*2009*	*2010*	*Base year–2010 (%)*
Annex A		Energy	77 538.63	77 538.63	81 044.63	97 167.30	10 6842.82	10 4915.56	10 0491.25	93 212.74	20.2
		Industrial processes	12 361.73	10 100.90	12 307.14	13 846.85	13 998.88	11 887.28	10 262.74	10 542.02	–14.7
		Solvent and other product use	308.34	308.34	299.82	306.61	309.29	314.13	315.60	316.17	2.5
		Agriculture	11 460.07	11 460.07	10 318.69	9 939.90	9 541.44	9 211.13	8 927.68	9 270.66	–19.1
		Waste	5 574.35	5 574.35	5 788.29	5 776.89	4 955.28	4 923.01	4 683.80	4 933.57	–11.5
		LULUCF	NA	–2 541.37	–3 252.89	–2 830.87	–2 891.34	–2 729.02	–2 813.72	–2 641.81	NA
		Total (with LULUCF)	**NA**	**102 440.91**	**106 505.68**	**124 206.68**	**132 756.38**	**128 522.09**	**121 867.36**	**115 633.36**	**NA**
		Total (without LULUCF)	**107 243.12**	**104 982.28**	**109 758.57**	**127 037.55**	**135 647.72**	**131 251.11**	**124 681.07**	**118 275.17**	**10.3**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation						–350.63	–350.63	–350.62	
		Deforestation						10.42	6.97	2.09	
		Total (3.3)						**–340.20**	**–343.65**	**–348.53**	
	Article 3.4[d]	Forest management						–1 846.51	–1 845.70	–1 854.76	
		Cropland management	NA					NA	NA	NA	NA
		Grazing land management	NA					NA	NA	NA	NA
		Revegetation	NA					NA	NA	NA	NA
		Total (3.4)	**NA**					**–1 846.51**	**–1 845.70**	**–1 854.76**	**NA**

Abbreviations: KP-LULUCF = land use, land-use change and forestry 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.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation, the base year and the inventory years of the commitment period must be reported.

Table 3
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2010, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	601 802 826	591 375 861		591 375 861
Annex A emissions for current inventory year				
CO_2	97 468 854			97 468 854
CH_4	9 794 609	9 806 906		9 806 906
N_2O	7 357 594	7 333 739		7 333 739
HFCs	3 557 924			3 557 924
PFCs	101 607			101 607
SF_6	6 142			6 142
Total Annex A sources	**118 286 730**	**118 275 172**		**118 275 172**
Activities under Article 3, paragraph 3, for current inventory year				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	–350 622			–350 622
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA			NA
3.3 Deforestation for current year of commitment period as reported	2 088			2 088
Activities under Article 3, paragraph 4, for current inventory year[c]				
3.4 Forest management for current year of commitment period	–1 854 763			–1 854 763
3.4 Cropland management for current year of commitment period				
3.4 Cropland management for base year				
3.4 Grazing land management for current year of commitment period				
3.4 Grazing land management for base year				
3.4 Revegetation for current year of commitment period				
3.4 Revegetation in base year				

Abbreviation: NA = not applicable.
[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.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 4
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	104 472 440			104 472 440
CH_4	9 731 050	9 743 398		9 743 398
N_2O	7 058 041	7 034 001		7 034 001
HFCs	3 356 105			3 356 105
PFCs	69 872			69 872
SF_6	5 258			5 258
Total Annex A sources	**124 692 766**	**124 681 074**		**124 681 074**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009 as reported	–350 626			–350 626
3.3 Afforestation and reforestation on harvested land for 2009 as reported	NA			NA
3.3 Deforestation for 2009 as reported	6 972			6 972
Activities under Article 3, paragraph 4, for 2009[c]				
3.4 Forest management for 2009	–1 845 699			–1 845 699
3.4 Cropland management for 2009				
3.4 Cropland management for base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for base year				
3.4 Revegetation for 2009				
3.4 Revegetation in base year				

Abbreviation: NA = not applicable.
[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.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 5
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	110 707 286			110 707 286
CH_4	9 988 418	10 000 995		10 000 995
N_2O	7 514 509	7 489 642		7 489 642
HFCs	2 956 544			2 956 544
PFCs	89 118			89 118
SF_6	7 529			7 529
Total Annex A sources	**131 263 404**	**131 251 114**		**131 251 114**
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008 as reported	–350 626			–350 626
3.3 Afforestation and reforestation on harvested land for 2008 as reported	NA			NA
3.3 Deforestation for 2008 as reported	10 425			10 425
Activities under Article 3, paragraph 4, for 2008[c]				
3.4 Forest management for 2008	–1 846 511			–1 846 511
3.4 Cropland management for 2008				
3.4 Cropland management for base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for base year				
3.4 Revegetation for 2008				
3.4 Revegetation in base year				

Abbreviation: NA = not applicable.
[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.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2012 annual inventory submission was submitted on 11 April 2012; it contains a complete set of common reporting format (CRF) tables for the period 1990–2010. The NIR was submitted on 18 April 2012. Greece also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 11 April 2012. The annual submission was submitted in accordance with decision 15/CMP.1. The ERT noted that Greece submitted its NIR slightly after the due date of 15 April but within the six-week period after which the consequences of late submission apply under decision 15/CMP.1. The ERT encourages Greece to take measures to ensure that its next annual submission is submitted by the deadline of 15 April, including both the CRF tables and the NIR.

7. Greece officially submitted revised emission estimates on 9 November 2012, in response to the list of potential problems and further questions raised by the ERT during the review week, including information on KP-LULUCF. The values in this report are those submitted by the Party on 9 November 2012.

8. The ERT also used previous years' submissions during the review. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.[3]

9. During the review, Greece provided the ERT with additional information. The documents concerned are not part of the annual submission but are in many cases referenced in the NIR. The full list of materials used during the review is provided in annex I to this report.

Completeness of inventory

10. The inventory is generally complete, including estimates for all mandatory[4] Annex A categories, and is complete in terms of years and geographical coverage. The ERT commends the Party for the improved completeness in its 2012 annual submission, achieved by enhancing the completeness of the reporting of CH_4 emissions from solid waste disposal on land through consideration of managed and unmanaged construction and demolition waste. The ERT also commends the Party for providing estimates of losses of

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), and 6(c) and (k)), under the auspices of the international transaction log (ITL) administrator using procedures agreed in the Registry System Administrators Forum. Part I is a completeness check of the submitted information relating to the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and to national registries. Part II contains a substantive assessment of the submitted information and identifies any potential problem regarding information on the accounting of Kyoto Protocol units and the national registry.

[4] Mandatory Annex A categories under the Kyoto Protocol are all source and sink categories for which the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* and the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* provide methodologies and/or emission factors to estimate GHG emissions.

carbon stock in living biomass for grassland remaining grassland in the LULUCF sector in the 2012 annual submission, which were reported as not occurring ("NO") in the previous annual submission. However, Greece has not reported estimates for some mandatory carbon pools in some subcategories of the LULUCF sector (see para. 103 below). The ERT recommends that Greece continue its efforts to improve the completeness of the reporting on the LULUCF sector in its future annual submissions.

11. The ERT noted that the Party's KP-LULUCF reporting does not cover all mandatory carbon pools (see para. 137 below) and strongly recommends that Greece provide the missing estimates in its next annual submission.

12. In addition, potential emissions of fluorinated gases (F-gases) are not reported, and the ERT encourages the Party to estimate potential emissions of F-gases and to provide these estimates in its next annual submission.

2. A description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Overview

13. The ERT concluded that the national system continued to perform its required functions.

14. The Party described the changes to the national system since the previous annual submission and these changes are discussed in chapter II.G.3 of this report.

Inventory planning

15. The NIR and additional information provided by Greece during the review week described the national system for the preparation of the inventory. The Ministry of Environment, Energy and Climate Change (MEECC) has overall responsibility for the national inventory. Its responsibilities include: the coordination of all organizations involved; overseeing the operation of the national system and its compliance with relevant decisions of the Conference of the Parties (COP) and the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP); the official approval of the inventory submission; responding to any issues raised in the inventory review process; the timely submission of the GHG inventory to the European Commission, for the preparation of the European Union's annual submission, and to the UNFCCC secretariat; the archiving of inventory information; the administration of the national registry; and the supervision of the quality assurance/quality control (QA/QC) plan.

16. The National Technical University of Athens (NTUA) School of Chemical Engineering is responsible for the technical and scientific aspects of the planning, preparation and management of the inventory and is a technical consultant of MEECC. The NTUA team works on a long-term contract basis and consists of a permanent staff of experienced experts with defined responsibilities.

17. Other governmental ministries and agencies are involved within a legal agreement released by MEECC in 2008 (Circular 918/21-4-08 "Structure and operation of the National Greenhouse Gases Inventory System – Roles and Responsibilities", hereinafter referred to as the circular), which defines each entity's responsibilities, concerning the inventory preparation and data provision. This framework includes the Hellenic Statistical Authority of Greece (EL.STAT), the Ministry of Development, Competitiveness, Infrastructure, Transport and Networks, the Ministry of Rural Development and Food, and the Public Power Companies (these are the major data providers for the energy balance of Greece). In response to questions raised by the ERT during the review, the Party informed

the ERT about a planned updating of the circular before the next annual submission in order to correct the names of organizations involved and their respective focal persons. The financing of the national system is stable and predictable and is provided by the Green Fund of Greece on an annual basis.

18. In addition to the agencies covered by the circular, a number of national and international associations, private entities and individual industrial companies provide activity data (AD) and relevant information on an annual basis. These include: Hellenic Petroleum; the National Organization for Medicines; the Association of Motor Vehicle Importers and Representatives; the Food and Agriculture Organization of the United Nations (FAO); Eurostat; the International Iron and Steel Institute; and the International Energy Agency (IEA). In addition, in response to a question raised by the ERT during the review, Greece explained that data from international organizations are used for QC checks.

19. The ERT noted that some AD in the agriculture sector were only provisionally provided at the time of the preparation of the annual submission, and that some AD had been estimated by the inventory team themselves (e.g. for livestock populations). In addition, the AD for the amount of mineral fertilizer applied to agricultural soils are obtained from a private company (the Pan-Hellenic Association of Fertilizer Producers and Dealers), which is not covered by the legal framework under the national system. Many AD are taken directly from the website of EL.STATwithout direct communication with statistical experts. The ERT recommends that Greece reinforce direct communications with respective experts from the statistical office and other ministries and agencies for its next annual submission. In addition, the ERT encourages Greece to strengthen the national system and obtain robust AD from public agencies which are covered by the formal circular instead of private organizations (e.g. from the Hellenic Statistical Authority for mineral fertilizers).

20. During the review week, in response to a question raised by the ERT concerning an issue identified in the previous review report, Greece explained its efforts undertaken to improve its reporting of the LULUCF sector and to strengthen its national system in that respect. A land-use change database has been completed and used to improve land representation (see para. 97 below). In 2012, the external LULUCF consultant was replaced by permanent NTUA staff, while the same data providers and methodologies continued to be applied. A continuously developed archiving system allows new experts to undertake inventory estimations in a consistent way. The ERT concludes that currently the Greek national system has the capacity to report a complete and accurate inventory.

