



United Nations

ADVANCE VERSION

FCCC/ARR/2010/EU



**Framework Convention on
Climate Change**

Distr.: General
13 July 2011

English only

**Report of the individual review of the annual submission of
the European Union submitted in 2010***

* In the symbol for this document, 2010 refers to the year in which the inventory was submitted, and not to the year of publication.

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I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2010 annual submission of the European Union, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 20 to 25 September 2010 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Paul Filliger (Switzerland) and Mr. Manfred Ritter (Austria); energy – Mr. Cesar Bermúdez Insua (Spain), Mr. Simon Eggleston (United Kingdom of Great Britain and Northern Ireland) and Mr. Sergiy Skybyk (Ukraine); industrial processes – Ms. Pia-Kristiina Forsell (Finland), Ms. Maria Jose Lopez (Belgium) and Ms. Siriluk Chiarakorn (Thailand); agriculture – Mr. Sorin Deaconu (Romania), Ms. Hongmin Dong (China) and Mr. Chhemendra Sharma (India); land use, land-use change and forestry (LULUCF) – Ms. Jennifer Jenkins (United States of America) and Ms. Tracy Johns (United States of America); and waste – Ms. Maryna Bereznytska (Ukraine) and Mr. Hiroyuki Ueda (Japan). Ms. Dong and Mr. Eggleston were the lead reviewers. The review was coordinated by Mr. Tomoyuki Aizawa (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 European Union, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Emission profiles and trends

3. In 2008, the main greenhouse gas (GHG) in the European Union was carbon dioxide (CO₂), accounting for 83.2 per cent of total GHG emissions¹ expressed in CO₂ eq, followed by methane (CH₄) (7.6 per cent) and nitrous oxide (N₂O) (7.2 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 1.9 per cent of the overall GHG emissions in the European Union. The energy sector accounted for 79.4 per cent of total GHG emissions, followed by the agriculture sector (9.7 per cent), the industrial processes sector (8.0 per cent), the waste sector (2.7 per cent) and the solvent and other product use sector (0.3 per cent). Total GHG emissions amounted to 4,000,086.34 Gg CO₂ eq and decreased by 6.5 per cent between the base year² and 2008. Due to the fact that the European Union’s GHG emissions are the sum of the emissions of the member States, the base year emissions cannot be deduced from the European Union’s CRF tables. Following a request from the ERT, the Party provided the base year emissions for the European Union in a separate Excel spreadsheet. The ERT encourages the Party to include the base year emissions of the European Union (calculated on the basis of the current submission) in the national inventory report (NIR).

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, respectively. In table 1, CO₂, CH₄ and N₂O

¹ In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO₂ eq excluding LULUCF, unless otherwise specified.

² “Base year” refers to the base year under the Kyoto Protocol, which for CO₂, CH₄ and N₂O is 1990 for all member States, and for HFCs, PFCs and SF₆ is 1990 for Austria, France and Italy, and 1995 for Belgium, Denmark, Finland, Germany, Greece, Ireland, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom. The base year emissions include emissions from Annex A sources only.

emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector, and also do not include the emissions from deforestation that were included in the European Union's initial report³ under the Kyoto Protocol for the base year and subsequently used for the calculation of the assigned amount.

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.

³ Please refer to paragraph 116 of the report of the initial review of the European Community (FCCC/IRR/2007/EC).

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 2008^a

	Greenhouse gas	Gg CO ₂ eq								Change Base year–2008 (%)	
		Base year	1990	1995	2000	2005	2006	2007	2008		
Annex A sources	CO ₂	3 367 325.28	3 367 325.28	3 297 537.36	3 368 341.25	3 477 178.69	3 456 747.97	3 399 296.32	3 328 194.78	-1.2	
	CH ₄	441 071.70	441 071.70	416 839.65	369 906.36	319 383.00	312 901.01	308 946.22	305 980.91	-30.6	
	N ₂ O	401 330.67	401 330.67	380 441.72	341 378.50	311 027.34	299 176.73	297 192.35	289 986.42	-27.7	
	HFCs	40 863.62	28 056.47	41 061.20	45 103.62	55 192.21	57 017.46	60 441.32	64 084.04	56.8	
	PFCs	14 999.83	16 824.70	10 943.37	7 284.48	4 110.61	3 675.17	3 407.08	2 860.15	-80.9	
	SF ₆	14 320.69	10 878.92	15 471.07	10 464.78	8 907.75	9 022.92	8 874.84	8 980.04	-37.3	
KP-LULUCF	Article 3.3 ^b	CO ₂							-196.57		
		CH ₄							IE, NO		
		N ₂ O							IE, NA, NO		
	Article 3.4 ^c	CO ₂	2 930.02							-263 516.40	-9 093.7
		CH ₄	NA							32.26	NA
		N ₂ O	NA							0.68	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, IE = included elsewhere, NA = not applicable, NO = not occurring.

