Advance Version

COMPLIANCE COMMITTEE **CC/ERT/ARR/2012/5***
19 March 2012

Report of the individual review of the annual submission of Greece submitted in 2011

Note by the secretariat

The report of the individual review of the annual submission of Greece submitted in 2011 was published on 16 March 2012. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2011/GRC, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

* Reissued for technical reasons.

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Report of the individual review of the annual submission of Greece submitted in 2011*

* In the symbol for this document, 2011 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2011 annual submission of Greece, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 29 August to 3 September 2011 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Bernd Gugele (European Union (EU)) and Mr. Newton Paciornik (Brazil); energy – Mr. Qiang Liu (China), Mr. Ole-Kenneth Nielsen (Denmark) and Ms. Kennie Tsui (New Zealand); industrial processes – Ms. Jolanta Merkeliene (Lithuania); agriculture – Mr. Tom Wirth (United States of America); land use, land-use change and forestry (LULUCF) – Mr. Toru Gomi (Japan) and Mr. Valentin Bellassen (France); and waste – Mr. Pavel Gavrilita (Republic of Moldova). In addition, Mr. Nielsen supported the sectors industrial processes and waste. Mr. Gugele and Mr. Paciornik were the lead reviewers. The review was coordinated by Ms. Barbara Muik and Mr. Roman Payo (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.

B. Emission profiles and trends

3. In 2009, the main greenhouse gas (GHG) in Greece was carbon dioxide (CO_2), accounting for 85.0 per cent of total GHG emissions[1] expressed in CO_2 eq, followed by methane (CH_4) (7.2 per cent) and nitrous oxide (N_2O) (5.7 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 2.1 per cent of the overall GHG emissions in the country. The energy sector accounted for 81.9 per cent of total GHG emissions, followed by the industrial processes sector (7.5 per cent), the agriculture sector (7.3 per cent), the waste sector (3.1 per cent) and the solvent and other product use sector (0.3 per cent). Total GHG emissions amounted to 122,724.11 Gg CO_2 eq and increased by 15.0 per cent between the base year[2] and 2009. The expert review team (ERT) considers the trends for the different gases and sectors to be reasonable.

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.

[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 to 2009[a]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A sources		CO_2	83 307.50	83 307.50	86 805.76	103 217.24	113 384.15	114 450.24	110 112.90	104 336.17	25.2
		CH_4	9 801.61	9 801.61	10 003.44	9 993.21	9 233.83	9 056.80	8 862.13	8 809.10	–10.1
		N_2O	10 254.81	10 254.81	9 005.87	8 532.26	7 905.70	7 907.71	7 194.80	6 968.73	–32.0
		HFCs	3 262.03	935.06	3 262.03	4 274.52	3 957.12	2 098.19	2 482.95	2 568.96	–21.2
		PFCs	85.78	263.38	85.78	151.70	73.05	60.19	76.08	36.13	–57.9
		SF_6	3.59	3.07	3.59	3.99	6.45	9.92	7.53	5.02	40.0
KP-LULUCF	Article 3.3[b]	CO_2							–346.75	–350.63	
		CH_4							NA	NA	
		N_2O							NA	NA	
	Article 3.4[c]	CO_2	NA						–2 052.47	–1 955.56	NA
		CH_4	NA						6.94	9.85	NA
		N_2O	NA						0.70	1.00	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 to 2009[a]

			Gg CO_2 eq								*Change*
		Sector	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A		Energy	77 504.81	77 504.81	80 999.20	97 119.42	106 826.55	108 161.42	104 369.33	100 536.22	29.7
		Industrial processes	12 357.36	10 207.48	12 301.95	13 829.92	13 815.31	11 511.29	11 296.77	9 178.25	–25.7
		Solvent and other product use	308.34	308.34	299.82	306.61	309.29	313.41	314.13	315.60	2.4
		Agriculture	11 483.24	11 483.24	10 336.87	9 956.34	9 555.08	9 645.67	8 974.94	8 939.50	–22.2
		Waste	5 061.56	5 061.56	5 228.63	4 960.62	4 054.07	3 951.26	3 781.21	3 754.54	–25.8
		LULUCF	NA	–2 496.11	–3 198.71	–2 836.48	–3 051.40	–2 933.66	–3 079.27	–3 018.56	NA
		Total (with LULUCF)	**NA**	**102 069.32**	**105 967.76**	**123 336.43**	**131 508.89**	**130 649.39**	**125 657.12**	**119 705.54**	**NA**
		Total (without LULUCF)	**106 715.31**	**104 565.43**	**109 166.47**	**126 172.91**	**134 560.29**	**133 583.05**	**128 736.39**	**122 724.11**	**15.0**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation & reforestation							–350.63	–350.63	
		Deforestation							3.88	NA, NO	
		Total (3.3)							**–346.75**	**–350.63**	
	Article 3.4[d]	Forest management							–2 044.82	–1 944.71	
		Cropland management	NA						NA	NA	NA
		Grazing land management	NA						NA	NA	NA
		Revegetation	NA						NA	NA	NA
		Total (3.4)	**NA**						**–2 044.82**	**–1 944.71**	**NA**

Abbreviations: LULUCF = land use, land-use change and forestry, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NO = not occurring.

[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.

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

Table 3
Information to be included in the compilation and accounting database in t CO_2 eq

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve	601 802 826			601 802 826	
Annex A emissions for current inventory year					
CO_2	104 326 511	104 336 165		104 336 165	
CH_4	8 740 736	8 809 096		8 809 096	
N_2O	6 865 963	6 968 733		6 968 733	
HFCs	2 568 960			2 568 960	
PFCs	36 132			36 132	
SF_6	5 019			5 019	
Total Annex A sources	**122 543 322**	**122 724 106**		**122 724 106**	
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	–350 626			–350 626	
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	NA, NO			NA, NO	
Activities under Article 3, paragraph 4, for current inventory year[d]					
3.4 Forest management for current year of commitment period	–1 944 710			–1 944 710	
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					

Abbreviations: NA = not applicable, NO = not occurring.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.
[d] 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 2011 national inventory report (NIR) was submitted on 15 April 2011; the common reporting format (CRF) tables were submitted on 19 April 2011 and resubmitted on 26 May 2011. The submission contains a complete set of CRF tables for the period 1990–2009 and an NIR. 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 adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 19 April 2011. The annual submission was submitted in accordance with decision 15/CMP.1. The ERT noted that Greece submitted the CRF and SEF tables 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. In response to a question raised during the review, the Party explained that the delay was due to a computer problem. The ERT recommends that Greece take measures in order to ensure that, in the future, all parts of its inventory submission will be submitted by 15 April.

7. Greece officially submitted revised emission estimates on 23 September 2011 in response to the list of potential problems and further questions raised by the ERT during the course of the centralized review (see paras. 44, 45 and 52 below). In addition, Greece officially submitted revised emission estimates on 18 October 2011 in response to the list of potential problems and further questions raised by the ERT during the review of the annual submission of the EU (see para. 84 below). The values used in this report are based on the values contained in the submissions of 23 September and 18 October 2011.

8. Where necessary, 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 and documents which are not part of the annual submission but are in many cases referenced in the NIR. The full list of information and documents used during the review is provided in annex I to this report.

Completeness of inventory

10. The inventory covers most source and sink categories for the period 1990–2009 and is complete in terms of years and geographical coverage. The ERT noted that Greece improved the completeness of its inventory for its 2011 submission, for example by reporting estimates for some categories for the first time (e.g. in the LULUCF and waste sectors). However, Greece did not report CO_2 emissions from soda ash use for uses other

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), 6(c) and 6(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.

than glass production, a category for which the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) provide estimation methodologies. However, in response to the list of potential problems and further questions raised by the ERT, the Party provided estimates for this category (see para. 52 below). In addition, Greece did not provide estimates for some mandatory and non-mandatory LULUCF categories and pools, for potential emissions of fluorinated gases (F-gases) and for other categories for which there are no methodologies available in the Revised 1996 IPCC Guidelines or the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance).

11. In response to the list of potential problems and further questions raised by the ERT, Greece provided revised estimates for emissions from navigation and lubricant use (see paras. 44 and 45 below). Further, in response to questions raised during the review of the annual submission of the EU, Greece provided revised emission estimates for industrial waste disposal (see para. 84 below). The ERT encourages Greece to report, in its next annual submission, estimates for categories not yet addressed, in order to further improve the completeness and accuracy of its inventory.