21. Each year, NTUA develops a national improvement plan for consideration by MEECC experts. During meetings, the views from data providers are taken into account in relation to ways to improve completeness, transparency and accuracy and to disaggregate calculations. The improvement plan is also based on the recommendations in previous review reports regarding completeness issues, underestimations, transparency, key category analysis, uncertainties, resources available, etc. The ERT noted that Greece has a functional national system for annual inventory improvement planning.

Inventory preparation

Key categories

22. Greece has reported a tier 1 key category analysis, both level and trend assessment, as part of its 2012 annual submission. The key category analysis performed by the Party

and that performed by the secretariat[5] produced different results (e.g. production of hydrochlorofluorocarbon (HCFC)-22 in the industrial processes sector was identified as a key category in the secretariat's analysis but not by the Party), owing to differences in the disaggregation of categories used by the Party for the energy and agriculture sectors. Greece has included the LULUCF sector in its key category analysis, which was performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF).

23. In its response to questions raised by the ERT during the review, Greece explained that it uses the results of the key category analysis to prioritize the development and improvement of the inventory.

24. Greece has identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, for 2010.

25. The ERT noted that a tier 2 key category analysis was not performed by the Party. Therefore, the ERT noted that, in accordance with the IPCC good practice guidance, Greece may wish to use its uncertainty analysis to implement a tier 2 key category analysis for its future annual submissions.

Uncertainties

26. Greece has reported a tier 1 uncertainty analysis in accordance with the IPCC good practice guidance, both for level and trend assessment, with and without the LULUCF sector. The uncertainty analysis for the LULUCF sector was performed in accordance with the IPCC good practice guidance for LULUCF. The results of the overall uncertainty analysis (excluding LULUCF) for 2010 are 8.8 and 9.6 per cent for level and trend assessment, respectively. Including the LULUCF sector the respective values are 9.1 and 9.9 per cent. Compared with the uncertainty estimates reported in the 2011 annual submission, the levels of uncertainty have slightly increased (e.g. 8.8 per cent in 2012 versus 8.7 per cent in 2011 for the trend assessment, excluding LULUCF). During the review, in response to questions raised by the ERT, the Party clarified that the increase in uncertainty resulted from an increase in the uncertainty of N_2O emissions due to the larger contribution to emissions of the category direct N_2O emissions from agricultural soils in the agriculture sector (uncertainty 400.5 per cent).

27. The ERT acknowledges the implementation by the Party of the recommendation in previous review reports to use more country-specific information for uncertainty values. In its 2012 annual submission, Greece has applied updated uncertainty values in the energy sector (e.g. for AD and the emission factors (EFs) for CO_2 emissions from gaseous, liquid, solid and other fuels); in the industrial processes sector (e.g. for AD for aluminium production and for F-gases); and in the waste sector (e.g. the CO_2 and CH_4 EFs for industrial waste and the CH_4 EF for construction and demolition waste). Plant-specific information has been used in many industrial processes categories. The ERT recommends

[5] The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

that Greece continue with its implementation of these improvements for its next and future annual submissions.

28. During the review, in response to questions raised by the ERT, Greece clarified how the results of the uncertainty analysis are used for prioritizing resources for the further improvement of the inventory. The ERT acknowledges the proper use of the results of both the key category analysis and the uncertainty analysis in the planning of inventory improvements.

Recalculations and time-series consistency

29. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party for the time series 1990 to 2009 have been undertaken in all sectors except the solvent and other product use sector, taking into account: updated AD (e.g. in the energy sector, public electricity and heat production, fugitive emissions from fuels, and transmission and distribution of oil and natural gas; soda ash use and commercial and transport refrigeration in the industrial processes sector; animal populations and animal waste management systems (AWMS) in the agriculture sector; areas and biomass stocks in the LULUCF sector; and managed waste disposal, industrial wastewater and human sewage in the waste sector); the improvement of EFs (e.g. road transportation, international bunkers and marine bunkers in the energy sector; and commercial refrigeration and mobile air conditioning in the industrial processes sector); new estimations (e.g. carbon stock changes in living biomass for grassland remaining grassland in the LULUCF sector and CH_4 emissions from solid waste disposal on land through consideration of managed and unmanaged construction and demolition waste in the waste sector); the use of plant-specific data (e.g. consumption of halocarbons and SF_6 in the industrial processes sector); the reallocation of categories (e.g. petroleum refining and gaseous fuels from the energy sector to the industrial processes sector); and the correction of noted errors (e.g. aluminium production in the industrial processes sector). The total magnitude of the impact of the recalculations was an increase in the estimated total GHG emissions (excluding LULUCF) of 0.4 and 1.8 per cent for the base year and 2009, respectively. The ERT concludes that the recalculations have been performed in accordance with the IPCC good practice guidance.

30. The rationale for these recalculations is provided in the NIR (chapter 9). The ERT noted that CRF table 8(b) was not completely filled in (in relation to the LULUCF sector, see para. 96 below) and recommends that Greece improve its reporting in CRF table 8(b) in its next annual submission. For some recalculations performed in the LULUCF sector the ERT noted a lack of transparency in the NIR (e.g. for cropland remaining cropland) and recommends that Greece improve its explanations of these recalculations in its next annual submission (see para. 100 below).

Verification and quality assurance/quality control approaches

31. Greece has provided information on QA/QC procedures in line with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the UNFCCC reporting guidelines). The QA/QC plan was presented and described in detail in the NIR and discussed during the review week. The QA/QC plan has been in place since 2004 and is in accordance with standard 9001:2000 of the International Organization for Standardization and in accordance with decision 19/CMP.1.

32. In response to questions raised by the ERT during the review, the Party indicated that, in the middle of 2012, the expert responsible for QA/QC from the National Centre for the Environment and Sustainable Development, which is supervised by MEECC, was

replaced by an expert from NTUA. The ERT considered that this change is a way to strengthen the QA/QC system within one responsible organization.

33. During the review, Greece demonstrated a functioning QC system by performing: a comparison of AD between alternative data sources; a comparison of trends in AD and emissions; an evaluation of EFs (using plant-specific data); an assessment of the consistency of the methodologies applied; and the reproduction of emission estimates using different working files. During the review, Greece also presented to the ERT examples of completed QC checklists.

34. The ERT concluded that the QC checks are well developed, sector-specific and implemented annually. However, the ERT noted that the consistency of the information presented in the NIR and the CRF tables (see para. 38 below) requires additional QC procedures and therefore recommends that Greece implement additional QC procedures during the preparation of its next annual submission to ensure the consistency of the information presented in the NIR and the CRF tables. The ERT welcomes the fact that the Party followed the recommendation in previous review reports to describe in detail, in its NIR, the sector-specific QA/QC procedures and procedures applied for European Union (EU) emissions trading scheme (EU ETS) data.

35. In response to a question raised by the ERT during the review, Greece provided additional explanations of the QA procedures implemented. These include: an independent audit of the whole report carried out in 2009 by an independent expert of NTUA (see the Party's 2010 NIR, table 1.8); annual completeness and consistency checks, sector-specific findings and explanations for recalculations, in accordance with the QA/QC plan of the EU; and a technical centralized review of the Greek GHG inventory in 2012 for the years 2005 and 2008–2010 undertaken by the European Commission's Directorate-General for Climate Action to support the determination of annual emission allocations under EU decision 406/2009/EC. This review covered methodologies, AD and EFs in all sectors. The results were presented to the ERT during the review and no problems were identified.

36. The ERT considered the results of the technical centralized review to be adequate QA procedures for the 2012 annual submission. However, the ERT noted that Greece has no clear plans to conduct an independent review of single sectors or categories by respective local experts in addition to the QA/QC procedures implemented within the EU reporting framework. The ERT encourages Greece to perform such periodic reviews, in order to gather country-specific information and national expert knowledge to improve the accuracy of its inventory, and report the results in future annual submissions.

Transparency

37. The ERT noted that the transparency of the Greek NIR has been improved as a result of the Party addressing most of the recommendations in the previous review report (e.g. information on the national system for LULUCF reporting, use and verification of EU ETS data, and sector-specific QA/QC procedures.). However, the ERT identified a lack of transparency in the energy sector (e.g. country-specific carbon content values for liquid fuels in road transportation) (see para. 62 below); in the industrial processes sector (e.g. AD on export/import data for F-gases) (see para. 72 below); in the agriculture sector (e.g. better justifications for EFs and parameters used, such as share of AWMS) (see paras. 86 and 88 below); in the LULUCF sector (e.g. development of a land matrix, and information on parameters and assumptions applied and recalculations made) (see paras. 95, 98, 99 and 101 below); and in the waste sector (e.g. management practices used and flow charts of different types of waste) (see para. 116 below). In response to questions raised by the ERT during the review, Greece provided detailed explanations in relation to the issues identified by the ERT. The ERT recommends that Greece continue improving the transparency of the sectoral chapters of the NIR in its next annual submission. Furthermore, the ERT

recommends that Greece provide more explanations for the recalculations made in the sectoral chapters, in addition to in chapter 9, of the NIR, and describe in more detail the procedure and criteria for the development of its improvement plan in the NIR of its next annual submission.

38. Despite these improvements, the ERT identified a few inconsistencies between the information in the NIR and the CRF tables (e.g. between NIR summary table 3 and CRF tables 7 and table 8(b)). The ERT reiterates the recommendation in the previous review report that the Party improve the transparency of its reporting by improving the consistency of the information presented in the NIR and the CRF tables in its next annual submission (see para. 116 below).

Inventory management

39. Greece has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements.

40. The archiving system contains three master folders for each annual submission: an input data file (all initial information received from data providers: disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory); a centralized inventory file (calculation sheets and related documentation); and a master file (includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements). Each folder contains a file with a catalogue of the information contained in it. In response to questions raised by the ERT during the review, the Party provided the requested additional archived information. The ERT acknowledges the organization and functionality of the archiving system in Greece.

3. Follow-up to previous reviews

41. In its 2012 annual submission, Greece has addressed most of the recommendations in the previous review report related to improving completeness and transparency in the sectoral chapters of the NIR; efforts to strengthen the national system for QA/QC implementation and for LULUCF reporting; usage of more country-specific information on uncertainty values; and provision of planned improvements and more detailed explanations for recalculations in the NIR and CRF tables (see paras. 10, 20, 26, 29 and 31 above). The ERT acknowledges the improvements made. However, other recommendations in the previous review report are pending, which mostly concern the continuation of efforts to improve completeness (e.g. the LULUCF sector) and transparency (e.g. the use of EU ETS data in the energy sector, and reporting on the LULUCF sector and KP-LULUCF activities). The recommendations reiterated by the ERT relate to the improvement of QC procedures to ensure the consistency of the information presented in the NIR and the CRF tables (see para. 38 above).