^a “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which for CO₂, CH₄ and N₂O is 1990 for all member States, and for HFCs, PFCs and SF₆ is 1990 for Austria, France and Italy, and 1995 for Belgium, Denmark, Finland, Germany, Greece, Ireland, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom. 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. Figures in base year do not include emissions/removals for forest management.

Table 2
Greenhouse gas emissions by sector and activity, base year to 2008

	Sector	Base year ^a	Gg CO ₂ eq							Change	
			1990	1995	2000	2005	2006	2007	2008	Base year– 2008 (%)	
Annex A	Energy	3 256 629.76	3 256 629.76	3 180 729.25	3 232 668.97	3 323 302.37	3 298 497.41	3 232 682.30	3 175 546.08	–2.5	
	Industrial processes	391 614.48	377 190.44	376 550.64	334 587.96	332 552.33	328 170.18	336 784.77	318 445.85	–18.7	
	Solvent and other product use	14 053.76	14 053.76	12 297.16	11 765.54	10 736.49	10 613.64	10 435.81	10 160.35	–27.7	
	Agriculture	442 903.86	442 903.86	421 483.43	421 348.16	394 703.92	389 412.90	389 599.91	389 491.30	–12.1	
	Waste	174 709.94	174 709.94	171 233.90	142 108.37	114 504.48	111 847.12	108 655.35	106 442.75	–39.1	
	Other	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA	
	LULUCF	NA	–209 552.31	–246 139.76	–268 664.39	–243 689.87	–250 810.07	–200 078.33	–250 533.13	–4.5	
	Total (with LULUCF)	NA	4 055 935.44	3 916 154.62	3 873 814.61	3 932 109.73	3 887 731.19	3 878 079.81	3 749 553.21	NA	
	Total (without LULUCF)	4 279 911.79	4 265 487.75	4 162 294.38	4 142 479.00	4 175 799.59	4 138 541.25	4 078 158.14	4 000 086.34	–6.5	
KP-LULUCF	Article 3.3 ^b	Afforestation & reforestation							–37 162.08		
		Deforestation							45 066.38		
		Total (3.3)							7 904.30		
	Article 3.4 ^c	Forest management								–262 185.54	
		Cropland management	2 905.50							–374.15	–112.9
		Grazing land management	24.52							–67.12	–373.7
		Revegetation	NA							NA	NA
	Total (3.4)	2 930.02							–262 626.82	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 for CO₂, CH₄ and N₂O is 1990 for all member States, and for HFCs, PFCs and SF₆ is 1990 for Austria, France and Italy, and 1995 for Belgium, Denmark, Finland, Germany, Greece, Ireland, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom. 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 3
Information to be included in the compilation and accounting database in t CO₂ eq

	<i>As reported</i>	<i>Adjustment^a</i>	<i>Final^b</i>	<i>Accounting quantity^c</i>
Commitment period reserve	17 659 243 358		17 659 243 358	
Annex A emissions for current inventory year				
CO ₂	3 317 510 660		3 328 194 782	
CH ₄	299 859 996		305 980 909	
N ₂ O	278 547 928		289 986 418	
HFCs	62 772 723		64 084 040	
PFCs	2 801 354		2 860 154	
SF ₆	8 980 038		8 980 038	
Total Annex A sources	3 970 472 699		4 000 086 340	
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	-43 416 197		-38 286 760	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	1 124 679		1 124 679	
3.3 Deforestation for current year of commitment period as reported	44 469 512		45 066 383	
Activities under Article 3, paragraph 4, for current inventory year^d				
3.4 Forest management for current year of commitment period	-262 306 785		-262 185 539	
3.4 Cropland management for current year of commitment period	-2 270 259		-374 152	
3.4 Cropland management for base year	3 471 767		2 905 502	
3.4 Grazing land management for current year of commitment period	-3 858		-67 124	
3.4 Grazing land management for base year	95 707		24 522	
3.4 Revegetation for current year of commitment period				
3.4 Revegetation in base year				

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.

^a "Adjustment" is relevant only for Parties for which the ERT has calculated a or several 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 2010 annual inventory submission was submitted on 15 April 2010 and a revised version was submitted on 27 May 2010; it contains two complete sets of common reporting format (CRF) tables, one for the Convention and the other for the Kyoto Protocol, for the period 1990–2008 and an NIR. The European Union 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 29 July 2010. The annual submission was submitted in accordance with decision 15/CMP.1.