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

Overview

12. The ERT concluded that the national system continues to perform its required functions.

13. The Party described the changes to the national system since the previous annual submission; these changes relate to the change of the national focal point (see para. 104 below).

Inventory planning

14. The NIR describes the national system and institutional arrangements for the preparation of the inventory. The Ministry of Environment, Energy and Climate Change (MEECC) (formerly the Ministry of Environment, Physical Planning and Public Works) has overall responsibility for the national inventory. The School of Chemical Engineering of the National Technical University of Athens has responsibility for compiling the technical and scientific aspects of the annual inventory, and various ministries and agencies are responsible for ensuring the provision of data. International and national associations, along with individual industrial companies, contribute to the provision of data and the development of methodologies. The Party develops an improvement plan annually in order to comply with the IPCC good practice guidance and 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).

15. In order to address the gaps in its reporting on the LULUCF sector and as part of an improvement programme for the LULUCF sector that began in 2008, the Party has started to develop a new database on land-use changes (the Land-use Change Database) within MEECC. The implementation of this improvement programme allowed Greece to provide estimates for a range of land-use change categories for the first time in its 2010 submission, but no improvements were noted in the 2011 submission. The ERT strongly recommends that the Party continue its efforts to strengthen its national system so that it can perform

fully all its required functions, particularly those related to its reporting on the LULUCF sector and on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Inventory preparation

Key categories

16. Greece has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2011 submission. There are important differences between the 2011 key category analysis and the results of the analysis presented in previous submissions. These differences refer to the number and identification of the key categories and are closely connected to the disaggregation of categories in the energy and agriculture sectors, following the suggestions made by the ERT during the 2010 review. The key category analysis performed by the Party and that performed by the secretariat[4] produced similar results for 2009. Greece has included the LULUCF sector in its key category analysis, which was performed in accordance with 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). The ERT acknowledges that Greece uses the key category analysis as a tool to support and guide improvements to its inventory.

17. Greece has identified CO_2 emissions from afforestation and reforestation and forest management under Article 3, paragraphs 3 and 4, of the Kyoto Protocol as key categories. The NIR and KP-LULUCF tables provide details on the criteria used to determine the key categories.

Uncertainties

18. Greece has provided a tier 1 uncertainty analysis in accordance with the IPCC good practice guidance both for level and trend, as well as excluding and including LULUCF. The quantitative uncertainty estimate for total GHG emissions (without LULUCF) was 8.7 per cent for 2009, while the estimated trend uncertainty was 11.3 per cent. The quantitative uncertainty estimate for total GHG emissions (with LULUCF) was 8.9 per cent for 2009, while the estimated trend uncertainty was 11.5 per cent. Compared with the values provided in the 2010 inventory submission, the uncertainty estimates have increased slightly, mainly due to revised uncertainty estimates of activity data (AD) for solid waste disposal. In general, Greece still uses many IPCC default uncertainty values and, therefore, improvements in emission estimates are not always reflected in lower uncertainties. Therefore, the ERT reiterates the encouragement of the previous review reports that Greece use more country-specific information on uncertainties for categories for which IPCC default uncertainty values have been used. Greece uses the uncertainty analysis to prioritize further improvements to its inventory.

Recalculations and time-series consistency

19. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The total effect of the recalculations was a 0.1 per cent decrease in estimated total GHG emissions for the base year and a 0.02 per cent increase in estimated

[4] 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.

total GHG emissions for 2008. Some of the most significant changes (in absolute terms) in the estimates for 2008 are increases in CH_4 emissions from enteric fermentation and from solid waste disposal on land and decreases in CH_4 emissions from manure management and from wastewater handling. CH_4 emissions from enteric fermentation and from manure management were revised using a new methodology. The AD used to estimate emissions from cattle and sheep were also revised. The recalculations in the waste sector were mainly due to revised AD and parameters (e.g. the fraction of degradable organic carbon (DOC_f) and the methane correction factor (MCF) for unmanaged landfills). In general, the rationale for the recalculations is explained transparently in the NIR and in CRF table 8(b). However, the ERT noted that there are a few cases in the LULUCF and waste sectors where the explanations provided by the Party were not fully transparent. No problems with the time series were identified.

Verification and quality assurance/quality control approaches

20. Greece's quality assurance/quality control (QA/QC) system is based on standard 9001:2000 of the International Organization for Standardization, was established in 2004 and has been developed in line with the IPCC good practice guidance. The QA/QC manual was last revised in May 2008. The National Technical University of Athens, in close cooperation with MEECC, is responsible for the implementation of the QA/QC system. In response to questions raised during the review, the Party provided additional information on implemented QA/QC procedures and verification activities for all sectors apart from the LULUCF sector. This information suggests that for all key categories, except for coal mining and handling and for wastewater handling, sector-specific QA/QC procedures exist. Therefore, the ERT recommends that Greece also implement sector-specific QA/QC procedures for these two key categories and for the LULUCF sector. In addition, the present ERT reiterates the recommendation in the previous review report that Greece provide additional information on its QA/QC procedures for the data supplied by external sources (in particular the EU emissions trading scheme (EU ETS)).

21. In response to recommendations in the previous review report, the Party provided information in its 2011 submission on training activities. In response to questions raised during the review, the Party clarified that it had nominated experts currently responsible for the inventory to the UNFCCC roster of experts, and that one expert had participated in the review of national communications.

Transparency

22. Greece has further improved the transparency of its NIR, which includes well-structured and clear information on the key categories, methods, data sources, uncertainty estimates, recalculations, QA/QC procedures and verification activities for most of the categories. However, the ERT recommends that Greece include in the NIR additional information on some categories, as addressed in the sector-specific chapters of this report (e.g. in the energy sector (see paras. 31 and 36–42 below), the agriculture sector (see paras. 55 below), the LULUCF sector (see paras. 66–67, 72–74 and 79–80 below) and the waste sector (see paras. 82 and 88 below), as well as on the activities under Article 3, paragraph 3, of the Kyoto Protocol (see paras. 90 and 92–95 below)).

23. In addition, the ERT identified a few inconsistencies between CRF table summary 3 and the NIR (e.g. CH_4 emissions from manure management and N_2O emissions from agricultural soils). The Party clarified these issues during the review. The ERT also identified differences between CRF table 7 and the key category analysis in the NIR due to the disaggregation of key categories in the NIR (e.g. stationary combustion and LULUCF), which is not reflected in CRF table 7. The ERT recommends that the Party correct these errors in its next annual submission.

Inventory management

24. Greece has a centralized archiving system, which includes the archiving of disaggregated emission factors (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. The centralized archiving system is located at MEECC and is updated annually upon completion of the inventory cycle. The ERT noted that, during the review, Greece was able to provide all requested additional archived information in a timely manner.

3. Follow-up to previous reviews

25. Greece has addressed several issues raised in previous review reports and followed their recommendations where appropriate or possible. This applies, in particular, to the industrial processes and agriculture sectors. However, for the LULUCF sector, hardly any improvements have been identified in response to the recommendations made in the previous review report; the major recommendations that have not yet been implemented by the Party are:

(a) The implementation of sector-specific QA/QC procedures for all key categories and for the LULUCF sector and the provision of additional information on the QA/QC procedures for the data supplied by external sources (in particular the EU ETS);

(b) Increasing the completeness and transparency in the LULUCF sector, in particular with regard to the change in the forest definition, the narrow definition of "managed forests" and the method used to calculate changes in carbon stocks in living biomass;

(c) Increasing transparency regarding KP-LULUCF activities, in particular through the provision of an explanation of: how afforestation and reforestation activities occurring on former grassland or unmanaged forests are estimated; the method used to identify land-use changes for the Land-use Change Database; and the QA/QC procedures that have been implemented;

(d) Ensuring the necessary capacity within the local Forest Services to acquire and report data on deforestation for all of the country's 51 prefectures in accordance with the requirements of paragraph 20 of the annex to decision 16/CMP.1;

(e) Reporting on all forest land that has legally or illegally lost its original forest cover.

4. Areas for further improvement

Identified by the Party

26. The 2011 NIR identifies several areas for improvement relating to specific categories. As a cross-cutting issue, the Party mentions that the improvement of the completeness of the GHG inventory is being further investigated through the inclusion of emission estimates, in the next annual submission, for categories for which IPCC methods and EFs do not exist. However, the planned improvements are not prioritized in the NIR and no time frame is provided. Therefore, the ERT encourages the Party to provide, in its next NIR, details of the planned improvements, together with a prioritization and a time frame for their implementation.