42. The ERT supports the intention of Greece to further improve its inventory in accordance with its national improvement plan, as presented to the ERT during the review and described in the NIR.

4. Areas for further improvement identified by the expert review team

43. During the review, the ERT identified several issues for improvement. These are listed in table 6 below.

44. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report and in table 6 below.

B. Energy

1. Sector overview

45. The energy sector is the main sector in the GHG inventory of Greece. In 2010, emissions from the energy sector amounted to 93,212.74 Gg CO_2 eq, or 78.8 per cent of total GHG emissions. Since 1990, emissions have increased by 20.2 per cent. The key drivers for the rise in emissions are the categories fuel combustion in transport, growing 2.3 per cent on average per year since 1990, and energy industries, growing 1.1 per cent on average per year since 1990. However, the economic recession starting in 2009 and the progressive introduction of natural gas in the energy mix of the country have held back the rise in these drivers in recent years. Emissions from manufacturing industries and construction had a mean annual decrease of 1.4 per cent, while fugitive emissions from fuels increased by 1.5 per cent on average per year for the period 1990–2010.

46. Within the sector, 56.0 per cent of the emissions were from energy industries, followed by 24.7 per cent from transport, 10.6 per cent from other sectors and 7.3 per cent from manufacturing industries and construction. The remaining 1.5 per cent were fugitive emissions from fuels.

47. The Party has made recalculations for the energy sector between the 2011 and 2012 annual submissions following changes in AD (due to the availability of country-specific and plant-specific data obtained from reporting to the EU ETS) and EFs, the reallocation of emissions to more appropriate categories and in order to rectify minor identified errors. The impact of these recalculations on the energy sector is a reduction in the estimated emissions of 0.1 per cent for 2009. The main recalculations took place in the following categories:

(a) Stationary combustion – the AD for solid fuels (particularly lignite) were updated for the year 2008, based on plant-specific data derived from verified EU ETS reports;

(b) Road transportation – a recalculation of the whole time series was carried out with new updated EFs for CH_4 and N_2O from gasoline and diesel, using a new version of the software, COPERT IV.

48. The reporting on the energy sector is complete. The CRF tables include emission estimates for all categories, gases, fuels and years for the energy sector, as available in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as Revised 1996 IPCC Guidelines) or the IPCC good practice guidance.

49. With regard to confidential data in the energy sector, Greece provided full access to the EU ETS data used during the review. All information requested and explanations have been provided to the ERT in a transparent manner.

50. Military fuel use is confidential and is reported as aggregated under the relevant categories in the energy sector (e.g. liquid fuels are reported under transportation). For this reason, the notation key for included elsewhere ("IE") is used for liquid fuels in the category other sectors – mobile sources.

51. Greece has reduced the 2012 uncertainty estimates for several categories in the energy sector from 5 per cent to 3 per cent (CO_2 emissions from stationary combustion solid fuels, stationary combustion liquid fuels, stationary combustion gaseous fuels, and stationary combustion other fuels; CH_4 emissions from stationary combustion all fuels; and N_2O emissions from stationary combustion all fuels) and 2 per cent (CH_4 emissions from coal mining) due to the use of data from the EU ETS and country-specific data. The ERT noted that the use of country-specific data has increased and this has contributed to the improved accuracy of the Greek national GHG inventory.

52. During the review, the ERT identified potential double counting and missing information between sectors. The following issues were identified, but ultimately the ERT determined that there was no double counting or omissions:

(a) With regard to the energy and waste sectors, energy consumption associated with landfill gas and sewage sludge gas are considered in the national energy balance and the resulting CH_4 emissions are reported under the energy sector in the categories for biomass for electricity purposes and other sectors, thereby avoiding double counting;

(b) Regarding energy and industrial processes, two cases were identified – emissions from hydrogen production are reported under the industrial processes sector, whereas emissions from ammonia production are reported under both the energy and industrial processes sectors, depending on the fuel consumed. Emissions associated with natural gas used in these processes are reported under the industrial processes sector, but in the case of ammonia plants that operated in the 1990s using liquid fuels, emissions are still reported under the energy sector. Although there is no double counting of emissions, the ERT encourages Greece to report combustion-related emissions under the energy sector and process-related emissions under the industrial processes sector, and clearly describe in the NIR the allocation of emissions.

53. The ERT commends Greece for having followed the recommendations in the previous review reports, in particular for having included relevant data from the EU ETS to improve AD and country-specific and plant-specific EFs in the GHG inventory. The ERT considers that the explanation given of the rationale behind this inclusion of EU ETS data has improved the transparency of the NIR (a complete and detailed annex II is provided). The ERT therefore encourages Greece to provide more explanations of the calculations performed to derive the country-specific and plant-specific EFs used and QA/QC procedures in annex II to its NIR in the next annual submission.

2. Reference and sectoral approaches

Comparison of the reference approach with the sectoral approach and international statistics

54. Greece has calculated CO_2 emissions from fossil fuel combustion using the reference approach and the sectoral approach for all years in the time series. For 2010, CO_2 emissions estimated using the sectoral approach were 0.86 per cent higher than those estimated using the reference approach. Differences between the reference approach and the sectoral approach are within +/–2 per cent for all years of the 1990–2010 series presented, except for 1995 (reference approach higher by 2.1 per cent) and 2007 (sectoral approach higher by 3.5 per cent).

55. Numerical differences between the reference approach and the sectoral approach data can be explained by the differences in apparent energy consumption calculated through the reference approach and excluding the fuel amounts that were not included in the total energy consumption but were included in other industries: bitumen, which was consumed in the construction industry; petroleum coke (petcoke), which was consumed in the non-ferrous industries and was accounted for in the industrial processes sector; coal and lignite,

which were consumed in the non-ferrous industries and were accounted for in the industrial processes sector; and a small fraction of natural gas, which was used as feedstock for the production of ammonia and hydrogen and was accounted for in the industrial processes sector.

56. The main source of IEA data for stationary combustion categories is the national energy balance, and the ERT would therefore presume that the IEA data would be identical to the data from the national energy balance for these categories. However, there are differences between these two sets of data. Greece's apparent consumption of all fuels in 2010 according to IEA is 1,044,625 TJ, whereas the CRF tables report all fuel consumption equivalent to 1,071,356 TJ. The difference between these two data sets is 26,732 TJ (2.5 per cent), with the CRF table data being higher than the IEA data. Differences were found for: lignite consumed for electricity production; all fuels used in refineries; petcoke and solid fuels consumed in mineral industries; and natural gas consumed in iron and steel production. Since electricity production facilities, refineries, some mineral industries and iron and steel facilities report to the EU ETS, these data could be used to improve the information provided through the national energy balance. In this regard, the ERT recommends that Greece clearly report in the NIR of its next annual submission how the EU ETS data might be used to supplement the data from the national energy balance for these categories and how QA/QC procedures would be applied.

International bunker fuels

57. GHG emissions from international aviation and marine bunkers are calculated using the same methodologies as described for national aviation and navigation. This means that the issues pointed out under the categories CO_2 emissions from civil aviation and navigation (see paras. 61 and 65 below) are also valid for international bunker fuels. The allocation of fuel consumption between domestic and international transportation is based on the data from the national energy balance. The allocation of emissions from the landing/take-off (LTO) cycle between domestic and international aviation is based on data provided by the International Civil Aviation Organization.

Feedstocks and non-energy use of fuels

58. In the NIR of its 2012 annual submission, Greece has accounted for fuels used as feedstocks for hydrogen production in the industrial processes sector. However, despite recommendations in previous review reports, the Party has not reallocated emissions from liquid fuels used for feedstock purposes in ammonia production to the industrial processes sector. The ERT therefore reiterates the recommendation in the previous review report that the Party, in its next annual submission, reallocate emissions from liquid fuels used in ammonia production from the energy sector to the corresponding category in the industrial processes sector, in order to ensure that the reporting is in line with the IPCC good practice guidance.

3. Key categories

Stationary combustion: liquid fuels – CO_2

59. The inter-annual change in the CO_2 implied emission factor (IEF) fluctuates, with a decreasing trend for liquid fuels in the subcategory petroleum refining and in all subcategories under manufacturing industries and construction. During the review, the ERT requested the data used and the calculations performed to estimate the trend in CO_2 emissions for these subcategories for the 1990–2010 period, in order to better understand the overall decreasing trends. In response to the question raised by the ERT during the review, Greece explained that, because each liquid fuel type (e.g. diesel, liquefied

petroleum gas, refinery gas, residual fuel oil and petcoke) has a different EF, the inter-annual variation of the percentage of all fuels that compose the liquid fuel mix causes the variance of the CO_2 IEF. In the case of petroleum refineries (CRF table 1.A(a)), the average CO_2 IEF for liquid fuels for the time series 1990–2010 is 68.18 t/TJ, a lower value than the IPCC default value of 73.33 t/TJ.

60. During the review, the ERT was able to review the working files confirming the CO_2 IEFs contained in the CRF tables for these categories, and was able to check the figures explaining the trend and agrees with the Party's reported data. The ERT recommends that Greece enhance the transparency of its reporting of trends by including in the NIR of its next annual submission an analysis with the numerical details showing the effect of the use of different liquid fuel mixtures in different years on the CO_2 IEF time series.

Civil aviation – CO_2

61. In the 2012 annual submission, the Party has used a tier 2 approach for this category, in conjunction with a correction of fuel consumption to account for the discrepancies between the increasing trend in the number of LTOs and the decreasing trend in aviation fuel consumption recorded in the national energy balance. Consequently, the fuel consumption and LTO data trends for the period 2007–2010 have been corrected; however, the ERT noted that the discrepancy between the increasing number of LTOs and the decrease in fuel consumption is still an issue that needs to be further studied by Greece. In this respect, the ERT recommends that Greece make full and thorough use of the data sets available (from the Ministry of Transport and the Civil Aviation Organization) following the enforcement of the European legislation on civil aviation emissions and report how the EU ETS data might be used to supplement the data from the national energy balance for these categories and how the QA/QC procedures would be applied.

Road transportation: liquid and gaseous fuels – CO_2, CH_4 and N_2O[6]

62. Greece has made efforts to improve the accuracy of the values associated with the physical and chemical properties of liquid fuels used for road transportation within the national inventory to better reflect its national circumstances. The country-specific carbon content values are based on measurements of the carbon content of a considerable number of liquid fuel samples (taken at several endpoint fuel stations scattered around Greece) performed by the Laboratory of Fuels and Lubricants of NTUA, as a part of a contract with fuel endpoint companies. The ERT commends the Party for this improvement to the accuracy of its inventory. In order to improve both the transparency of the reporting and to improve the QA/QC, the ERT recommends that Greece document the methodologies used to collect data and to derive the country-specific carbon content values, and ensure that all information is archived as part of the national system of Greece, and report thereon in its next annual submission.

63. Greece expanded the use of COPERT IV, version 8.1, to improve emission estimates of CH_4 and N_2O for the whole time series 1990–2010. The ERT welcomes this improvement made by Greece.