7. The European Union officially submitted revised emission estimates on 15 November 2010 in response to questions raised by the ERT during the course of the centralized review. The European Union submitted revised information on 15 December 2010 on the accounting of Kyoto Protocol units in response to questions raised by the ERT during the review. Where necessary, the ERT also used the previous year's submission during the review.

8. 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.⁴

9. During the review, the European Union 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.

Completeness of inventory

10. The European Union's GHG inventory comprises the direct sum of the national inventories compiled by the member States making up the EU-15 and the EU-27. The EU-15 took on a common commitment to reduce emissions by 8 per cent between 2008 and 2012 compared with emissions in the base year; the EU-27 does not have a common Kyoto Protocol target. The inventory covers almost all categories for the period 1990–2008 and is complete in terms of years, geographical coverage, and direct and indirect GHGs. The European Union has provided inventory data in all CRF tables and a complete and detailed NIR. Explanations for the categories that are reported as not estimated ("NE") are provided in CRF table 9(a) and an analysis of the completeness of the inventory is presented in the NIR. The sector with the most categories reported as "NE" by at least one member State is the industrial processes sector, followed by the LULUCF sector and the energy sector. For the agriculture, waste, and solvent and other product use sectors, only a few categories are reported as "NE".

⁴ 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 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.

11. The completeness of the Party's inventory is dependent on the completeness of the member States' inventories. In response to a question raised by the ERT during the review, the European Union confirmed that member States' emissions are set to zero in the summation process where member States report notation keys. As a result, the European Union's CRF tables contain emission estimates for only part of the European Union for these categories, which suggests that these categories might be underestimated at the European Union level. The European Union further explained that several categories reported as "NE" should have been reported as not occurring ("NO"). It seems that the notation keys are used in different ways by the member States. The ERT therefore recommends that the European Union continue to undertake activities to harmonize the use of notation keys between the member States. The ERT requested further clarification from the European Union as part of the list of the potential problems.

12. In the response to the list of the potential problems, the Party sent a detailed and comprehensive response to the ERT on 8 November 2010. In the first part of the response, the European Union describes the institutional and legal framework to deal with this issue. European Commission decision 2005/166/EC defines the procedures. The European Union even defines infringement procedures against any member State deemed to be in breach of the European Union's obligations. There is no doubt that the European Union has in place the required legal framework and the necessary quality assurance/quality control (QA/QC) procedures to address this issue. A gap-filling procedure is defined in the European Union's procedure, but "gap-filling methods are used for major gaps when it is highly certain that emissions from these categories exist in the member States concerned". For the 2010 submission, no gap-filling procedures were undertaken, although some (minor) gaps still exist in the inventory.

13. The European Union's response also defines specific actions to improve the completeness of the European Union's GHG inventory, including a three-step procedure:

(a) The creation of a software program to identify and document categories that are reported as "NE" immediately after member States have submitted their inventory to the European Union (15 January). On this basis, the need to perform gap-filling procedures or the need to use different notation keys will be discussed at the European Union level;

(b) The European Environment Agency's (EEA) status report to the member States will include a section relating to completeness, and a consultation procedure with the member States will address potential completeness issues (15 January–15 March);

(c) If, even after the two preceding steps, a member State's GHG inventory, as submitted to the European Commission by 15 March, still contains categories reported as "NE" where Intergovernmental Panel on Climate Change (IPCC) methods exist, and/or if such reporting has been identified as a problem in previous reviews, then the European Union inventory experts, in close cooperation with member States, will prepare the missing GHG category estimates in accordance with the gap-filling provisions in Articles 13–16 of European Commission decision 2005/166/EC. In particular, with regard to the LULUCF sector, gap-filling procedures based on expert assessment will be applied to all categories or carbon pools for which the UNFCCC review identified gaps and/or missing estimates. Article 16 requires member States to use these estimates in their national submissions to the UNFCCC in order to ensure consistency between the European Union inventory and member States' individual inventories.

14. In addition, the European Union informed the ERT that a general assessment of completeness will be included in a separate chapter of the NIR. The ERT recommends that the European Union include this information in its NIR in order to reflect the progress which was explained to the ERT during the review in the next annual submission.

15. The ERT concluded that the procedure described by the European Union to deal with the completeness issue is well defined and should guarantee a substantial improvement

in future annual submissions. The ERT commends the European Union for its detailed response to the question raised during the review.

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

Overview

16. The ERT concluded that the national system continues to perform its required functions. The Party described the changes to the national system since the previous annual submission, such as the change of the name of the institution which has overall responsibility for the inventory. These changes are described in chapter II.X of this report.