Identified by the expert review team

27. During the review, the ERT identified several cross-cutting issues for improvement. These are listed in paragraph 120 below.

28. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report.

B. Energy

1. Sector overview

29. The energy sector is the main sector in the GHG inventory of Greece. In 2009, emissions from the energy sector amounted to 100,536.22 Gg CO_2 eq, or 81.9 per cent of total GHG emissions. Since 1990, emissions have increased by 29.7 per cent. The key driver for the rise in emissions is the substantial increase in emissions from the transport category, which grew by 73.3 per cent between 1990 and 2009. Fuel combustion was the largest contributor to emissions in the sector, with 98.5 per cent. Within the sector, 54.5 per cent of the emissions were from energy industries, followed by 25.6 per cent from transport, 10.9 per cent from other sectors and 7.4 per cent from manufacturing industries and construction. Fugitive emissions from solid fuels accounted for 1.4 per cent and the remaining 0.2 per cent were from fugitive emissions from oil and natural gas.

30. The Party has made recalculations for the energy sector between the 2010 and 2011 submissions, some of which were made in response to the recommendation in the previous review report, while others were due to the use of more accurate AD. The impact of these recalculations on the energy sector is an increase in emissions of 0.04 per cent for 2008. The main recalculations took place for the following reasons:

(a) The use of updated AD (e.g. updated AD for solid fuel use in manufacturing industries based on plant-specific information from EU ETS reports and updated AD for transport);

(b) The correction of errors that were made in previous submissions (e.g. the AD used in the calculation of emissions for public electricity and heat production);

(c) The reallocation of GHG emissions from the use of gas in gas works from gaseous fuels to solid fuels in the same category, which has no impact on total GHG emissions;

(d) The correct reporting of fuels in the industrial processes sector and those used for international aviation in the CRF tables, which has no impact on total GHG emissions.

31. The reporting on the energy sector is generally transparent and Greece has provided detailed information on the methodologies used, the descriptions of assumptions, the rationale for the recalculations and details of planned improvements in the sector. However, the ERT noted that the Party could further enhance transparency by providing, in the NIR, more background documentation on EFs (e.g. for other fuels in other sectors, and those based on data from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* and from the core inventory of air emissions (CORINAIR), including an explanation of their appropriateness to the national circumstances of Greece) and disaggregated AD (e.g. other fuels in other (manufacturing industries and construction), waste fuels for combustion by category, lubricant use by category, bituminous coal and lignite by category and biomass in residential). The ERT recommends that Greece enhance the transparency of its reporting by providing the above information in its next NIR.

32. The present ERT agrees with the conclusion of the previous ERT that the Party has not provided sufficient information in its NIR to confirm whether the EU ETS data have

been prepared and incorporated in the inventory submission in line with the IPCC good practice guidance. Since there is still a lack of relevant information provided in the 2011 NIR, the ERT raised questions during the review on the AD, EFs and methodological tier levels used by Greece for the calculation of emissions in the energy sector. In response to these questions, Greece provided more background information for clarification purposes. The ERT recommends that Greece provide detailed information (e.g. in an annex to the NIR) on the EU ETS data used, including an analysis of their completeness and consistency with the IPCC methodology, and on the verification procedure applied to ensure conservation of the fuel mass balance and completeness of the data and that the Party report on the progress made with regard to this issue in its next NIR.

33. The sectoral information in the report and in the CRF tables is generally correct and accurate. However, the ERT noticed some errors in the NIR (e.g. fugitive CH_4 emissions from solid fuels for the years 2008 and 2009 in NIR table 3.1; the notation keys used to report fugitive CO_2 emissions from solid fuels for the years 2000–2009, which should be reported as not occurring ("NO") and not as included elsewhere, not occurring ("IE, NO") in NIR table 3.1; and the EF for jet kerosene in civil aviation in NIR table 3.13) and in the CRF tables (e.g. the apparent energy consumption excluding non-energy use and feedstocks in CRF table 1.A(c); jet kerosene used in international aviation from 2003 to 2004 in CRF table 1.C; and CH_4 and N_2O emissions from liquid fuels in railway transportation). The ERT recommends that Greece correct these data and enhance its QC procedures for its next annual submission.

2. Reference and sectoral approaches

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

34. 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 2009, CO_2 emissions estimated using the sectoral approach were 0.31 per cent lower than those estimated using the reference approach.

35. The ERT noted that the data on jet kerosene in the CRF tables are high compared to the data from the International Energy Agency (IEA). Also, the inventory of Greece includes the consumption of aviation gasoline for civil aviation, while no such consumption is included in the IEA data. Greece explained that, since there is a discrepancy between the number of landings and take-offs (LTOs) and the corresponding fuel consumption from the national energy balance, the adjustment applied to the estimate for the base year is continuously applied in the estimation of CO_2 emissions from civil aviation. The ERT recommends that Greece continue its efforts to estimate the country-specific share of LTOs and the corresponding fuel consumption, and report on any progress made in this matter in its next annual submission.

Feedstocks and non-energy use of fuels

36. The ERT noted that there are some inconsistencies between CRF tables 1.A(d) and 1.A(c). In table 1.A(d), non-energy use of natural gas is reported as 8.2 PJ but in table 1.A(c), only 3.9 PJ is subtracted. For liquid fuels, table 1.A(d) reports 25 PJ, while the difference in table 1.A(c) is only 15 PJ. Greece explained these differences in response to questions raised by the ERT during the review. The ERT recommends that the Party include these explanations in its next NIR. The ERT also noted that some fuels used as feedstocks and for non-energy use are still accounted for in the energy sector (e.g. natural gas used for hydrogen production and some amounts of naphtha, lubricants and other petroleum), which leads to low implied emission factors (IEFs) for CO_2, CH_4 and N_2O emissions in relevant sectors. Furthermore, the additional information on the stored carbon

of these fuels for feedstocks and non-energy use in CRF table 1.A(d) is far from complete and consistent. According to the Revised 1996 IPCC Guidelines, all feedstocks and non-energy use should be reallocated to the industrial processes sector and not included in the energy sector. The ERT recommends that Greece exclude all fuels for feedstocks and non-energy use from the energy sector and report, in line with the Revised 1996 IPCC Guidelines, in CRF tables 1.A(b) and 1.A(d) all feedstocks and non-energy use of fuels (as identified in the national energy balance), the associated CO_2 emissions and the category/sector under which they are allocated in the inventory.

37. The ERT found that CO_2 emissions from solid fuel combustion in ferroalloys production have been allocated to the industrial processes sector as reported in the NIR. However, the amount consumed has not been indicated in CRF tables 1.A(d), 1.A(b) and 1.A(c) (e.g. in table 1.A(d), the solid fuel used for feedstock and non-energy use is reported as "NO", which is not in line with the Revised 1996 IPCC Guidelines). Greece also regarded this as one of the reasons for the difference between the reference and the sectoral approach in the NIR, which should be not relevant if the corresponding information is correctly included in the CRF tables. The ERT recommends that Greece report, in line with the Revised 1996 IPCC Guidelines, in CRF tables 1.A(b) and 1.A(d) the feedstocks and non-energy use of solid fuels (as identified in the national energy balance), the associated CO_2 emissions and the category/sector under which they are allocated in the inventory and revise the relevant information in the NIR of the next annual submission.

3. Key categories

Stationary combustion: solid fuels – CO_2

38. The ERT noted that the net calorific values and carbon EFs for lignite are significantly different for energy industries and for manufacturing industries and construction. In response to a question raised by the ERT during the review, Greece provided detailed information explaining and justifying this difference, including the fact that the lignite is distributed from different mining fields. The ERT recommends that Greece include this information in its next NIR.

Stationary combustion: liquid fuels – CO_2 and N_2O

39. The ERT noted that the CO_2 IEF for liquid fuels in petroleum refining and in all subcategories under manufacturing industries and construction fluctuates with a general decreasing trend. In response to questions raised by the ERT, Greece explained that this is due to the change in the percentage of the fuels that compose the liquid fuel mix of these subcategories. The ERT recommends that Greece provide more detailed background information on the AD and EFs for all types of liquid fuels in these subcategories in its next NIR in order to improve the transparency of the reporting.