64. The ERT noted that Greece continues to apply the method used by the ERT in the initial review for calculating the consumption of lubricants for road transportation, which is based on the average lubricant consumption/fuel consumption ratio for a cluster of countries for the whole time series rather than on the data from the national energy statistics. The present ERT reiterates the recommendation in previous review reports that

[6] Not all emissions related to all gases under this category are key categories, particularly CH_4 and N_2O emissions. However, since the calculation procedures for issues related to this category are discussed as whole, the individual gases are not assessed in separate sections.

Greece verifies the data on lubricants used for road transportation and report thereon in its next annual submission.

Navigation: liquid fuels – CO_2

65. This is a key category and the second most important subcategory in the category for mobile sources (after road transportation), accounting for 1.9 per cent of the emissions reported in the Party's GHG inventory (excluding LULUCF). Greece uses a tier 1 method to estimate emissions for this category, considering fuels reported in the national energy balance: residual fuel oil and diesel oil.

66. The ERT noted that the use of fuel consumed to estimate CO_2 emissions is not in accordance with the IPCC good practice guidance, since table 2.8 of the IPCC good practice guidance ("Criteria for defining international or domestic marine transport") has not been used by Greece. However, Greece followed the recommendation of the IPCC good practice guidance that Parties consider the fuel type, its carbon content and the fraction of the fuel left unoxidized. According to figure 2.6 of the IPCC good practice guidance: "Decision tree for emissions from water-borne navigation" specific data (e.g. fuel consumption by fuel type, national carbon content data and type of engines) contribute to a better estimate of emissions from this category. Furthermore, the IPCC good practice guidance also states that, in this case, "national approaches may also be good practice if they are well documented and have been peer reviewed". Other countries with similar circumstances to those of Greece use a more thorough approach to account for these water-borne navigation emissions, including gathering information on the number of arrivals and departures, destination and fleet composition from local port authorities (Italy and Malta), customs (Malta) and statistics offices (Italy). The ERT therefore recommends that Greece start a process aimed at providing, in future annual submissions, a more accurate estimate of CO_2 emissions associated with this category by gathering information on the number of arrivals and departures, destination and fleet composition and, if necessary, take into consideration the experiences of other Parties in gathering these data.

C. Industrial processes and solvent and other product use

1. Sector overview

67. In 2010, emissions from the industrial processes sector amounted to 10,542.02 Gg CO_2 eq, or 8.9 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 316.17 Gg CO_2 eq, or 0.3 per cent of total GHG emissions. Since the base year, emissions have decreased by 14.7 per cent in the industrial processes sector and increased by 2.5 per cent in the solvent and other product use sector. A key driver for the decrease in emissions in the industrial processes sector is the decrease in N_2O emissions from chemical industry. Within the industrial processes sector, 46.7 per cent of the emissions were from mineral products, followed by 34.5 per cent from consumption of halocarbons and SF_6, 10.4 per cent from chemical industry and 8.5 per cent from metal production.

68. Greece has made recalculations for the industrial processes sector between the 2011 and 2012 annual submissions following changes in AD and EFs and in order to rectify identified errors. The impact of these recalculations on the industrial processes sector is an increase in the estimated emissions of 4.3 per cent for 2009. The main recalculations took place in the following categories:

(a) Chemical industry (an increase of 265.65 Gg CO_2 eq or 141.6 per cent);

(b) Metal production (a decrease of 2.27 Gg CO_2 eq or 0.3 per cent).

69. Greece also reallocated emissions from hydrogen production from the energy sector to the industrial processes sector under other (chemical industry).

70. Following the recommendation in the previous review report, Greece improved its inventory by estimating for the first time emissions from soda ash use for the entire time series 1990–2010 using the default methodology from the Revised 1996 IPCC Guidelines. A recalculation has been made and the impact on the estimate of total emissions is an increase of 0.01 per cent for 2009. The ERT commends the Party for this improvement.

71. The Party did not report on any existing or planned abatement technologies for aluminium or nitric acid production to reduce emissions from these two categories. In response to a question raised by the ERT during the review, Greece responded that there have been no abatement technologies implemented for economic reasons in the two industries up to now. In order to improve transparency, the ERT recommends that Greece report in the NIR of its next annual submission on the existence of abatement technologies to reduce emissions from these plants.

72. Greece did not report potential emissions of F-gases due to lack of data. During the review week, in response to questions raised by the ERT, Greece explained to the ERT the ongoing improvement plan for collecting data from different operators throughout the country. But, Greece emphasized that, due to its national circumstances, this process has slowed down. Greece expects to complete data collection and data processing by the end of 2013. The ERT therefore encourages the Party to continue collecting data and to report potential emissions in its 2014 annual submission, as planned.

2. Non-key categories

Other (chemical industry) – CH_4

73. The Party uses the notation key for confidential ("C") for AD and CH_4 emissions are reported as "NO" in CRF tables 2(I).A-G and 2(I). Greece reported CH_4 emissions from the subcategory organic chemicals production in the NIR (page 421, table IV.2) for 2010 but no emissions were reported in the CRF tables for 2001 onward. The ERT strongly recommends that the Party correct this inconsistency in its next annual submission, clarify whether or not such emissions are occurring and, if so, provide estimates in the CRF tables.

Aluminium production – PFCs

74. Data on aluminium production are confidential but there are publicly available data published in the database of the United States Geological Survey,[7] the United Nations Commodity Statistics and the Greek Mining Enterprises Association. Following the recommendation in the previous review report, Greece reported in CRF table 2(I).A-G AD on aluminium production from the United States Geological Survey to cover the entire time series. In response to questions raised by the ERT during the review related to the confidential data submitted by the aluminium production plant, Greece provided the entire time series of the aluminium production AD used to estimate emissions. The ERT checked the confidential data and made a comparison with the publicly available data. The ERT considers the trend of AD from the one plant is generally similar to those publicly available from the United States Geological Survey and appropriate for any comparison among other Parties. Considering the confidentiality, the ERT appreciates the transparency of the Party's approach and recommends that Greece report in its next annual submission the trend in emissions in terms of percentage of aluminium production.

[7] <http://minerals.usgs.gov/minerals/pubs/commodity/aluminum/>.

D. Agriculture

1. Sector overview

75. In 2012, emissions from the agriculture sector amounted to 9,270.66 Gg CO_2 eq, or 7.8 per cent of total GHG emissions. Since 1990, emissions have decreased by 19.1 per cent. The key driver for the fall in emissions is a decrease in the consumption of nitrogen in mineral fertilizer. Within the sector, 57.0 per cent of the emissions were from agricultural soils, followed by 34.8 per cent from enteric fermentation and 6.5 per cent from manure management. Rice cultivation accounted for 1.3 per cent and field burning of agricultural residues accounted for 0.5 per cent.

76. The Party has made recalculations for the agriculture sector between the 2011 and 2012 annual submissions following changes in AD. The impact of these recalculations on the agriculture sector is a decrease in the estimated emissions of 0.01 per cent for 2009. The main recalculations took place in the following categories:

(a) Enteric fermentation (a decrease of 4.82 Gg CO_2 eq or 0.15 per cent);

(b) Manure management (a decrease of 29.38 Gg CO_2 eq or 4.67 per cent);

(c) Agricultural soils (an increase of 22.38 Gg CO_2 eq or 0.46 per cent).

77. Greece uses a three-year average in its inventory for animal population. The use of the three-year average is in accordance with the Revised 1996 IPCC Guidelines. The ERT noted that this causes a continuous recalculation every year for the last three years of the inventory, for almost all categories. However, an analysis of the overall impact on the Party's inventory performed by the ERT has shown that the continuous recalculations have very little effect on the emission estimates, normally less than 1 per cent for the last years. The ERT recommends that Greece use the latest published AD and only make a recalculation in the case of any changes to the AD. If AD for the most recent year are not available at the time of the preparation of the annual inventory, the ERT recommends that Greece apply extrapolation or another approach, as recommended by the IPCC good practice guidance, to estimate the AD.

78. The inventory for the agriculture sector is complete and includes estimates of all gases and for all categories for the whole time series. The transparency of the NIR is generally sufficient, although the ERT recommends that the Party provide additional information on the AD used for the tier 2 estimates of emissions from enteric fermentation (see paras. 81 and 82 below) for other cattle and sheep, in order to enhance transparency (e.g. the milk yield for sheep is given as 0.23 l/day, whereas it should be given in l/year/ewe; further, sheep should not be mentioned under cattle in the NIR).

79. Uncertainty estimates have been provided for all categories and extensive QA/QC procedures have been implemented in the development and review of the emission estimates.

80. The numbers of animals for 2010 is based on a projection made by the inventory team, because the EL.STAT has not been able to provide final or provisional data, especially within the last two years, due to problems regarding the operation within EL.STAT. EL.STAT has informed the Party's inventory team that these delays have been overcome and that data will be available for the next annual submission. The ERT commends the Party for its efforts to improve the data acquisition. The ERT recommends that Greece make further efforts to increase the scientific level of its agricultural inventory and use more country-specific data, parameters and EFs (see paras. 90 and 93 below) in its next annual submission.

2. Key categories

Enteric fermentation – CH_4

81. Greece uses the tier 2 methodology from the Revised 1996 IPCC Guidelines and the IPCC good practice guidance for cattle, with default parameters for the Mediterranean area. The NIR indicates that some expert judgement has been made. In response to questions raised by the ERT during the review to provide country-specific input data for the parameterization, Greece explained that no country-specific data are available and so the default values for methane conversion factor (Ym) and digestibility of feed are used. The default value for digestibility for dairy cattle is 60 per cent for Mediterranean conditions. It is the assessment of the ERT that this value is too low when compared with the Greek milk production level, and that CH_4 emissions from enteric fermentation may be underestimated. The ERT strongly recommends that Greece investigate the national feeding conditions (Ym and digestibility), especially for dairy cows, sheep and goats, and recalculate emissions for the entire time series, if appropriate, for the next annual submission.

82. The reported CH_4 emissions for enteric fermentation from sheep are based on the tier 2 methodology from the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, using default values for Ym and feed digestibility combined with country-specific animal weights and milk production data. The ERT commends the Party for using this approach and recommends that Greece use official statistics for milk production data (i.e. milk delivered to the dairies, including milk for lambs and local consumption) instead of expert judgement. Furthermore, the ERT recommends that, for clarification, Greece provide, in the NIR of the next annual submission, milk production data per ewe for the different types of milking sheep, instead of an average per sheep.

83. The NIR states that Greece is planning to advance to a tier 2 methodology for goats. The ERT commends the Party for this effort, as Greece has a substantial number of goats.