Inventory planning

17. The NIR and additional information submitted by the Party during the review described the national system for the preparation of the inventory. The European Commission's Directorate-General for Climate Action ("DG Climate Action") has overall responsibility for the inventory. The main institutions involved in the compilation of the inventory are the member States. The EEA and its European Topic Centre on Air and Climate Change (ETC/ACC), Eurostat and the Joint Research Centre (JRC) are also involved in the preparation of the inventory. The legal arrangements for the compilation of the European Union's inventory are contained in Council decision 280/2004/EC, concerning a mechanism for monitoring the European Union's GHG emissions and for implementing the Kyoto Protocol inventory preparation process.

18. Inventory development plans are referenced in the NIR, and the European Union provided the plans for the submission years 2009 and 2010 following a request from the ERT. The plans include all recommendations from previous reviews, while also defining a deadline for resolving those recommendations, designating responsibility for carrying out the improvements, evaluating the improvements made and identifying further potential improvements. The ERT commends the European Union for this very transparent instrument.

Inventory preparation

Key categories

19. The European Union has reported key category tier 1 and tier 2 analyses both level and trend assessment as part of its 2010 submission. The European Union has included the LULUCF sector in its key category tier 1 analysis. The key category analysis performed by the Party and that performed by the secretariat⁵ produced different results due to the different disaggregation of the categories. The European Union identified 80 key categories excluding LULUCF and 85 including LULUCF. The key category analysis was performed in accordance with the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF).

⁵ The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance for LULUCF. 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.

20. The documentation relating to the key category analysis is not fully transparent (e.g. the tier 2 analysis is only documented in one table in annex 1 to the NIR). The tier 2 analysis does not contain the LULUCF sector. The ERT recommends that the European Union give priority to the tier 2 key category analysis, that it include the LULUCF sector and that it document the tier 2 analysis in the NIR.

21. The key categories for KP-LULUCF activities are listed for various member States but are not calculated at the European Union level. The ERT encourages the European Union to include this information in its next annual submission under the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory as provided in chapter 5.4.4 of the IPCC good practice guidance for LULUCF.

Uncertainties

22. The European Union has performed a tier 1 uncertainty analysis for the GHG inventory based on the tier 1 uncertainty estimates of the EU-15. The NIR provides information on the uncertainty analysis based on each member State's individual uncertainties for each category. An incomplete table in the NIR presenting an overview of uncertainty estimates available from the EU-15 member States was completed during the review following a request from the ERT. Uncertainty estimates are also listed in each sectoral chapter. The ERT encourages the European Union to perform a tier 2 uncertainty analysis based on the Monte Carlo approach (which was used for the waste sector). The description of the uncertainty analysis in chapter 1.7 of the NIR should be more transparent (e.g. the inclusion of a table with the uncertainties at the individual category level which are used to compile the uncertainty estimate of the European Union as a whole) and focus on the description of the overall uncertainty analysis of the European Union (e.g. by carrying out a Monte Carlo analysis).

Recalculations and time-series consistency

23. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party for the period 1990–2007 have been undertaken in almost every sector, except the sector “other”, and in all member States. The major changes in absolute value have been made in the agriculture sector (for the categories enteric fermentation, manure management, and rice cultivation, mainly due to changes in emissions factors (EFs) and methods in Germany), followed by the industrial processes sector (for the categories mineral products, chemical industry, metal production, and production of halocarbons and SF₆, mainly due to the use of plant-specific data in Germany) and the energy sector (for the categories energy industries, manufacturing industries and construction, and transport, due to the updating of EFs in Italy, the use of the final energy balance in Germany, and revised activity data (AD) in France). Relatively small recalculations have been reported in the waste sector. The rationale for these recalculations is provided in the NIR and in CRF table 8(b). The major changes, and the magnitude of the impact include: an increase in estimated total GHG emissions excluding LULUCF in 1990 (0.8 per cent) and in 2007 (0.6 per cent). This implies that the emissions trend from 1990 to 2007 changes from a decrease of 4.5 per cent to a decrease of 4.7 per cent.

Verification and quality assurance/quality control approaches

24. The European Union provided information on QA/QC procedures in line with the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories” (hereinafter referred to as the UNFCCC reporting guidelines). An elaborated QA/QC plan is in place in accordance with decision 19/CMP.1 and the IPCC good practice guidance. It

is not part of the submission but was sent to the ERT during the review in response to a request. The QA/QC plan is very detailed and includes general QC procedures (tier 1) as well as category-specific procedures (tier 2). QA by internal and external review is also described in the NIR. The GHG inventory now includes reported data from the European Union emissions trading scheme (EU ETS) for the period 2005–2008. EU ETS data are widely used throughout the member States. The ERT encourages the European Union to continue to work with member States in order to improve the quality of its inventories and the European Union’s QA/QC procedures through the use of EU ETS data to extent possible.