40. The ERT noted that the carbon content reported for refinery gas (15.42 t C/TJ) is low compared to the IPCC default value (18.2 t C/TJ). In response to a question raised by the ERT during the review, Greece provided more detailed data on refinery gas and explained how the EF (including the carbon content) is computed. The ERT recommends that Greece include this explanation in its next NIR in order to improve the transparency of the inventory.

41. The ERT noted that the N_2O IEF for liquid fuels in agriculture, forestry and fisheries is much lower in 2009 (23.44 kg/TJ) compared with the values in previous years (26.94–27.70 kg/TJ). In response to a question raised by the ERT during the review, Greece explained that three liquid fuels are used in this category (i.e. diesel and heavy fuel oil for boilers, and diesel and motor gasoline for off-road machinery). In 2009, the IEF decreased due to the reduction in diesel use and the change in the allocation of diesel use between off-

road machinery and boilers. The ERT recommends that Greece provide more background information on the N_2O IEF for liquid fuels in agriculture, forestry and fisheries in its next NIR.

Stationary combustion: other fuels – CO_2

42. In 2009, the CO_2 IEF for other fuels in other (manufacturing industries and construction) (32.73 t/TJ) is much lower compared with the value in previous years (89.25–119.13 t/TJ). In response to a question raised by the ERT during the review, Greece explained that the other fuels in this category are alternative fuels (e.g. scrap tyres, cable coating, etc.) used in Greek cement plants and provided the AD and EFs for these fuels for further clarification. The ERT recommends that Greece include this information in its next NIR.

Road transportation: liquid fuels – CO_2

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

4. Non-key categories

Navigation: liquid fuels – CH_4 and N_2O

44. In the NIR, Greece states that the CH_4 and N_2O EFs for national navigation refer to CORINAIR values (0.0012 g/MJ and 0.0019 g/MJ). The ERT noted that the Party is referencing an old version of the European Monitoring and Evaluation Programme /CORINAIR *Emission Inventory Guidebook*, which includes an incorrect reference to the Revised 1996 IPCC Guidelines. In response to questions raised by the ERT during the review on the rationale for using these EFs, Greece explained that, as it did not have data available concerning the different engine types and the corresponding fuel consumed, it is not possible to use the varied EFs listed in the Revised 1996 IPCC Guidelines. The ERT considers that this is not relevant as the default values contained in the Revised 1996 IPCC Guidelines do not provide EFs corresponding to different engine types but distinguish between: (a) diesel engines of ocean-going ships using residual fuel oil (CH_4: 0.007 g/MJ and N_2O: 0.002 g/MJ); and (b) diesel engines used in inland waterways (CH_4: 0.004 g/MJ and N_2O: 0.03 g/MJ). The ERT noted that the use of CORINAIR EFs could lead to an underestimation of emissions. In response to the list of potential problems and further questions raised by the ERT, Greece provided revised emission estimates for CH_4 and N_2O emissions from liquid fuels in national navigation, which are based on EFs from the Revised 1996 IPCC Guidelines. The ERT agrees with these estimates. The overall impact of this revision is an increase of 106.50 Gg CO_2 eq in 2009, equivalent to 0.1 per cent of total sectoral emissions.

45. The ERT noted that the IEFs for CH_4 and N_2O emissions from lubricant use (0.124 kg/TJ and 0.015 kg/TJ) in national navigation are much lower than the default values in the Revised 1996 IPCC Guidelines (Reference Manual) (5.0 kg/TJ and 0.6 kg/TJ). In response to a question raised by the ERT during the review, Greece explained that it uses the CH_4 and N_2O EFs from tables 1.7 and 1.8 of the IPCC Reference Manual (under the oil column) for lubricant use, which the ERT judged to be correct. Greece identified that the emission estimates that were calculated on the basis of these EFs were not transferred

correctly to the CRF Reporter, which led to lower CH_4 and N_2O emissions in this category in the CRF tables. In response to the list of potential problems and further questions raised by the ERT, Greece provided revised emission estimates for CH_4 and N_2O emissions from lubricant use, which are based on corrected values. The ERT agrees with these estimates. The overall impact of this revision is an increase of 0.05 Gg CO_2 eq in 2009, equivalent to less than 0.00 per cent of total sectoral emissions.

C. Industrial processes and solvent and other product use

1. Sector overview

46. In 2009, emissions from the industrial processes sector amounted to 9,178.25 Gg CO_2 eq, or 7.5 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 315.60 Gg CO_2 eq, or 0.3 per cent of total GHG emissions. Since the base year, emissions have decreased by 25.7 per cent in the industrial processes sector, and increased by 2.4 per cent in the solvent and other product use sector. The key driver for the fall in emissions in the industrial processes sector is the closure of the hydrochlorofluorocarbon-22 manufacturing plant. Emissions also decreased due to the contraction in nitric acid, aluminium and cement production activities. The decrease in emissions was somewhat compensated for by the increase in HFC emissions from the consumption of halocarbons and SF_6. Within the industrial processes sector, 58.0 per cent of the emissions were from mineral products, followed by 28.0 per cent from consumption of halocarbons and SF_6, 7.9 per cent from metal production and 6.0 per cent from chemical industry.

47. Greece has made recalculations for the industrial processes sector between the 2010 and 2011 submissions. PFC emissions from aluminium production were recalculated due to methodological changes in the estimation of emissions introduced by the producer. CH_4 emissions from steel production and N_2O emissions from nitric acid production were recalculated due to identified errors in the AD, and recalculations of HFC emissions from consumption of halocarbons and SF_6 were performed following updates to the AD. The impact of these recalculations on the industrial processes sector is an increase of 0.4 per cent for 2008.

48. The inventory for the industrial processes is generally complete, except for the soda ash category. CO_2 emissions from soda ash use in glass production were reported under other (mineral products), but other possible soda ash uses (e.g. in chemicals, soaps, detergents and flue gas desulphurization) were not taken into account (see para. 52 below). The ERT noted that potential emissions of F-gases are not reported. The ERT reiterates the encouragement of the previous review report that the Party provide estimates of the potential emissions of F-gases in its next annual submission, noting that Greece has already taken some steps to improve data on F-gas collection, as explained by the Party during the review.

49. The Party addressed most of the recommendations made in the previous review report, except for the recommendation to report publicly available AD on aluminium production in the CRF tables (see para. 50 below). The inventory for the industrial processes sector is generally transparent and the ERT commends Greece for the numerous improvements related to the increased transparency of the NIR, which were implemented in response to the recommendations in the previous review report.

2. Key categories

Aluminium production – PFCs

50. As already noted in previous review reports, Greece does not report AD on aluminium production in the CRF tables due to the confidentiality of the data. Publicly available data on primary aluminium production published in the United Nations Industrial Commodity Statistics (Yearbook and Database) are also not reported, because they are considered inconsistent with regard to data sources and incomplete throughout the time series. Nevertheless, the ERT reiterates the recommendation that the Party report, in the CRF tables of its next annual submission, publicly available data on aluminium production in order to enable the assessment of the approximate level and trend of the IEFs for PFC emissions for a cross-country comparison and trend analysis. The ERT commends Greece for performing additional QC procedures on the plant-specific data by comparing it with publicly available data, noting that the difference between these data is, on average, just 0.13 per cent, as stated in the NIR.

Consumption of halocarbons and SF_6 – HFCs

51. HFC emissions from foam blowing are estimated with reference only to emissions from hard foam production. In response to a question raised by the ERT during the review on imported foams containing HFCs, the Party explained that the national foam market is mainly covered by the products produced in Greece. Furthermore, the Party informed the ERT that, among the companies producing foams, only one company reports on the import of extruded polystyrene foams and emissions from these products have already been taken into account in the Party's calculations. The other companies' production is concentrated only on the import of products that do not contain HFCs. The ERT notes that the information on HFC emissions from imported foams is not reflected in the NIR and recommends that Greece include a transparent explanation on the assumptions, methodologies, AD and EFs used to estimate HFC emissions from foam blowing in the next annual submission. The ERT also notes that the import of foams containing HFCs can be covered not only by companies producing foams and recommends that the Party further investigate the import of HFC-containing foam products in Greece for the next annual submission.