Agricultural soils – N_2O

84. In its 2012 annual submission, Greece provides in the NIR AD on the consumption of mineral fertilizers for the first time. The data were provided by the Pan-Hellenic Association of Professional Fertilizers Producers & Dealers (PHAPFDP). The consumption decreased by 50 per cent from 1990 to 2010. The ERT noted that these data deviate from what is reported by Eurostat and FAO, although the level and trend is approximately the same. During the review, the ERT asked to review the documentation for all of the suppliers that are included in the data set, as well as locally imported mineral fertilizers. The ERT noted that import/export statistics on pure nitrogen exist only on the total amount of fertilizer. The import/export statistics showed a similar decreasing trend, although very variable. The decreasing trend seems therefore justified. The ERT further noted that there are no arrangements in the national system on data delivery with PHAPFDP and no description of the data set is available. The ERT therefore recommends that Greece strengthen its national system and arrangements with data providers, primarily with official bodies such as EL.STAT and secondarily with PHAPFDP, on data delivery, including documentation on how the data set has been elaborated. The ERT noted that the data should be supported by documentation on how the data have been collected, estimates for sales and purchases from non-members of PHAPFDP, and local unregistered imports.

85. For estimating the indirect N_2O emissions from nitrogen deposition, Greece uses the default tier 1 methodology from the Revised 1996 IPCC Guidelines. However, the ERT noted that, for reporting obligations for nitrous compounds under the Convention on Long-range Transboundary Air Pollution (LRTAP), the Party uses a default tier 1 methodology from the European Monitoring and Evaluation Programme's (EMEP) EMEP/EEA air

pollutant emission inventory guidebook — 2009.[8] The emission estimates for LRTAP and the UNFCCC are made by the same inventory team but with two different methodologies, thus resulting in different estimates. To improve the accuracy and transparency of its reporting, the ERT therefore encourages Greece to select the most appropriate methodology for the national conditions and advance to higher-tier methodologies.

3. Non-key categories

Manure management – CH_4 and N_2O

86. For nitrogen excretion (Nex) from dairy cows, Greece uses the default value for Western European conditions from the Revised 1996 IPPC Guidelines, which is 100 kg nitrogen/cow/year. This value has been used for all years since 1990 despite an increased trend in milk production per dairy cow. The increased feed intake is reflected in the CH_4 emission estimate for enteric fermentation (see para. 81 above) but not in the estimate for Nex. The default Nex in the Revised 1996 IPCC Guidelines is based on an estimated annual milk production of 4,200 l/cow/year. The average Greek milk production in 2010 was 5,565 l/year. In response to questions raised by the ERT during the review, regarding national data for Nex Greece explained that "there are no published data concerning the nitrogen content in animal feed, i.e. dairy cows, other cattle, sheep and goats and the feed consumption". The ERT concluded that the use of the IPCC default value may not reflect the situation in Greece and therefore the ERT encourages Greece to estimate country-specific Nex rates, especially for dairy cattle, and report these in its next annual submission.

87. Greece uses the default value for Nex for sheep from the Revised 1996 IPCC Guidelines for Mediterranean conditions, with an average of 12 kg/adult sheep/year. For lambs, Greece implemented a reduction factor in accordance with the IPCC good practice guidance. The ERT noted that, in its reporting of ammonia emissions to the EMEP under LRTAP, Greece used a default Nex value of 20 kg/sheep, 67 per cent higher than the IPCC default value. The inconsistencies between inventories for LRTAP and the UNFCCC require additional clarifications to ensure the accuracy of the estimates. In response to a question raised by the ERT during the review, Greece informed the ERT that no country-specific information is published. The ERT encourages Greece to check the applicability of default values or develop national values for Nex for sheep, as this is an important category.

88. Greece uses the default manure management type distribution for Mediterranean conditions (Revised IPCC 1996 Guidelines, table 4.7 of the workbook) to estimate the CH_4 emissions from AWMS of dairy cattle. In its 2012 annual submission, Greece has assumed that all manure of dairy cattle is handled as solid storage. In response to a question raised by the ERT during the review regarding manure handling, Greece explained that deep litter was the main manure type. In the view of the ERT, deep litter may create a large amount of CH_4 which was not included in the inventory.

89. In response to several questions raised by the ERT during the review regarding this methodology, Greece proposed, by the end of the review week, a new methodology for estimating CH_4 emissions from manure management based on a national publication (in Greek). The ERT was not in a position to verify the proposed methodology during the review week and included this problem in the list of potential problems and further questions raised by the ERT during the review week.

90. Responding to the list of potential problems and further questions raised by the ERT during the review week, on 9 November 2012 Greece provided revised estimates for CH_4 and N_2O emissions from manure management, based on a national distribution of AWMS

[8] <http://www.eea.europa.eu/publications/emep-eea-emission-inventory-guidebook-2009>.

for dairy cows, which has been accepted by the ERT as a first approach. The revised estimates include an increase in CH_4 from manure management and a decrease in N_2O emissions. The overall effect of the revised estimates is a reduction in the estimated emissions of 11.56 Gg CO_2 eq for 2010. The ERT recommends that Greece improve the agricultural information on which its GHG inventory is based, collect up-to-date, well-documented and verified country-specific agricultural data to enhance the accuracy of the inventory and report these in full in its next annual submission.

91. For all years Greece used the same default distribution of AWMS from the Revised 1996 IPCC Guidelines, despite the fact that both Greek (www.statistics.gr) and Eurostat farm structure surveys (http://epp.eurostat.ec.europa.eu) show that agriculture in Greece is switching to larger and more specialized farms. This will, over time, change the way animal manure is handled. The ERT encourages Greece to improve its reporting on AWMS in accordance with data from both Greek and Eurostat farm structure surveys in its next annual submission.[9]

92. The sheep population in Greece is divided into two: a nomadic population (10 per cent) and a stationary population (90 per cent). For the inventory it is assumed that all sheep are grazing all year round and that no manure is handled in AWMS, although the majority of the sheep are in stalls. The ERT strongly encourages Greece to investigate this assumption further to avoid a possible underestimation of the emissions from stored manure.

93. For poultry, Greece assumes that 28 per cent of the manure is handled as other manure and the remaining 72 per cent is deposited from free-ranging poultry. However, according to the farm structure survey by Eurostat, 46 per cent of the broilers are located on farms larger than 500 livestock units, and the average farm size is 170,000 broilers. The ERT is of the view that it is very unlikely that farms having more than 2,000–5,000 broilers are using free-ranging systems. The ERT therefore recommends that Greece investigate the distribution of AWMS for all animal types in detail and update this in its next annual submission together with all documentation of its national circumstances.

E. Land use, land-use change and forestry

1. Sector overview

94. In 2010, net removals from the LULUCF sector amounted to 2,641.81 Gg CO_2 eq. Since 1990, net removals have increased by 4.0 per cent. The key driver for the rise in removals is related to increases in carbon stock changes on forest land remaining forest land and land converted to forest land. Within the sector, net removals from forest land accounted for 2,205.40 Gg CO_2 eq, followed by cropland accounting for 451.79 Gg CO_2 eq and settlements accounting for 4.62 Gg CO_2 eq. Net emissions from grassland accounted for 7.47 Gg CO_2 eq, followed by settlements accounting for 4.62 Gg CO_2 eq. The remaining net emissions were from other land (3.28 Gg CO_2 eq).

95. The Party has made recalculations for the LULUCF sector between the 2011 and 2012 annual submissions in response to the 2011 annual review report. The impact of these recalculations on the LULUCF sector is a decrease in the estimated removals of 204.84 Gg CO_2 eq, or 6.8 per cent, for 2009. The recalculations affected the categories in the following manner:

(a) Forest land (a decrease in removals of 99.01 Gg CO_2 eq or 4.3 per cent);

(b) Cropland (a decrease in removals of 95.16 Gg CO_2 eq or 12.9 per cent);

[9] <www.statistics.gr>.

(c) Grassland (an increase in emissions of 1.23 Gg CO_2 eq or 8.8 per cent);

(d) Settlements (an increase in emissions of 2.81 Gg CO_2 eq; emissions from settlements were not estimated in the previous annual submission);

(e) Other land (an increase in emissions of 6.63 Gg CO_2 eq; emissions from other land were not estimated in the previous annual submission).

96. The Party provided explanations for recalculations in the NIR, chapter 10 (recalculations and improvements). Nevertheless, no explanations were found in CRF table 8(b). The ERT reiterates the recommendation in the previous review report that the Party include detailed explanations for the recalculations of each land-use category in the relevant paragraphs of the NIR (sectoral chapter) and report in the explanation note in CRF table 8(b) in its next annual submission.

97. The Party has developed a methodology to collect data on areas of land use and land-use change in order to identify the land-use categories, and used this methodology to identify the land-use categories. The NIR included a land-use change matrix.

98. In response to questions raised by the ERT during the review, Greece provided detailed information on the different data sources used to classify the area according to the IPCC good practice guidance for LULUCF land-use categories, but these are not included in the NIR. The ERT recommends that the Party include the above-mentioned detailed explanations and a clear description of the assessment of land uses and land-use changes in the next annual submission. Furthermore, the ERT recommends that Greece increase the transparency of the NIR by including a table specifying the data sources used (including their main content and the land-use category (if any) for which these data have been used) in the NIR of the next annual submission. In addition, the ERT recommends that Greece increase the transparency of the reporting in the NIR by providing, in tabular form, the status of surveys and/or monitoring projects on forestry activities carried out in the country, detailing if and how the outcomes have been used for reporting purposes.

99. Greece assumes that the carbon stock changes in mineral soils for the land-use conversion categories occur fully in the year after the conversion takes place. The ERT noted that the IPCC good practice guidance for LULUCF allows the use of country-specific land-use transition periods, provided that removals are not overestimated and emissions are not underestimated. The ERT recommends that Greece, in its next annual submission, use a default transition period of 20 years in the estimation process for carbon stock changes in mineral soils for the land-use conversion categories, or demonstrate that the current approach is not overestimating removals or underestimating emissions.

100. The ERT noted that soil carbon stock changes for the conversions of the cropland category (including cropland converted to forest land, cropland converted to grassland and cropland converted to other land categories) are currently reported in the category cropland remaining cropland (reported as “IE”). In response to a question raised by the ERT during the review, the Party clarified that no information is available about stratification by crop type on areas of cropland converted to forest land, grassland or other land uses. In addition, the methodology used to represent land areas (approach 1 of the IPCC good practice guidance for LULUCF) does not allow for determining the initial crop type of the area abandoned or afforested, and consequently does not allow for the carbon stock changes in these land-use categories to be reported separately. The ERT recommends that the Party collect additional information of the abovementioned item in order to allocate soil carbon stock changes from cropland converted to other land uses in the proper categories (i.e. land converted to forest land, land converted to grassland or land converted to other land) in its next annual submission.

2. Key categories

Forest land remaining forest land – CO_2

101. Carbon stock changes and GHG emissions and removals have been estimated for managed forest land remaining forest land in accordance with the IPCC good practice guidance for LULUCF. The area reported in the forest land remaining forest land category is equal to 3,355 kha in 2012; the area of managed forests is 1,206 kha and corresponds to the area subject to activities under Article 3, paragraph 4, of the Kyoto Protocol (see para. 128 below).