Transparency

25. The 2010 annual submission of the European Union is generally transparent. The information contained in the NIR is sufficiently detailed. The NIR indicates that the European Union cannot provide all the required data in the sectoral background data tables of the CRF tables. The main reasons for this include: the limited availability of data reported in the sectoral background data tables in the individual member States’ CRF tables due, in part, to confidentiality issues; and the different types of AD used by member States.

26. In CRF table 9(a), several categories are listed as included elsewhere (“IE”), but no explanations are given in the table. The ERT recommends that the European Union make efforts to reduce the number of categories reported as “IE” in order to increase the comparability and transparency of its inventory and to provide the required information in CRF table 9(a) in the next submission.

Inventory management

27. The European Union has a centralized archiving system, which includes:

- (a) An electronic and paper copy of the list of the full contents of the documentation file for that year;
- (b) Paper and electronic copies of the draft and final European Union inventory report and electronic copies of the draft and final CRF tables;
- (c) Electronic copies of all the final linked category spreadsheets for the inventory estimates (including all spreadsheets that feed the emission spreadsheets), as well as any important printouts;
- (d) For the overall inventory and for individual categories, the documentation contains adequate explanation of the linkages among the spreadsheets and the inventory document;
- (e) All information and data received in the project file from each member State;
- (f) All additional materials received and included in the project file;
- (g) Copies of all checklists, reports and forms that were completed as part of QA/QC procedures;
- (h) The information is archived after finalization of the inventory preparation process at least in two different places. One copy is archived in the safe for data storage at Umweltbundesamt in Vienna. The files are stored for at least 15 years.

3. Follow-up to previous reviews

28. The European Union reported on the improvements implemented in response to previous review reports. The information is provided in a detailed table, which contains all the recommendations of previous review reports, the status of the issue and comments. The most important improvements are in relation to:

- (a) QA/QC: extended quality checks of KP-LULUCF; follow-up checks of the European Union's internal review findings were performed during the initial check phase;
- (b) Transparency: additional explanations of trends and, unusual IEFs/parameters (which are extremely larger/smaller than standard values) have been provided in the sector chapters of the NIR; more information was provided on the allocation of emissions between the member States;
- (c) The LULUCF sector in the NIR: more detailed information has been included in the LULUCF chapter, based on the recommendations from the previous review reports;
- (d) The industrial processes sector in the NIR: additional explanations of trends have been provided; some member States have revised their allocation of emissions, in particular for glass production;
- (e) The transparency of the NIR: the European Union split the report into two parts: one part related to the EU-15 and one to the EU-27 and provided additional information for the EU-27 (with a focus on the 20 largest key categories); an overview of responses to the review report findings of the European Union's GHG inventory is included in chapter 10 of the NIR;
- (f) Uncertainty estimates/key category analysis: uncertainty estimates are now available at a more disaggregated level of detail in order to improve the tier 2 key category analysis; trend uncertainty estimates are now available for the LULUCF sector.

4. Areas for further improvement

Identified by the Party

29. The European Union's 2010 inventory improvement plan identifies several areas for improvement. It includes about 100 items covering, on the one hand, general aspects such as improving transparency or accuracy and, on the other hand, very specific improvements such as the EFs that have been observed in a member State. The inventory improvement plan is considered to be a very useful instrument in the European Union's overall inventory development process.

Identified by the expert review team

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

- (a) The reduction of the number of categories/subcategories which are reported as "NE" and the harmonization of the use of notation keys by member States;
- (b) The inclusion of information on the general assessment of completeness and the procedure for ensuring the completeness of the European Union's inventories and the general information in the NIR in the next annual submission;
- (c) The description of the KP-LULUCF key category analysis and the uncertainty analysis, which should focus on the overall analyses of the European Union instead of member States' individual analyses;
- (d) The completion of CRF table 9(a) by including explanations for the categories reported as "IE".

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

B. Energy

1. Sector overview

32. The energy sector is the main sector in the GHG inventory of the European Union. In 2008, emissions from the energy sector amounted to 3,175,546.08 Gg CO₂ eq or 79.4 per cent of total GHG emissions. Since the base year, emissions have decreased by 2.5 per cent. The key driver for the fall in emissions is the decrease in manufacturing industries and construction. Within the sector, 36.1 per cent of the emissions were from energy industry, followed by 26.4 per cent from transport, 19.3 per cent from other sectors and 16.4 per cent from manufacturing industries and construction. Oil and natural gas accounted for 1.3 per cent and solid fuels accounted for 0.3 per cent. The remaining 0.2 per cent were from other (fuel combustion).