3. Non-key categories

Soda ash use – CO_2

52. Greece reports CO_2 emissions from soda ash use as "IE, NO". CO_2 emissions from soda ash use in glass production are reported under other (mineral products), but other possible soda ash uses were not taken into account. In response to questions raised by the ERT during the review, Greece provided statistics for the import/export of soda ash for the period 1998–2009 and affirmed that other uses of soda ash are non-emissive, but did not provide the necessary justification for this assumption. The ERT notes that the Revised 1996 IPCC Guidelines explicitly state that "Carbon dioxide emissions are associated with the use of soda ash. Some of the major uses include glass manufacture, chemicals, soaps, detergents and flue gas desulphurisation. For each of these uses, it is assumed that for each mole of soda ash use, one mole of CO_2 is emitted". In response to the list of potential problems and further questions raised by the ERT, Greece provided revised estimates for CO_2 emissions from soda ash use, which are based on the national consumption of soda ash. The ERT agrees with these estimates. The overall impact of this revision in 2009 is an increase of 9.65 Gg CO_2 eq, equivalent to 0.1 per cent of emissions from the industrial processes sector. The ERT recommends that Greece use this revised estimate for its future

annual submissions and transparently document the methodologies, EFs and AD used for the calculations.

D. Agriculture

1. Sector overview

53. In 2009, emissions from the agriculture sector amounted to 8,939.50 Gg CO_2 eq, or 7.3 per cent of total GHG emissions. Since the base year, emissions have decreased by 22.2 per cent. The key driver for the fall in emissions is the decrease in the use of synthetic fertilizers, which has led to a reduction in N_2O emissions from agricultural soils. Within the sector, 55.0 per cent of the emissions were from agricultural soils, followed by 36.2 per cent from enteric fermentation, 7.0 per cent from manure management, 1.3 per cent from rice cultivation and 0.5 per cent from field burning of agricultural residues.

54. The Party has made recalculations for the agriculture sector between the 2010 and 2011 submissions, partly in response to the 2010 annual review report and also due to improvements identified by the Party. Changes were made to nitrogen excretion (Nex) rates for livestock, and due to the use of the tier 2 method for enteric CH_4 emissions from dairy cattle and other cattle, the inclusion of enteric emissions from poultry and the inclusion of sewage sludge application to agricultural soils. The impact of these recalculations on the agriculture sector is an increase of 0.6 per cent for 2008. The main recalculations took place in the following categories:

(a) CH_4 emissions from enteric fermentation;

(b) N_2O emissions from agricultural soils;

(c) CH_4 and N_2O emissions from manure management.

55. The inventory for the agriculture sector is complete and includes estimates of all gases and for all categories. 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 enteric fermentation estimate for other cattle, in order to enhance transparency. The inventory is complete for all categories and gases and the time series is consistent. 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.

2. Key categories

Enteric fermentation – CH_4

56. For the estimation of CH_4 emissions from enteric fermentation, Greece applied the IPCC tier 2 method using country-specific information for sheep and cattle. Poultry have been included in the estimate this year for the first time, using an EF obtained through a review of the inventories of other countries. The Party has applied an IPCC tier 1 method with default EFs to the estimation of emissions from other animals. This is in line with the IPCC good practice guidance. Improvements to transparency in the enhanced characterization of sheep have also been implemented.

57. A notable improvement in the Party's inventory was the use of an IPCC tier 2 method to estimate emissions from cattle, as recommended in the previous review report. While the description provided for dairy cattle is sufficient, further information could be provided on the AD used for the enteric fermentation emission estimates for other cattle. As enteric fermentation is a key category, the move to a tier 2 approach is an important improvement to the Party's inventory.

58. Greece has implemented a number of improvements to its approach to estimating enteric fermentation emissions from sheep. Further details have been provided explaining the updated enhanced characterization. Following the recommendations of the 2010 review, Greece now estimates the energy requirements for wool production for all mature sheep and accounts for the number of milking ewes and single/double births, which is consistent with the IPCC good practice guidance. However, due to the limited time available during the review for the ERT to properly assess the approach, it would be useful for future ERTs to look more closely at the approach and data used in order to ensure that they are fully consistent with the IPCC good practice guidance.

Agricultural soils – N_2O

59. Greece estimated N_2O emissions from agricultural soils using the tier 1a and tier 1b methods from the IPCC good practice guidance in combination with country-specific and IPCC default data.

60. Greece has included emissions of N_2O from sewage sludge application to agricultural soils in its inventory for the first time. The time series begins in 2004 and continues until 2009. In response to a question from the ERT during the review, Greece provided information to confirm that the application of sewage sludge did not occur prior to 2004; therefore, the time series is complete and consistent for the current inventory report.

61. In response to the recommendations from previous review reports, Greece now uses the Western Europe value for Nex from dairy cattle due to the similarity of the production practices. For non-dairy cattle, the Nex values range from 42 kg/head/year to 45 kg/head/year across the time series, which is in the lower range of the values recommended in the Revised 1996 IPCC Guidelines. However, because Greece is a Mediterranean country with production practices different from those in Western Europe for these animal types, the ERT considers that the use of these values is justified. The sheep and swine Nex values are also lower than those recommended in the Revised 1996 IPCC Guidelines for Western Europe but, again, because Greece is a Mediterranean country, these values are justified. The ERT encourages Greece to provide further explanation in future NIRs as to why these values have been selected.

62. In response to the recommendations in previous review reports that the Party describe the country-specific allocation of manure to animal waste management systems (AWMS) for cattle, buffalo and swine, Greece has provided a detailed description of how manure is allocated to the various AWMS for each animal type. The ERT commends Greece for this improvement, which has enhanced the transparency of its inventory.

3. Non-key categories

Manure management – CH_4 and N_2O

63. Greece now uses a tier 2 method to estimate CH_4 emissions from manure management and a tier 1 approach to estimate N_2O emissions. A single livestock characterization, as described in the section on enteric fermentation, is also applied to the manure management estimates, as recommended in the previous review report. Conclusions to Nex values for sheep are also included to account for young animals, in line with the IPCC good practice guidance.

E. Land use, land-use change and forestry

1. Sector overview

64. In 2009, net removals from the LULUCF sector amounted to 3,018.56 Gg CO_2 eq. Since the base year, net removals have increased by 20.9 per cent. The key drivers for the rise in removals are the reduction in fellings and the afforestation programme launched in 1994. Within the sector, 76.0 per cent of the net removals were from forest land (2,295.34 Gg CO_2 eq), followed by 24.4 per cent from cropland (737.22 Gg CO_2 eq). Grassland was a net source of emissions and accounted for 13.99 Gg CO_2 eq.

65. The Party has made recalculations for the LULUCF sector between the 2010 and 2011 submissions due to methodological changes, yet the ERT found no explanation in the NIR or in CRF table 8(b) regarding these methodological changes. The impact of these recalculations on the LULUCF sector is a net decrease in removals of 3.0 per cent in 2008. The recalculations took place in the category forest land remaining forest land only, with a decrease in net removals of 4 per cent.

66. As already noted in the previous review report, Greece does not provide a transparent explanation in its NIR regarding the recalculations for the LULUCF sector. The ERT recommends that Greece dedicate a section of its NIR to explain the recalculations in this sector and that it adequately complete CRF table 8(b).

67. Net emissions/removals from wetlands, settlements and other land were reported as "NO" or "NE" (not estimated). The following subcategories were also reported as "NO": land converted to grassland; and CO_2 emissions from grassland remaining grassland. Greece followed the recommendation of the previous review report regarding the provision of information in the documentation box for categories where AD are reported and emissions are not occurring (e.g. wetlands). However, Greece failed to implement these recommendations regarding the improvement of completeness, in particular regarding the provision of estimates for carbon stock changes in dead organic matter and regarding the enhancement of transparency for the subcategories reported as "NO", by indicating in the documentation boxes where the relevant information can be found in the NIR. The ERT reiterates the recommendations of the previous review report that Greece improve the completeness and transparency of its reporting in its next annual submission.

68. In its 2010 submission, Greece indicated that it was developing a new mapping system based on remotely sensed data, which would enable the Party to provide more complete information on land-use changes. However, no mention of this upcoming system is made in its 2011 submission. The ERT encourages Greece to provide information regarding the status of this ongoing effort in its next annual submission.

69. The ERT notes that Greece estimates some key categories (e.g. forest land remaining forest land) by using EFs developed for a similar climate (Catalonia) rather than the IPCC default values. The ERT encourages Greece to continue moving to higher-tier methods for the key categories, in particular for soil carbon changes in cropland remaining cropland.