102. Greece used outcomes from the Forest Management Plans Database as the main data source for the forest land area assessment, together with the data from the national forest inventory, concerning the assessment of forest area in 1990. The ERT noted that Greece reported in the CRF tables the total area of forest land remaining forest land, whereas it reported carbon stock changes related to managed forest areas only. In order to enhance transparency and to ensure comparability, the ERT strongly recommends that Greece include, in the next annual submission, the area of total forest land remaining forest land with disaggregation for unmanaged and managed areas included in the category forest land remaining forest land.

103. Greece reported carbon stock changes for above-ground and below-ground biomass, while dead organic matter and soil carbon stock changes have been reported as not applicable, in accordance with assumptions under the IPCC tier 1 approach. The ERT recommends that the Party explore the possibility of estimating and reporting carbon stock changes for the above-mentioned pools.

104. The IPCC good practice guidance for LULUCF carbon stock change method has been used to estimate emissions and removals for the category forest land remaining forest land. During the review week, the ERT compared the reported data against the outcomes of the IPCC gain–loss method, using data and parameters provided by the Party. The comparison shows that the removals time series obtained with the different methods have the same order of magnitude; nevertheless the results of the comparison draw attention to some unusual values, resulting in a potential overestimation of removals. The ERT strongly recommends that Greece verify the results of its carbon stock change method, through the application of the IPCC gain–loss method, and include the outcomes of this verification activity in its next annual submission (see para. 138 below).

Land converted to forest land – CO_2

105. The ERT noted that soil carbon stock changes for cropland converted to forest land are currently reported in the cropland remaining cropland category (see para. 100 above). The ERT recommends that the Party collect additional information in order to report soil carbon stock changes for cropland converted to forest land in the proper category (land converted to forest land) in its next annual submission.

106. Greece assumes that the carbon stock changes in mineral soils for land converted to forest land occur fully in the year after the conversion takes place. The ERT recommends that, for its next annual submission, Greece use a transition period of 20 years in the estimation process for carbon stock changes in mineral soils for the category land converted to forest land, or demonstrate that the current approach is not overestimating removals or underestimating emissions (see para. 99 above).

Cropland remaining cropland – CO_2

107. The ERT noted that soil carbon stock changes for cropland converted to other land-use categories are currently reported in the cropland remaining cropland category (see para. 100 above). The ERT recommends that the Party collect additional information in order to

report soil carbon stock changes for cropland converted to other land-use categories in the appropriate categories in its next annual submission.

3. Non-key categories

Land converted to cropland – CO_2, CH_4 and N_2O

108. Greece assumes that the carbon stock changes in mineral soils for land converted to cropland occur fully in the year after the conversion takes place. The ERT recommends that, in its next annual submission, Greece use a transition period of 20 years in the estimation process for carbon stock changes in mineral soils for the category land converted to cropland, or demonstrate that the current approach is not overestimating removals or underestimating emissions (see para. 99 above).

Land converted to grassland – CO_2, CH_4 and N_2O

109. The ERT noted that soil carbon stock changes for cropland converted to grassland are currently reported in the category cropland remaining cropland (see para. 100 above). The ERT recommends that the Party collect additional information in order to report soil carbon stock changes for cropland converted to grassland in the proper category (land converted to grassland) in its next annual submission.

110. Greece assumes that the carbon stock changes in mineral soils for land converted to grassland occur fully in the year after the conversion takes place. The ERT recommends that, in its next annual submission, Greece use a transition period of 20 years in the estimation process for carbon stock changes in mineral soils for the category land converted to grassland, or demonstrate that the current approach is not overestimating removals or underestimating emissions (see para. 99 above).

Land converted to wetlands – CO_2, CH_4 and N_2O

111. The ERT noted that Greece reported the annual area of land converted to wetlands for the period 1990–2010, but emissions have been reported only for some of the years in the period 1990–2010 (i.e. 1990, 1992, 1994, 1996–1998 and 2000–2008). In response to a question raised by the ERT during the review, Greece clarified that the annual area reported for the category land converted to wetlands for the period 1990–2010 is the cumulative area subject to the specific activity, while emissions were not estimated. The ERT recommends that, in its next annual submission, Greece use a default transition period of 20 years in the estimation process for carbon stock changes in mineral soils for the category land converted to wetlands, or demonstrate that the current approach is not overestimating removals or underestimating emissions (see para. 99 above).

F. Waste

1. Sector overview

112. In 2010, emissions from the waste sector amounted to 4,933.57 Gg CO_2 eq, or 4.2 per cent of total GHG emissions. Since 1990, emissions have decreased by 11.5 per cent. The key drivers for the fall in emissions are the increase in recycling of municipal solid waste (MSW) accompanied by biogas collection and destruction at solid waste disposal sites and switching to aerobic wastewater treatment systems for the majority of the population. Within the sector, 70.3 per cent of the emissions were from solid waste disposal on land, followed by 29.6 per cent from wastewater handling and 0.1 per cent from waste incineration.

113. The Party has made recalculations for the waste sector between its 2011 and 2012 annual submissions in response to the 2011 annual review report and following changes in

AD and the application of country-specific EFs. The impact of these recalculations on the waste sector is an increase in the estimated emissions of 24.8 per cent for 2009. The main recalculations for 2009 took place in the following categories:

(a) Solid waste disposal on land (an increase of 772.56 Gg CO_2 eq or 30.6 per cent);

(b) Wastewater handling (an increase of 155.83 Gg CO_2 eq or 12.7 per cent);

(c) Waste incineration (an increase of 0.86 Gg CO_2 eq or 23.6 per cent).

114. In its 2012 annual submission Greece improved the completeness of its reporting of the sector by including in its calculation of CH_4 emissions from solid waste disposal on land waste types such as industrial waste (in accordance with recommendations in previous review reports) and biodegradable construction and demolition waste.

115. The total emissions from waste incineration are reported under the waste sector in accordance with the IPCC good practice guidance because the waste incineration in Greece is not used for energy purposes. The ERT noted that waste composting practices have been emerging in the country since 2012 and encourages the Party to estimate and report CH_4 emissions from composting in its future annual submissions.

116. However, the ERT noted that the descriptions in the NIR of the waste and wastewater treatment systems used in the country and their share of the waste are not sufficiently transparent. The ERT recommends that Greece further improve the transparency of the NIR by providing the relevant AD, EFs and other parameters used in the form of tables and flow charts in its next annual submission.

117. In Greece there is a well-developed QC system to check the GHG inventory results. In response to questions raised by the ERT during the review, the Party demonstrated the documented cross-check results and protocols for the waste sector categories from its archiving system. Nevertheless, the ERT identified a weakness in the sector-specific QA procedures. The ERT encourages the Party to enhance the QA procedures for key categories in the sector, for example by conducting meetings or conferences involving leading national experts in the waste sector and documenting the results of these discussions in the NIR of its next annual submission.

118. The waste sector makes the largest contribution to the uncertainty value of the national total CH_4 emissions. In order to reduce uncertainty and to improve the accuracy of calculations, the ERT encourages the Party to continue its research into country-specific data on MSW content and country-specific first order decay parameters.

2. Key categories

Solid waste disposal on land – CH_4

119. Emissions from this category amounted to 3,467.9 Gg CO_2 eq, applying the tier 2 first order decay method from the IPCC good practice guidance with default parameters and country-specific data on waste content. The ERT noted that the estimated CH_4 emissions from solid waste disposal on land and CH_4 recovery have been recalculated for the period 1990–2009.

120. The recalculation was made on the basis of AD from EL.STAT for industrial and construction/demolition waste disposed at the same landfills as MSW, and amounts of CH_4 recovered were calculated using the national energy balance data. However, the ERT noted that waste flows in Greece and amounts of waste are not described in the NIR in a transparent manner. In response to questions raised by the ERT during the review, the Party provided the ERT with a clear flow chart of its waste treatment types, including their share

of the waste. The ERT recommends that Greece include such a flow chart for the last reported year in the NIR of its next annual submission and provide a table with data on the amounts of disposed waste, by type, for the complete time series in an annex to the NIR.

121. The ERT recommends that Greece improve the transparency of this category by providing a table showing the first order decay method parameters used for calculations, by waste type, in the NIR of its next annual submission.

Wastewater handling – CH_4 and N_2O

122. CH_4 emissions from this category amounted to 1,068.16 Gg CO_2 eq. CH_4 emissions from commercial wastewater handling and CH_4 emissions from sludge generated industrial wastewater have been recalculated due to the use of country-specific factors for the period 1990–2009 following recommendations in the previous review report.

123. The NIR states that CH_4 recovery is reported as "NO" for CH_4 emissions from domestic and commercial wastewater handling. However, for the same time period the national energy balance contains information on wastewater biogas plants' activity and these emissions are accounted for by Greece under the energy sector. In response to questions raised by the ERT during the review, the Party explained that this recovery is accounted for in the category solid waste disposal on land because the process is a pre-treatment before sewage sludge disposal to solid waste disposal sites. The ERT recommends that the Party describe in a transparent manner how and why CH_4 recovery by means of wastewater biogas plants is accounted under the energy and waste sectors in the NIR of the next annual submission.

124. The Party has calculated N_2O emissions from industrial wastewater handling using industrial production AD from EL.STAT reports and the EFs provided by the EMEP/CORINAIR Emission Inventory Guidebook - 2007. The ERT acknowledges the correct reporting by the Party.

3. Non-key categories

Waste incineration – CO_2, CH_4 and N_2O

125. CO_2, CH_4 and N_2O emissions from waste incineration have been recalculated in the 2012 annual submission due to the inclusion of emissions from additional types of waste indicated in the Hellenic Statistical Report: biogenic agricultural residues produced in slaughterhouses and small amounts of industrial chemical waste. CO_2 emissions from clinical waste and from industrial chemical waste are estimated using the default method and EFs from the IPCC good practice guidance. CO_2 emissions were not estimated for the agricultural residues, taking into account their biogenic nature. CH_4 and N_2O emissions were estimated using the default methodology and EFs from EMEP/CORINAIR. This improvement was made in response to a recommendation in the previous review report. The ERT commends the efforts of Greece to improve the completeness and accuracy of its inventory.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

126. Greece submitted estimates for afforestation, reforestation and deforestation activities under Article 3, paragraph 3, of the Kyoto Protocol. Greece also submitted estimates for forest management, the only elected activity under Article 3, paragraph 4, of the Kyoto Protocol. Greece has chosen to account for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol at the end of the commitment period. Greece provided information related to KP-LULUCF activities following the annotated NIR by providing general, land-specific and activity-specific information, which is generally in line with the requirements of the annex to decision 15/CMP.1. Three exceptions were noted by the ERT and are described in paragraphs 131, 135 and 137 below.

127. The reporting of KP-LULUCF activities is in line with the IPCC good practice guidance for LULUCF in relation to estimates of carbon stock changes from the activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Reporting method 1 from the IPCC good practice guidance for LULUCF has been used to report activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The geographical units that have been used for this purpose are the 51 prefectures of Greece.