33. The sector is complete and is produced as the sum of the individual member States' emissions. The largest recalculations in the energy sector in absolute terms in 1990 and 2007 were performed for CO₂ emissions. In relative terms, the recalculations of N₂O emissions resulted in a decrease in emissions in 1990 (-4.2 per cent) and in 2007 (-12.9 per cent). In absolute terms, Germany and France had the greatest influence on the recalculations of CO₂ emissions among the EU-15 in 2007. The recalculations reported by Germany and France are mainly due to a revision of the energy balance data. The recalculations of N₂O emissions were mainly influenced by the change in road transportation estimates reported by Spain as a result of the switch from the use of a COPERT III to a COPERT IV model. The impact of recalculation for Energy sector in 1990 is an increase of 0.9 per cent, and in 2007 is an increase of 2.0 per cent.

2. Reference and sectoral approaches

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

34. The IPCC reference approach for estimating CO₂ emissions from fossil fuels for the European Union is based on Eurostat energy data. Energy statistics are submitted to Eurostat by member States on an annual basis with the five joint Eurostat/International Energy Agency (IEA)/United Nations Economic Commission for Europe (UNECE) questionnaires (on solid fuels, oil, natural gas, electricity and heat, and renewables and waste). The sectoral approach for estimating CO₂ emissions is based on member State CRF table submissions. For the year 2008, the difference between the reference and the sectoral approaches was 0.95 per cent and the reasons for the difference are explained in the NIR.

35. The ERT welcomes the improvements to the reference approach implemented since the previous review. In CRF table 1.A(b), several fuels are reported as "NE" (orimulsion, natural gas liquids, other kerosene, shale oil, other oil, oil shale, and BKB and patent fuel), although the NIR indicates that some of these fuels are aggregated under other fuels (e.g. "orimulsion" is included in "residual fuel oil"; "natural gas liquids" is included in "crude oil"; and "other kerosene" is included in "total kerosene"). "Anthracite", "coking coal" and "other bituminous coal" are included in "other bituminous coal" and are correctly reported as "IE". The ERT recommends that the European Union use the correct notation keys and explain the reasons for their use in the next NIR.

International bunker fuels

36. The NIR states that emissions from bunkers for international aviation and maritime transport are estimated as the sum of the bunker emissions of each member State. Between 1990 and 2008, GHG emissions from international bunker fuels increased by 79 per cent. Between 1990 and 2008, emissions from aviation bunker fuels increased by 114.2 per cent and emissions from marine bunker fuels increased by 58.4 per cent.

37. The NIR includes a brief summary of a study on bunker fuel emissions conducted in 2007 by the ETC/ACC comparing the aviation emissions reported by member States with modelling results provided by Eurocontrol and discussed in the previous review report. The ERT again recommends that the European Union continue such QA exercises, that it try to address the issues identified, and that it continue to work on making data from Eurocontrol available to member States on a regular basis.

3. Key categories

Stationary combustion: solid fuel – CO₂

38. As pointed out in the previous review, the CO₂ implied emission factor (IEF) for the whole time series except 1990 (78.32–90.51 t/TJ) is the third lowest among reporting Parties (3.29–216.75 t/TJ). The European Union informed the ERT that the IEF is largely dominated by the German IEF, as Germany accounts for 42 per cent of total EU-15 CO₂ emissions in 2008. The low German IEF is due the fact that Germany reports CO₂ emissions from blast furnace gas under metal production (steel) but the AD data are reported under fuel combustion (energy industry, and manufacturing industries and construction). The ERT recommends that the European Union work with Germany to correctly allocate these emissions.

Road transportation: liquid fuel – CO₂

39. The ERT commends the EU for including in the NIR explanations of the IEF trend as requested by the previous review report. The dominance of a few member States and their changing contributions and IEFs leads to significant fluctuations in the European Union IEF compared to other reporting Parties.

C. Industrial processes and solvent and other product use

1. Sector overview

40. In 2008, emissions from the industrial processes sector amounted to 318,445.85 Gg CO₂ eq or 8.0 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 10,160.35 Gg CO₂ eq or 0.3 per cent of total GHG emissions. Since 1990, emissions have decreased by 15.6 per cent in the industrial processes sector and decreased by 27.7 per cent in the solvent and other product use sector. The key driver for the fall in emissions is cement production, and iron and steel production. The reduction in CO₂ emissions from cement production is most noticeable in Germany, Italy and the United Kingdom due to the dramatic drop in clinker production during 2007 and 2008. The decrease in emissions from iron and steel production is mainly as a result of the decrease in Germany and Italy due to a decreasing production trend in recent years. Within the industrial processes sector, 35.1 per cent of the emissions were from mineral production, followed by 23.2 per cent from metal production, 21.8 per cent from consumption of halocarbons and SF₆ and 18.2 per cent from chemical production. The remaining 1.7 per cent were from production of halocarbons and SF₆ and other (industrial processes).