70. The QA/QC procedures implemented in the LULUCF sector and their corresponding findings are not documented in the NIR. During the review, Greece provided the key findings of the procedures. The main findings were related to the correct use of the annotated NIR and of the notation keys "NO" and "NE". Nevertheless, the ERT noted that these two issues have still not been corrected in the 2011 submission. The ERT recommends that Greece document the QA/QC procedures for the LULUCF sector in its next annual submission and that it correct its next annual submission in accordance with the findings of the QA/QC procedures. The ERT encourages Greece to document its follow-up

to this review for the LULUCF sector in the same way that it has documented the follow-up to the 2010 review for other sectors in table 9.8 of its 2011 NIR.

2. Key categories

Forest land remaining forest land – CO_2

71. The previous review report contained three major recommendations regarding the category forest land remaining forest land, related to the change in the forest definition, the narrow definition of "managed forests", and the method used to calculate changes in carbon stocks in living biomass. None of these recommendations have been addressed by Greece in its 2011 submission, although some of them were explained during the review. The ERT therefore strongly recommends that the Party address these issues in its next annual submission, by implementing the recommendations in paragraphs 72–74 below.

72. The previous review report noted that Greece changed its definition of forest in its 2010 submission, including a minimum tree height of 2 m and an increase in the minimum crown cover from 10 to 25 per cent, in order to make it consistent with its forest definition under the Kyoto Protocol (see also para. 89 below). Greece does not provide in the NIR any information on the impact of this change in the forest definition on the data sources used for the inventory, and the ERT reiterates the strong recommendation of the previous review report that the Party provide this information in its next annual submission.

73. Greece defines "managed forests" as forests for which there is a management plan. As a result, 65 per cent of Greek forests are not managed, and are ,therefore, not estimated. This narrow interpretation of forest management leads to an unusually low proportion of managed forests. The ERT recommends that Greece improve the transparency on this key issue by providing evidence in the NIR that forests without a management plan do not "fulfill relevant ecological, economic and social functions" in accordance with the IPCC good practice guidance for LULUCF. Such evidence could include: the criteria which mandate a management plan (e.g. the size threshold and forest type), the reasons why unmanaged forests are not harvested and the reasonable levels of harvest when all wood harvested in Greece is attributed to forests with a management plan only. The ERT further encourages Greece to dedicate an easily identifiable section of its NIR to the definition of "managed forests" and "forest management".

74. The previous review report noted the need for the Party to further increase transparency on the method used (stock change method) and in particular on the kind of data available to justify the use of this method. During the review, Greece explained that data from Forest Management Plans (FMPs) are more frequently updated than data from national forest inventories and therefore provide sufficient data for a stock change method. Greece provided the example of one district which clearly shows that stock changes are indeed assessed more regularly at the property level for FMPs. The ERT recommends that Greece include this information in the NIR to justify its choice of method, together with some methodological elements on the forest inventory conducted when an FMP is carried out.

75. The AD reported for this activity relate to the entire forest area. During the review, Greece announced that it would separate managed and unmanaged forest area in its 2012 CRF. The ERT welcomes this upcoming improvement.

Land converted to forest land – CO_2

76. The estimates of the carbon stock changes in soil carbon are included in the cropland remaining cropland category. Greece explained that it was not possible to distinguish the type of cropland management between conversion categories (e.g. land converted to forest

land and land converted to cropland) and the cropland remaining cropland category. The ERT understands the explanation but nevertheless recommends that Greece develop separate estimates for the changes in soil carbon for the different subcategories, for example by using the weighted average of the soil carbon content as the soil carbon content before conversion to forest land. Separating these categories in terms of their soil carbon changes will be particularly important at the end of the commitment period as it will impact on the estimates for afforestation, reforestation and deforestation activities.

3. Non-key categories

Grassland remaining grassland – CO_2

77. The carbon stock changes in grassland remaining grassland are reported as "NO", which is justified in the NIR by the fact that management practices have not changed in the last 20 years. During the review, Greece indicated that it would provide evidence for this absence of change in its next annual submission. The ERT welcomes this upcoming improvement in transparency.

Biomass burning – CO_2, CH_4 and N_2O

78. Greece reported for the first time in its 2011 submission the AD for wildfires in the grassland remaining grassland category. The ERT commends Greece for this improvement in completeness.

79. The previous ERT recommended that Greece provide information in its NIR on how fire emissions are distinguished between managed and unmanaged forest land. During the review, the Party explained that it did not have data to distinguish between these land types and therefore used a weighted average. The ERT reiterates the recommendation that the Party include this information in the NIR.

80. AD and emissions are reported as not applicable ("NA") for the cropland remaining cropland category. During the review, Greece explained that CO_2 emissions were not occurring as plants regrow the following year. The ERT recommends that Greece document this fast regrowth in the NIR as well as its consistency with the 13- and 25-year periods indicated in NIR table 7.9 as the time required for vines and olive trees, respectively, to reach their maturity biomass. The ERT further recommends that Greece estimate CH_4 and N_2O emissions from biomass burning or use the notation key "IE" if those emissions are already included in the agriculture sector.

F. Waste

1. Sector overview

81. In 2009, emissions from the waste sector amounted to 3,754.54 Gg CO_2 eq, or 3.1 per cent of total GHG emissions. Since the base year, emissions have decreased by 25.8 per cent. The key drivers for the fall in emissions are the implemented management policies and measures in the country, the increase in the aerobic treatment of wastewater and the reduction of unmanaged solid waste disposal sites (SWDS). Within the sector, 67.3 per cent of the emissions were from solid waste disposal on land, followed by 32.6 per cent from wastewater handling and 0.1 per cent from waste incineration.

82. The Party has recalculated CH_4 emissions from solid waste disposal on land by incorporating a revised DOC_f and MCF for unmanaged SWDS and updated data for recycled waste for 2007 and 2008 and by using the IPCC tier 2 method for calculating flared CH_4, which resulted in an increase in emissions of 59.86 Gg CO_2 eq (or 3.5 per cent) in the base year and of 213.40 Gg CO_2 eq (or 9.5 per cent) in 2008. Additionally, Greece

has recalculated CH_4 emissions from domestic wastewater handling by incorporating updated data of produced amounts of sewage sludge for the period 1990–2008, which has resulted in a decrease in emissions of 248.42 Gg CO_2 eq (or 8.1 per cent) in the base year and of 381.18 Gg CO_2 eq (or 30.9 per cent) in 2008. Altogether, the recalculations resulted in a decrease in total sectoral emissions of 185.42 Gg CO_2 eq (or 3.6 per cent) in the base year and of 167.78 Gg CO_2 eq (or 4.3 per cent) in 2008. The ERT recommends that the Party include waste flows (including sludge flows) in its next NIR in order to increase transparency.

2. Key categories

Solid waste disposal on land – CH_4

83. Greece used the first-order decay method (tier 2) of the IPCC good practice guidance with a mix of country-specific data and IPCC default emission parameters to estimate CH_4 emissions from solid waste disposal on land. There is no confirmed official time-series data regarding the composition and quantity of municipal solid waste (MSW) at the national level. For the years 1960–2000, the quantity of MSW was estimated on the basis of population figures and assumptions regarding waste generation/day, and for the follow-up period more accurate data based on MSW quantities were used.

84. Greece reports only MSW; however, based on information from the Hellenic Statistical Authority, large amounts of industrial and commercial waste are generated but are not included in the inventory. The Party explained that industrial and commercial waste is mainly recycled and the rest is disposed of at the same managed and unmanaged SWDS that are used for MSW. Additionally, it was mentioned by the Party that disposed industrial and commercial waste is included in the amount of MSW disposed. During the review of the annual submission of the EU, that ERT raised the same question and, in response to the list of potential problems and further questions raised by the ERT, Greece submitted revised estimates of the emissions from industrial waste for the entire time series. The revised estimates resulted in an increase in CH_4 emissions from solid waste disposal on land of 39.49 Gg CO_2 eq (or 2.1 per cent) in the base year and of 64.58 Gg CO_2 eq (or 2.6 per cent) in 2009. The AD were obtained from the Hellenic Statistical Authority and, since industrial waste is disposed of at the same landfills as MSW, a similar method was used to estimate CH_4 emissions. Most of the parameters used are IPCC default ones. The ERT considers that these revisions have been done in accordance with the IPCC good practice guidance and recommends that the Party include more information on industrial waste in its next NIR.