128. The methodologies used to estimate emissions and removals from areas subject to KP-LULUCF activities are the same as those used to assess emissions and removals for the LULUCF reporting under the Convention.

129. The categories afforestation and reforestation and forest management have been identified as key categories, consistent with the IPCC good practice guidance for LULUCF.

130. The Party has made recalculations for the KP-LULUCF activities between the 2011 and 2012 annual submissions, taking into account updated AD (updated data from its land-use change database and the inclusion of the updated data on biomass stocks from its latest Forest Management Plans) and the correction of reporting errors noted in the previous annual submission. The impact of these recalculations on each KP-LULUCF activity for 2009 is as follows:

(a) Article 3, paragraph 3, activities: in the 2011 annual submission a net removal of 350.63 Gg CO_2 eq was reported compared with a net removal of 343.65 CO_2 eq reported in the 2012 annual submission (a decrease of 2.0 per cent);

(b) Afforestation and reforestation: no recalculation;

(c) Deforestation: in the 2011 annual submission emissions from deforestation were not reported, while emissions of 6.97 Gg CO_2 eq were reported in the 2012 annual submission;

(d) Article 3, paragraph 4, activities (forest management): in the 2011 annual submission a net removal of 1,944.71 Gg CO_2 eq was reported compared with a net removal of 1,845.70 CO_2 eq reported in the 2012 annual submission (decrease of 5.1 per cent).

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO_2, CH_4 and N_2O

131. Greece reported carbon stock changes for above-ground and below-ground biomass, while dead organic matter and soil carbon stock changes have been reported as "NO". The ERT strongly recommends that Greece report, in its next annual submission, carbon stock changes for the litter, dead wood and soil pools, or provide transparent and verifiable information that the pools are not net sources, in accordance with decision 15/CMP.1, annex, paragraph 6(e).

132. The Party used "afforestation registry and statistics" published by MEECC to assess the direct human-induced areas of afforestation and reforestation. Emissions and removals related to activities under Article 3, paragraph 3, of the Kyoto Protocol were estimated using a 'static model', without taking into account the growth trend (i.e. constant values were used to assess carbon stocks). The ERT recommends that Greece adopt the IPCC tier 2 approach for the estimation of emissions and removals from areas subject to afforestation and reforestation activities, also taking into account that the above-mentioned category has been identified by the Party as a key category.

133. The ERT noted that Greece did not report data related to biomass burning (AD and consequent GHG emissions) in the areas subject to afforestation and deforestation activities. In response to a question raised by the ERT during the review, the Party clarified that emissions from biomass burning are currently included under forest management. The ERT recommends that Greece report, in its next annual submission, AD and GHG emissions from biomass burning in the areas subject to afforestation and reforestation activities.

Deforestation – CO_2, CH_4 and N_2O

134. Following recommendations in the previous review report, Greece has reported and estimated the emissions from deforestation activities, for the entire country (i.e. 51 prefectures), on the basis of deforested land identified through the use of the Land-Use Change Database.

135. Greece reported carbon stock changes for above-ground and below-ground biomass, while dead organic matter and soil carbon stock changes have been reported as "NO". The ERT noted that this could be a potential underestimation of emissions and strongly recommends that Greece report, in its next annual submission, carbon stock changes for the litter, dead wood and soil pools, or provide transparent and verifiable information that the pools are not net sources, in accordance with decision 15/CMP.1, annex, paragraph 6(e).

136. The ERT noted that Greece did not report data related to biomass burning (AD and consequent GHG emissions) in the areas subject to deforestation. In response to a question raised by the ERT during the review, the Party clarified that emissions from biomass burning are currently included in activities under forest management. The ERT recommends that Greece report, in its next annual submission, AD and GHG emissions from biomass burning in the areas subject to deforestation activities under Article 3, paragraph 3, of the Kyoto Protocol.

Activities under Article 3, paragraph 4, of the Kyoto Protocol

Forest management – CO_2, CH_4 and N_2O

137. Greece reported carbon stock changes for above-ground and below-ground biomass, while dead organic matter and soil carbon stock changes have been reported as "NO". The ERT strongly recommends that Greece report, in its next annual submission, carbon stock changes for the litter, dead wood and soil pools, or provide transparent and verifiable

information that the pools are not net sources, in accordance with decision 15/CMP.1, annex, paragraph 6(e).

138. Consistent with estimates reported under the Convention (see para. 101 above), the Forest Management Plans Database, developed by MEECC, was used for estimating removals from areas subject to forest management activities, and the carbon stock change method from the IPCC good practice guidance for LULUCF has been used to estimate emissions and removals for areas subject to forest management activities. During the review week, the ERT compared the reported data against the outcomes of the IPCC gain–loss method, using data and parameters provided by the Party, as reported in paragraph 104 above. The ERT strongly recommends that Greece verify the results of its carbon stock change method, applied for estimations under forest management through the application of the IPCC gain–loss method, and include the outcomes of this verification activity in the NIR of its next annual submission.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

139. Greece has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings included in the SIAR on the SEF tables and the SEF comparison report.[10] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10.

140. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j). The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies. The Party provided access to information from its national registry that substantiated or clarified the information reported in its annual submission.

National registry

141. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. However, the SIAR identified the following problems: some mistakes in publicly available information; no representative name and contact information; wrong Party name; no reporting of units retired during the reported year; and no specification of what information has been declared confidential and no citation of the regulation that declares it confidential. The ERT

[10] The SEF comparison report is prepared by the ITL administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

recommends that Greece address these problems and report the results in its next annual submission.

142. In response to questions raised by the ERT during the review, the Party informed the ERT that in June 2012 the national registries of the EU member States were replaced by the consolidated EU registry, which was developed and is maintained by the European Commission. Due to the migration to the EU registry system, the web page referred to in the SIAR is no longer available. A new web page is under preparation, which will be hosted by MEECC. In the meantime, general information on the Greek registry, as well as the relevant legislation, is presented on the website of MEECC, available in Greek.[11] The ERT recommends that Greece ensure that its national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the CMP. Further, the ERT also recommends that the Party report the changes to the national registry in its next annual submission.

Calculation of the commitment period reserve

143. Greece has reported its commitment period reserve in its 2012 annual submission. The Party reported that its commitment period reserve has not changed since the initial report review (601,802,826 t CO_2 eq), as it is based on the assigned amount and not on the most recently reviewed inventory. In response to questions raised by the ERT during the review, Greece clarified that for the calculation it used the 2009 inventory as the most recently reviewed inventory for comparison. The ERT noted that the most recently reviewed inventory is that for 2010 (118,275,172 t CO_2 eq). Therefore, the ERT disagrees with the commitment period reserve reported by the Party in its 2012 annual submission. During the review and as a result of the submission of revised estimates on 9 November 2012 in response to the list of potential problems and further questions raised by the ERT during the review week, Greece provided a revised calculation of its commitment period reserve, which is 591,375,861 t CO_2 eq, based on the estimated GHG emissions for 2010 (118,275,172 t CO_2 eq). The ERT agrees with this figure.

3. Changes to the national system

144. Greece reported that there has been a change in its national system since the previous annual submission. The Party described the change in its NIR, which is that the UNFCCC focal point for Greece has changed. In response to a question raised by the ERT during the review, the Party clarified that it is a recent change and happened in May 2012. The ERT concluded that, taking into account the confirmed change, Greece's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

145. In the 2012 NIR Greece reported that there have been no changes in its national registry since the previous annual submission. In response to questions raised by the ERT during the review, information on recent changes in the national registry was provided (see para. 142 above). Greece confirmed that it intends to report these changes in the 2013 annual submission. The ERT concluded, taking into account the confirmed changes in the national registry, that the national registry of Greece continued to perform its functions as set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. The ERT recommends that Greece report in its next annual submission on changes in its national registry in accordance with decision 15/CMP.1, annex, chapter I.G.

[11] <http://www.ypeka.gr/Default.aspx?tabid=456&language=el-GR>.

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

146. Greece did not provide information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its annual submission. The information in the NIR explained that policies at the national level have only indirect impacts on third countries. Greece provides transparent information on the considerations related to the implementation of its commitments under Article 3, paragraph 14, of the Kyoto Protocol in the context of the EU directive on the promotion of the use of energy from renewable sources (2009/28/EC) and the EU directive amending directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community (2008/101/EC), as these directives have been identified as having a potential impact on third countries.

147. The ERT concluded that the information provided continues to be complete and transparent. The ERT recommends that the Party, in its next annual submission, report any changes in the information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I.H.

III. Conclusions and recommendations

A. Conclusions

148. Greece made its annual submission on 11 and 18 April 2012. The annual submission contains the GHG inventory (comprising the CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes to the national system and the national registry, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

149. The ERT concludes that the inventory submission of Greece has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and the Party has submitted a complete set of CRF tables for the years 1990-2010 and an NIR; these are complete in terms of geographical coverage, years and sectors, as well as generally complete in terms of categories and gases. Some of the carbon pools in subcategories for the LULUCF sector were reported as not estimated.

150. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1.

151. The Party's inventory is in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

152. The Party has made recalculations for the inventory between the 2011 and 2012 annual submissions in response to the 2011 review report, following updates in AD and improvements to EFs and the provision of new estimates and in order to rectify identified errors. The impact of these recalculations on the national totals is an increase in the estimated emissions of 1.8 per cent for 2009. The main recalculations took place in the following sectors/categories:

(a) CO_2 emissions from energy industries and fuel combustion (energy sector), chemical industry (industrial processes sector) and forest and cropland (LULUCF sector);

(b) CH_4 emissions from transport (energy sector), forest land and cropland (LULUCF sector) and solid waste disposal on land and wastewater handling (waste sector);

(c) N_2O emissions from fuel combustion, transport and other (energy sector) and waste incineration (waste sector).

153. Greece provided information related to KP-LULUCF activities, which is generally in line with the requirements of the annex to decision 15/CMP.1 and the annex to decision 16/ CMP.1 (see para. 127 above).

154. Greece has made recalculations for the KP-LULUCF activities between the 2011 and 2012 annual submissions, taking into account updated AD and the correction of reporting errors noted in previous review reports (see para. 130 above). The impact of these recalculations on each KP-LULUCF activity for 2009 is as follows:

(a) Decrease of 2.0 per cent in the estimated removals from Article 3, paragraph 3, activities;

(b) Decrease of 5.1 per cent in the estimate of removals from Article 3, paragraph 4, activities (forest management).

155. Greece has reported information on its accounting of Kyoto Protocol units in accordance with decision 15/CMP.1, annex, chapter I.E, and used the required reporting format tables as specified by decision 14/CMP.1.

156. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1.

157. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continued to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the CMP in 2011.

158. Greece has reported information under decision 15/CMP.1, annex, chapter I.H, "Minimization of adverse impacts in accordance with Article 3, paragraph 14", as part of its 2012 annual submission. The information provided is complete and transparent.