41. Explanations of the major reasons underlying the largest recalculations are provided in the NIR but this information is missing for some member States. In order to improve transparency, the ERT recommends that the European Union provide correct and complete information on sector-specific recalculations along with an explanation of the major reasons underlying the largest recalculations in its next annual submissions.

42. Actual and potential emissions of HFC-41, HFC-134, HFC-143 and HFC-245ca are reported as “IE, NA, NE, NO”. The EU-15 values are derived from the aggregation of the

respective member States' values. When member States do not report any numeric value (reporting notation keys) the European Union then reports the list of notation keys used by the member States. The following member States reported potential and actual emissions of HFCs as "NE": Belgium, for other applications using ozone-depleting substance (ODS) substitutes; Greece, for solvents; and Luxembourg, for fire extinguishers and solvents. During the review, the European Union indicated that the main reason given by member States for not providing potential emissions was that the relevant data were not available at member State level and that the estimation of potential emissions of fluorinated gases (F-gases) is of lower priority because actual emissions of F-gases are estimated. The European Union also indicated that emissions from other applications using ODS substitutes in Belgium did not occur and that the notation keys will be changed in the 2011 submission. The ERT recommends that the European Union encourage these countries to comply with the UNFCCC reporting guidelines by using the appropriate notation keys (Belgium) and by preparing and reporting estimates of actual emissions of HFCs (Greece for solvents and Luxembourg for fire extinguishers and solvents).

43. The notation key "NE" is used to report PFC emissions from foam blowing, aerosols/metered dose inhalers, solvents, and other applications using ODS substitutes due to the fact that Greece reported PFC emissions from foam blowing, aerosols/metered dose inhalers and solvents as "NE" and Belgium reported the emissions from other applications using ODS substitutes as "NE". During the review, the European Union informed the ERT that emissions from these categories and in these countries did not occur and that the notation key "NE" had been incorrectly used in the 2010 submission for the EU-15 and in the member States' submissions. The ERT recommends that the European Union correctly use the notation keys in the reporting of PFC emissions from those categories and that the Party encourage Greece and Belgium to correct those notation keys in their next annual submissions.

44. According to the information provided in the NIR, there are no sector-specific QA/QC procedures for the solvent and other product use sector. During the review, the European Union informed the ERT that its focus had been on the key categories and, consequently, the Party has not yet implemented QA/QC procedures for the solvent and other product use sector. However, the European Union plans to do so for the 2011 submission. The ERT welcomes this plan and recommends that the European Union carry it out.

2. Key categories

Limestone and dolomite use – CO₂

45. The NIR explains that France reports emissions from limestone and dolomite use in cement production and in lime production under limestone and dolomite use. According to the IPCC good practice guidance, these emissions should be reported under the cement production and lime production categories. During the review, the European Union explained that if limestone is being used to manufacture lime, the emissions are included in the category lime production and, if it is used directly in processes such as cement and/or glass, then emissions are recorded in the consumer sectors, respectively. The European Union clarified that, in France, the category limestone and dolomite use includes the use of limestone in the process of agglomeration of ore steel and that emissions were previously reported in the category iron and steel (fuel combustion). This was described incorrectly in the NIR and the European Union will correct it for the 2011 submission. The ERT welcomes this clarification.

46. Additionally, the French IEF (0.05 t/t) is the lowest among all reporting Parties (0.31–0.59 t/t) and lower than the IPCC default EF of 0.44 t/t. During the review, the European Union clarified that the AD reported by France refer to the quantity of limestone

used for strings in the process of agglomeration. The use of these AD does not justify the very low French IEF of 0.05 t/t compared to the other reporting Parties. In order to improve transparency, the ERT recommends that the European Union provide explanations of the methods, AD and EFs used for estimating CO₂ emissions from limestone and dolomite use in France.

47. The NIR indicates that the comparably low IEF (in 2008) in the Netherlands (0.31 t/t) for limestone and dolomite use (table 4.11) could be explained by the incomplete AD of limestone use (the amount of limestone used in desulphurizing installations is not included). However, incomplete AD would result in a higher (not lower) IEF. During the review, the European Union informed the ERT that not only is the use of limestone in desulphurizing installations missing but also the CO₂ emissions from these installations in the estimates of the Netherlands. The European Union also clarified that, in the Netherlands, the AD of limestone use consist of the limestone used for fertilizer for road construction (dolomite as a filler) and the limestone used in steel production. As this does not explain the reason why the IEF in the Netherlands is so low compared to the other reporting Parties and to the IPCC default EF (0.44 t/t), the ERT recommends that the European Union improve the completeness of this category by including CO₂ emissions from desulphurizing installations and by providing explanations in the NIR on the methods, AD and EFs used for estimating CO₂ emissions from limestone and dolomite use in the Netherlands.