85. There are four landfill sites in Greece where CH_4 is recovered. However, according to the Party, for three of the sites it has not been possible to obtain data but it has been assumed that 60 per cent of the CH_4 at those sites is recovered. The Party explained that a recovery rate of 60 per cent is estimated at the SWDS in Athens where the CH_4 is measured because it is used for energy production. Taking into consideration the fact that the other three landfill sites have been constructed with similar characteristics to that of Athens, it is estimated that the same fraction of CH_4 is recovered at those sites. The ERT recommends that the Party further investigate the amount of CH_4 recovered at the sites where it is flared with no energy recovery and provide a justification for the calculation of the amount of CH_4 recovered in its next NIR.

86. Greece does not differentiate between garden and park waste and other non-food putrescibles and food waste as all have been included in the general putrescibles. As the DOC value of these waste types differs, their allocation to the same category is not in line with the Revised 1996 IPCC Guidelines. The ERT reiterates the recommendation made in

the previous review report that Greece estimate these waste types separately using appropriate DOC values.

Wastewater handling – CH_4

87. Greece has used a tier 1 method to calculate CH_4 emissions from wastewater handling. However, wastewater handling is identified as a key category in the Greek inventory. According to the decision trees in the IPCC good practice guidance, the Party should use a tier 2 method for this key category. The Party explained that the use of a higher-tier method is limited by the lack of more detailed data. The ERT recommends that the Party make efforts to obtain the necessary data and encourages it to use a tier 2 method for the calculation of CH_4 emissions from wastewater handling in its next annual submission.

3. Non-key categories

Waste incineration – CO_2, CH_4 and N_2O

88. Greece has used the IPCC good practice guidance to estimate CO_2 emissions, and a default methodology and country-specific EFs to estimate CH_4 and N_2O emissions from the incineration of clinical waste. The Party mentioned in its NIR that there is no other incineration plant for any other type of waste, only the one for clinical waste. However, the ERT noted that the Hellenic Statistical Authority lists a significant amount of "other waste" without energy recovery and a larger amount of waste incinerated with energy recovery. The Party mentioned that the "other waste" is accounted for in the energy sector. The ERT recommends that Greece improve the information provided in the waste incineration subchapter in the NIR by including more detailed documentation on the waste incinerated with and without energy recovery.

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

89. The Party has reported activities under Article 3, paragraph 3, of the Kyoto Protocol and has also reported forest management, which it has elected as an activity under Article 3, paragraph 4, of the Kyoto Protocol. Greece has elected to account for KP-LULUCF activities at the end of the commitment period. Greece defines forest land as land with a tree crown cover of more than 25 per cent, an area larger than 0.3 ha and a minimum tree height, or the potential to achieve it, of 2 m. This forest definition is the same as that used in the Party's reporting under the Convention starting from its 2010 submission.

90. Greece applies reporting method 1 from the IPCC good practice guidance for LULUCF to report activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, with the boundaries of the areas that encompass these activities defined as the 51 prefectures of the country. The Party presents a land-use transition matrix for 2009 based on several data sources. The data on afforestation and reforestation originate from the afforestation registry of MEECC and encompass afforestation activities on cropland since 1994. Data on deforestation are obtained from the Party's Land-use Change Database, which includes data on changes from forest land to other land-use categories since 1990 collected by the local Forest Services. The AD for forest management are derived from the Forest Management Plans Database (FMPD). The ERT reiterates the recommendations

from the previous review report that Greece increase the transparency of its reporting on: (a) how afforestation and reforestation activities occurring on former grassland or unmanaged forests are estimated; (b) the method used to identify land-use changes for the Land-use Change Database; and (c) the QA/QC procedures implemented.

91. 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 92–94 below.

92. Decision 15/CMP.1 requires information to be provided on how emissions/removals from activities under Article 3, paragraph 4, of the Kyoto Protocol are not accounted for under activities under Article 3, paragraph 3. The information provided in the NIR on how the FMPD interacts with the new Land-use Change Database for deforestation and the Afforestation/Reforestation Database collected under EEC Regulations 2080/92 and 1257/99 is not sufficiently transparent. In particular, if an FMP is established for a plantation, the corresponding land will then show up in the FMPD and in the Afforestation/Reforestation Database at the same time, thus resulting in double counting. Similarly, if an area under forest management is deforested, it needs to be removed from the FMPD. There is no indication of how regularly the FMPD is updated, which means that there is no indication of the period of time following submission of the last FMP after which this area is considered to be no longer managed. Depending on the frequency of the update, removals from forest management may be overestimated. The ERT urges Greece to strengthen its accounting system and its description in the NIR so that the impossibility of double counting is transparently documented.

93. Decision 15/CMP.1 requires information to be provided on whether factoring out is implemented by the Party. During the review, Greece stated that no factoring out was implemented. The ERT recommends that the Party include this information in its next annual submission.

94. The ERT noted that, in its 2011 submission, Greece did not provide sufficient verifiable information, as required by paragraph 6(e) of the annex to decision 15/CMP.1, to demonstrate that omitted pools, namely litter, dead wood and soils, are not net sources of emissions. Greece indicated in its NIR that the estimation of the carbon stock changes for these pools was a priority for its next annual submission. The ERT welcomes this upcoming improvement and recommends that Greece either estimate the carbon stock changes for these pools or provide the required evidence that these pools are not a net source if an estimate is not provided.

95. Greece has not made any recalculations for KP-LULUCF activities between the 2010 and 2011 submissions. The Party did, however, recalculate its removals for the forest land category under the Convention. As mentioned above, the ERT was not able to assess this recalculation or, therefore, to further assess whether it has an impact on KP-LULUCF activities. The ERT recommends that Greece improve transparency regarding this recalculation and recalculate relevant estimates for KP-LULUCF activities if warranted.

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

Afforestation and reforestation – CO_2

96. The ERT noted that the category afforestation and reforestation has not been recalculated, whereas the category land converted to forest land has been recalculated for the Party's reporting on LULUCF under the Convention. No justification is provided in the NIR for this apparent inconsistency. The ERT reiterates the strong recommendation

pertaining to transparency expressed in the forest land remaining forest land section of this report (see para. 71 above).

Deforestation – CO_2

97. The previous ERT noted that data on deforestation had not been reported for 11 out of the country's 51 prefectures for the 2008 inventory year. The Party explained that the missing information would be provided in its 2011 submission. The ERT noted that the relevant AD were still missing from the 2011 submission and that data for 24 prefectures were missing for the 2009 inventory year. The ERT noted that the inability to identify deforested lands in these prefectures could result in an underestimation of the total area of deforested land. The ERT strongly recommends that Greece ensure the necessary capacity within the local Forest Services to acquire and report these data in accordance with the requirements of paragraph 20 of the annex to decision 16/CMP.1.

98. Greece indicates that only legal deforestation is included in its Land-use Change Database, assuming that lands that have illegally lost their forest cover are only temporarily unstocked, with vegetation recovering naturally or as a result of human intervention. Thus, harvesting or disturbance in these areas is not considered deforestation. The previous review report noted that this approach may lead to an underestimation of deforestation and that Greece has sufficient information on the size and geographical location of areas that have lost forest cover through illegal harvest or biomass burning, but that this information is not readily available for use in the context of its reporting under the Kyoto Protocol. The previous review report strongly recommended that the Party report on all forest land that has legally or illegally lost its original forest cover. The ERT did not note any improvement in this regard and therefore reiterates the recommendation of the previous review report.

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

Forest management – CO_2

99. The ERT noted that the category forest management has not been recalculated, whereas the category forest land remaining forest land has been recalculated for the Party's reporting on LULUCF under the Convention. No justification is provided in the NIR for this apparent inconsistency. The ERT reiterates the strong recommendation pertaining to transparency expressed in the forest land remaining forest land section of this report (see para. 71 above).

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

100. 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.[5] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10.

101. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with chapter I.E of the annex to decision 15/CMP.1, 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

[5] 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.

transaction log and the clean development mechanism registry and meets the requirements set out in paragraph 88(a–j) of the annex to decision 22/CMP.1.

National registry

102. 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. The ERT noted from the SIAR that the Party revised the publicly available information such that it is also available in English in response to a recommendation made in the previous review report. However, the ERT also noted that mistakes in the publicly available information identified in the previous review report were not corrected at the time of the 2011 review. In response to questions raised during the 2011 review, the Party indicated that it is currently establishing a new website and that the relevant information will be corrected and available on that website by the end of 2011. The ERT recommends that Greece correct the mistakes indicated above and report on this matter in its next annual submission.