B. Recommendations

159. The ERT identifies issues for improvement as listed in table 6 below.

Table 6
Recommendations identified by the expert review team

Sector	*Category*	*Recommendation*	*Paragraph reference*
General	Cross-cutting and national system	Continue efforts to improve the completeness of the LULUCF inventory	10
	National system	Provide the missing estimates for KP-LULUCF	11
		Reinforce direct communications with respective experts from the statistical office and other ministers and agencies	19
	Inventory management	Describe the procedure and criteria for the development of the improvement plan	21
	Cross-cutting	Continue to improve the uncertainty analysis and country-specific uncertainty values used	27
		Improve the reporting in CRF table 8(b) and improve the explanations of recalculations	30

Sector	*Category*	*Recommendation*	*Paragraph reference*
		Implement additional QC procedures to ensure the consistency of the information presented in the NIR and the CRF tables	34
		Perform periodic reviews in order to gather country-specific information and national expert knowledge to improve the accuracy of the inventory, and report the results of these reviews	36
		Continue to improve the transparency of the sectoral chapters of the NIR and provide more explanations for the recalculations made in the sectoral chapters, in addition to in chapter 9, of the NIR	37
		Improve the consistency of the information presented in the NIR and the CRF tables (e.g. between NIR summary table 3 and CRF tables 7 and 8(b))	38
Energy	Transparency	Report how the EU ETS data might be used to supplement the data from the national energy balance for these categories and how QA/QC procedures would be applied	56
	Ammonia production	Reallocate emissions from ammonia production to the corresponding category in the industrial processes sector	58
	Stationary combustion: liquid fuels – CO_2	Provide an analysis with numerical details showing the effect of the use of different liquid fuel mixtures in different years on the CO_2 IEF time series	60
	Civil aviation – CO_2	Make full and thorough use of the data sets already available in the country (from the Ministry of Transport and the Civil Aviation Organization) and report how the EU ETS data could replace the data from the national energy balance for these categories and how QA/QC procedures would be applied	61
	Road transportation: liquid fuels – CO_2	Improve the documentation associated with the gathering and calculation of the country-specific carbon content values and ensure that all information is archived as part of the national inventory system of Greece	62
		Verify the data on lubricants used for road transportation and report thereon	64
	Navigation – CO_2	Start a process aimed at providing, in future annual submissions, a more accurate estimate of the CO_2 emissions by gathering information on the number of arrivals and departures, destination and fleet composition and, if necessary, taking into consideration the experiences of other Parties in gathering these data	66

Sector	*Category*	*Recommendation*	*Paragraph reference*
Industrial processes	Overview	Report on abatement technologiesy planned by the aluminium and nitric acid production plants	71
	Aluminium production – PFCs	Report the aluminium production trend in emissions in terms of percentage of aluminium production	73
	Other (chemical production) – CH_4	Correct the notation key inconsistency in the CRF tables and clarify whether or not this category is occurring, and if so, provide estimates in the CRF tables	74
Agriculture	Overview	Use the latest published AD and only make a recalculation in the case of any changes to the AD. If AD for the most recent year are not available at the time of the preparation of the annual inventory, apply extrapolation or another approach, as recommended by the IPCC good practice guidance, to estimate the AD	77
		Provide additional information on the AD used for the tier 2 estimates for enteric fermentation for other cattle and sheep, in order to enhance transparency	78
		Make further efforts to increase the scientific level of the agricultural inventory and use more country-specific data, parameters and EFs	80
	Enteric fermentation	Investigate the national feeding conditions (Ym and digestibility), especially for dairy cows, sheep and goats	81
		Use official statistics for milk production data delivered to the dairies, including milk for lambs and local consumption, instead of expert judgements, and provide milk production data per ewe for the different types of milking sheep instead of average per sheep for clarification	82
	Agricultural soils	Make institutional arrangements with the data providers, in particular with official bodies like EL.STAT and PHAPFDP, on data delivery, including documentation on how the data set has been elaborated	84
	Manure management – CH_4 and N_2O	Improve the agricultural information on which the GHG inventory is based and collect up-to-date, well-documented and verified country-specific agricultural data to enhance the accuracy of the inventory	90
	Manure management – CH_4 and N_2O	Investigate the distribution of AWMS for all animal types in detail and update, together with all documentation of the national circumstances	93
LULUCF	Overview	Provide detailed explanations for the recalculations of each land-use category in the relevant paragraphs of the NIR (sectoral chapter) and report in the explanation note in CRF table	96

Sector	*Category*	*Recommendation*	*Paragraph reference*
		8(b)	
		Include detailed explanations and a clear description of the assessment of land uses and land-use changes in the next annual submission and provide a table specifying the data sources used (including their main content and the land-use category (if any) for which these data have been used) in the NIR. In addition, increase the transparency of the reporting in the NIR, including, in tabular form, the status of surveys and/or monitoring projects on forestry activities carried out in the country, detailing if and how the outcomes have been used for reporting purposes	98
		Use a default transition period of 20 years in the estimation process for carbon stock changes in mineral soils for the land-use conversion categories, or demonstrate that the current approach is not overestimating removals or underestimating emissions	99
		Collect additional information to report soil carbon stock changes for cropland converted to other land uses in the proper categories (i.e. land converted to forest land, land converted to grassland or land converted to other land)	100
	Forest land remaining forest land – CO_2	Provide the total area of forest land remaining forest land with disaggregation for unmanaged and managed areas included in the category forest land remaining forest land	102
		Explore the possibility of estimating and reporting carbon stock changes for the abovementioned pools	103
		Verify the results of the carbon stock change method, through the application of the IPCC gain–loss method, and report on the outcomes of this verification activity	104
	Land converted to forest land – CO_2	Collect additional information in order to report soil carbon stock changes for cropland converted to forest land in the proper category (land converted to forest land)	105
		Use a transition period of 20 years in the estimation process for carbon stock changes in mineral soils for the category land converted to forest land, or demonstrate that the current approach is not overestimating removals or underestimating emissions	106
	Cropland remaining cropland – CO_2	Collect additional information in order to report soil carbon stock changes for cropland converted to other land-use categories in the appropriate categories	107

Sector	*Category*	*Recommendation*	*Paragraph reference*
	Land converted to cropland – CO_2, CH_4 and N_2O	Use a transition period of 20 years in the estimation process for carbon stock changes in mineral soils for the category land converted to cropland, or demonstrate that the current approach is not overestimating removals or underestimating emissions	108
	Land converted to grassland – CO_2, CH_4 and N_2O	Collect additional information in order to report soil carbon stock changes for cropland converted to grassland in the proper category (land converted to grassland)	109
		Use a transition period of 20 years in the estimation process for carbon stock changes in mineral soils for the category land converted to grassland, or demonstrate that the current approach is not overestimating removals or underestimating emissions	110
	Land converted to wetlands – CO_2, CH_4 and N_2O	Use a default transition period of 20 years in the estimation process for carbon stock changes in mineral soils for the category land converted to wetlands, or demonstrate that the current approach is not overestimating removals or underestimating emissions	111
Waste	General	Improve the transparency of the NIR by providing the key AD, EFs and other parameters used in the form of tables and flow charts	116
	Solid waste disposal on land – CH_4	Include a flow chart for the last reported year in the next NIR and provide a table with data on the amounts of disposed waste, by type, for the entire time series in the annex to the NIR	120
		Improve transparency in this subcategory by providing a table with the first order decay method parameters used for calculations by waste type	121
	Wastewater handling – CH_4 and N_2O	Describe in a transparent manner how and why CH_4 recovery by means of wastewater biogas plants is accounted for under the energy and waste sectors in the NIR	123
KP-LULUCF	Afforestation and reforestation – CO_2, CH_4 and N_2O	Report on carbon stock changes for the litter, dead wood and soil pools, or provide transparent and verifiable information that the pools are not net sources, in accordance with decision 15/CMP.1, annex, paragraph 6(e)	131
		Adopt the IPCC tier 2 method to estimate emissions and removals from areas subject to afforestation and reforestation activities, also considering that the category has been identified by the Party as a key category	132
		Report AD and GHG emissions for biomass burning in the areas subject to afforestation and reforestation activities under Article 3, paragraph	133

Sector	*Category*	*Recommendation*	*Paragraph reference*
		3, of the Kyoto Protocol	
	Deforestation – CO_2, CH_4 and N_2O	Report carbon stock changes for the litter, dead wood and soil pools, or provide transparent and verifiable information that the pools are not net sources, in accordance with decision 15/CMP.1,annex, paragraph 6(e)	135
		Report AD and GHG emissions for biomass burning in the areas subject to deforestation activities under Article 3, paragraph 3, of the Kyoto Protocol	136
	Forest management – CO_2, CH_4 and N_2O	Report on carbon stock changes for the litter, dead wood and soil pools, or provide transparent and verifiable information that the pools are not net sources, in accordance with decision 15/CMP.1, annex, paragraph 6(e)	137
		Verify the results of the carbon stock change method, applied for estimations under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, through the application of the IPCC gain–loss method, and include the outcomes of this verification activity in the next NIR	138
National registry		Correct the errors and improve the accuracy of the reporting regarding the national registry	141
		Ensure that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the CMP	142
Changes to the national registry		Report on changes in the national registry in accordance with decision 15/CMP.1, annex, chapter I.G	145
Article 3, paragraph 14, of the Kyoto Protocol		Report any changes in the information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I.H	147

IV. Questions of implementation

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

Annex I

Documents and information used during the review

A. Reference documents

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

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/SBSTA/2006/9. Available at <http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>.

"Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention". FCCC/CP/2002/8. Available at <http://unfccc.int/resource/docs/cop8/08.pdf>.

"Guidelines for national systems 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 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 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>.

Status report for Greece 2012. Available at <http://unfccc.int/resource/docs/2012/asr/grc.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2012. Available at <http://unfccc.int/resource/webdocs/sai/2012.pdf>.

FCCC/ARR/2011/GRC. Report of the individual review of the annual submission of Greece submitted in 2011. Available at <http://unfccc.int/resource/docs/2012/arr/grc.pdf>.

UNFCCC. *Standard independent assessment report*, parts I and II. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Irini Nikolaou (Emissions Trading Office, Ministry of Environment, Energy and Climate Change), including additional material on the methodologies and assumptions used. The following documents[1] were also provided by Greece:

Circular 918. 2008. "*Structure and operation of the national greenhouse gases emissions inventory system – roles and responsibilities*". Hellenic republic. Ministry for the environment, physical planning and public works. Deputy minister's office. Athens, 21 April 2008. Unofficial translation. 18 pp.

[1] Reproduced as received from the Party.

Annex II

Acronyms and abbreviations

AD	activity data
CH_4	methane
C	confidential
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
EU	European Union
EU ETS	European Union emissions trading scheme
FAO	Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
kg	kilogram (1 kg = 1,000 grams)
LTO	landing/take-off cycle
LULUCF	land use, land-use change and forestry
AWMS	animal waste management system
MSW	municipal solid waste
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
Nex	nitrogen excretion
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
UNFCCC	United Nations Framework Convention on Climate Change