Calculation of the commitment period reserve

103. Greece has reported its commitment period reserve in its 2011 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 the most recently reviewed inventory. The ERT agrees with this figure.

3. Changes to the national system

104. Greece reported that there have been changes to its national system since the previous annual submission. However, all the changes mentioned in the latest NIR (apart from the information on the change of the national focal point) had already been reported in the previous NIR. Therefore, the ERT concluded that the national system has not changed since the 2010 submission (apart from the change of the national focal point). In response to questions raised by the ERT during the review, the Party confirmed that the change of the national focal point was the only change to the national system. The ERT recommends that the Party report in its future annual submissions only those changes to its national system compared to the previous annual submission in accordance with chapter I.F of the annex to decision 15/CMP.1. The ERT concluded that, taking into account the confirmed change in the national system, Greece's national system continues to be in accordance with the requirements of national systems set out in decision 19/CMP.1.

4. Changes to the national registry

105. Greece reported that there have been no changes to its national registry since the previous annual submission. The ERT concluded that the Party's 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 Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

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

106. 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 since the previous annual submission. However, the ERT identified that no changes have been made and concluded that the information provided continues to be complete and transparent.

107. The Party explained in the NIR that the majority of Greek policies are directly related to the implementation of EU policies at the national level and that impacts on third countries are mostly indirect. 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. The ERT considers this information complete given the relevance of the EU policies considered.

108. Greece has included a separate section in its NIR containing information on how it gives priority, in implementing its commitments under Article 3, paragraph 14, of the Kyoto Protocol, to the specific actions listed in paragraph 24(a–f) of the annex to decision 15/CMP.1.

III. Conclusions and recommendations

109. Greece made its annual submission on 15 April 2011; the 2011 CRF tables were submitted on 19 April 2011 and resubmitted on 26 May 2011. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information 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 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. The annual submission was submitted in accordance with decision 15/CMP.1. The ERT noted that Greece submitted the CRF and SEF tables slightly after the deadline of 15 April but within the six-week period after which the consequences of late submission apply under decision 15/CMP.1. In response to a question raised by the ERT during the review, the Party explained that the delay was due to a computer problem.

110. The ERT concludes that the inventory submission of Greece has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory covers most source and sink categories for the period 1990–2009 and is complete in terms of years and geographical coverage. The ERT noted that Greece improved the completeness of its inventory for its 2011 submission, reporting estimates for some categories for the first time (e.g. in the LULUCF and waste sectors). However, Greece did not report CO_2 emissions from soda ash use for uses other than glass production, a category for which the Revised 1996 IPCC Guidelines provide estimation methodologies. However, in response to the list of potential problems and further questions raised by the ERT, the Party provided estimates for this category (see para. 52 above). In addition, Greece did not provide estimates for some mandatory and non-mandatory LULUCF categories and pools, for potential emissions of F-gases and for other categories for which there are no methodologies available in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. Finally, in response to the list of potential problems and further questions, Greece provided revised estimates to

resolve the potential underestimations of emissions from navigation and lubricant use (see paras. 44 and 45 above). Further, in response to questions raised during the review of the annual submission of the EU, Greece provided emission estimates for industrial waste disposal (see para. 84 above).

111. 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.

112. The Party's inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF, with the following exceptions: the reporting of fuels in the reference approach related to feedstock and non-energy use of fuels; and the allocation of garden and park waste as well as other non-food putrescibles in the general putrescibles.

113. The Party has made recalculations for the inventory between the 2010 and 2011 submissions in response to the 2010 annual review report, due to changes in AD and EFs and due to identified errors. The recalculations have been performed and reported in accordance with the IPCC good practice guidance. The impact of these recalculations on the national total GHG emissions is an increase of 0.02 per cent for 2008. In general, the rationale for the recalculations is explained transparently in the NIR and in CRF table 8(b). However, the ERT noted that there are a few cases in the LULUCF and waste sectors where the explanations provided by the Party were not fully transparent. The main recalculations took place in the following sectors/categories:

(a) CH_4 emissions from enteric fermentation;

(b) CH_4 emissions from manure management;

(c) CH_4 emissions from solid waste disposal on land;

(d) CH_4 emissions from wastewater handling.

114. Greece has elected to account for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol at the end of the commitment period. The Party follows the requirements of paragraphs 5–9 of the annex to decision 15/CMP.1. The KP-LULUCF inventory has been prepared in line with the IPCC good practice guidance for LULUCF. The following issues were identified concerning the reporting on KP-LULUCF:

(a) A lack of transparency on how afforestation/reforestation activities occurring on former grassland or unmanaged forests are estimated;

(b) A lack of transparency on the method used to identify land-use changes for the Land-use Change Database;

(c) The need to document the QA/QC procedures implemented;

(d) A lack of capacity within the local Forest Services to acquire and report data in accordance with the requirements of paragraph 20 of the annex to decision 16/CMP.1;

(e) A lack of capacity to report on all forest land that has legally or illegally lost its original forest cover.

115. The Party has not made any recalculations for KP-LULUCF activities between the 2010 and 2011 submissions.

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

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

118. 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 CMP decisions.

119. Greece has reported information under chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2011 annual submission. The information was provided on 15 April 2011. The reported information is considered complete and transparent.

120. The ERT identifies the following cross-cutting issues for improvement:

(a) The action needed to ensure that, in the future, all parts of the Party's inventory submission will be submitted by 15 April;

(b) The continuation of efforts to strengthen the national system so that it can perform fully all its required functions, particularly those related to reporting on the LULUCF sector and activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, and those with regard to the timeliness of the annual submission;

(c) The implementation of sector-specific QA/QC procedures for all key categories and for the LULUCF sector and the provision of additional information on the QA/QC procedures for the data supplied by external sources (in particular the EU ETS);

(d) The improvement of transparency in the energy (see paras. 31 and 36–42 above), agriculture (see paras. 55 and 57 above), LULUCF (see paras. 66–67, 72–74 and 79–80 above) and waste (see paras. 82 and 88 above) sectors and KP-LULUCF activities (see paras. 90 and 92–95 above);

(e) The provision of the planned inventory improvements, together with a prioritization and a time frame for implementing the improvements in the next annual submission.

121. In the course of the review, the ERT formulated a number of recommendations relating to the sectors. The key recommendations are that Greece:

(a) Correct the reporting of feedstocks and non-energy use of fuels and provide more information on the use of EU ETS data in the energy sector;

(b) Provide AD for aluminium production in the industrial processes sector;

(c) Provide additional information on the AD used for the tier 2 enteric fermentation estimates for other cattle in the agriculture sector;

(d) Provide explanations of any recalculations, improve and document the QA/QC procedures and implement recommendations made in the previous review report related to the change in forest definition, the narrow definition of "managed forests" and the method used for changes in carbon stocks in living biomass in the LULUCF sector;

(e) Investigate the amount of CH_4 recovered from landfills and implement the tier 2 method for CH_4 emissions from wastewater handling in the waste sector.

IV. Questions of implementation

122. 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 2011. Available at <http://unfccc.int/resource/docs/2011/asr/grc.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2011. Available at <http://unfccc.int/resource/webdocs/sai/2011.pdf>.

FCCC/ARR/2010/GRC. Report of the individual review of the greenhouse gas inventory of Greece submitted in 2010. Available at <http://unfccc.int/resource/docs/2011/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. Afroditi Kotidou (Ministry of Environment, Physical Planning and Public Works) and Mr. Ioannis Sempos (National Technical University of Athens), including additional material on the methodologies and assumptions used.

Annex II

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management systems
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
DOC_f	degradable organic carbon fraction
EF	emission factor
ERT	expert review team
EU	European Union
EU ETS	European Union Emission Trading Scheme
F-gas	fluorinated gas
FMP	Forest Management Plan
FMPD	Forest Management Plan Database
Gg	gigagram
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	inlcuded elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
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 and take-offs
LULUCF	land use, land-use change and forestry
MCF	methane correction factor
MJ	megajoule (1 MJ = 10^6 joule)
MSW	municipal solid waste
NA	not applicable
N_2O	nitrous oxide
NE	not estimated
Nex	nitrogen excretion rate
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
SWDS	solid waste disposal sites
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change