48. Finally, the allocation of CO₂ emissions from limestone and dolomite use varies across the member States. These emissions are reported in different categories of the industrial processes sector and even in different sectors (industrial processes and energy). In order to increase comparability, the ERT encourages the European Union to undertake actions to harmonize the allocation of CO₂ emissions across member States in this category.

Ammonia production – CO₂

49. In the European Union inventory, Greece has reported CO₂ emissions from ammonia production from 1990 to 1997 as “IE”, while estimates are provided from 1998 to 2008. During the review, the European Union informed the ERT that up to 1999, there were two ammonia plants in Greece. Since 1998 (and up to today) the one plant still operating is using natural gas as the raw material of ammonia. According to expert information, the other plant, which closed in 2000, used lignite as feedstock until 1991, and liquid fuels until its closure. In the absence of detailed fuel consumption data on natural gas for the years 1998–1999, only CO₂ emissions from the first plant have been estimated. CO₂ emissions in the industrial processes sector refer to emissions from natural gas (for the years 1998–2007), whereas emissions from the other fuels used (for the years 1990–1999) are included in the energy sector. The notation key “IE” was used, as the required data concerning the liquid and solid fuel consumption of the closed plant for the years 1990–1998 were not available. Greece is exploring ways of addressing this issue. The ERT recommends that the European Union encourage Greece to continue to make efforts to improve the time-series consistency of this category in the next annual submission.

50. Recovering/capturing the CO₂ emitted by the ammonia production process has become commonplace in the European Union. The method used to report the recovered/captured amount varies from Party to Party. Some Parties continue to report these emissions, including the recovered/captured CO₂, while others do not report them at all or report them in the categories where the recovered CO₂ is used or stored. For example, the NIR states that, in Italy, the recovered CO₂ in ammonia production has been investigated and accounted for in the 2010 submission; in Belgium, the CO₂ recovered is taken into account; in the United Kingdom, a correction has to be made for the CO₂ recovered; and Austria subtracts the carbon stored in melamine. During the review, the European Union informed the ERT that it plans to study this issue further as part of the European Union’s internal review. The ERT welcomes this plan and encourages the

European Union to undertake actions to harmonize the reporting of the member States with regard to the recovered CO₂ emissions from ammonia production.

Iron and steel production – CO₂

51. The allocation of emissions from pig iron production, which is the largest source in this category, differs between member States. Some member States report these emissions under fuel combustion, and others report them under industrial processes. The European Union has looked into the issue of the consistency of the allocation of CO₂ emissions from iron and steel production on several occasions. It concluded that, due to the complexity of the sector and the use of country-specific models, further harmonization in this sector towards more consistent reporting across member States would be very difficult. Therefore, the European Union aims to provide information on the methods, EFs and allocation of emissions used by member States as transparently as possible in the NIR. The ERT welcomes these efforts to enhance transparency at the European Union level and encourages the Party to continue to provide this information on the methods, EFs and allocation of emissions used by member States.

Consumption of halocarbons and SE₆ – HFCs

52. The NIR does not contain any information on HFC emissions from fire extinguishers. In the European Union submission, HFC emissions from fire extinguishers were identified as a key category for the first time in the 2010 submission. The ERT recommends that the European Union increase transparency and add the relevant information which can make readers replicate the calculation on this category in the NIR of the next annual submission.

3. Non-key categories

Carbide production – CO₂

53. CO₂ emissions from carbide production decreased by 74 per cent from 1990 to 2008 but information to explain this trend is not provided in the NIR. During the review, the European Union informed the ERT that this is due to the fact that carbide production is not a key category. An overview of member States' methodologies, EFs, quality estimates and emission trends is only provided in the NIR if identified as a key category at the EU-15 level. However, the European Union explained that the EU-15 CO₂ emissions trend from carbide production is mainly influenced by Germany and France. In Germany, emissions dropped by 79 per cent in 1991 compared to 1990. During the reunification period, calcium carbide production took place primarily in the former East Germany. Shortly after reunification, production discontinued in the former East Germany, while only one producer remained in the former West Germany. In the period 1990–2008, this producer cut production by about half. In France, carbide production occurred in one plant up to 2003, and since 2003 there has been no carbide production in France. The ERT commends the European Union for this explanation and encourages the Party to provide this additional information in the NIR, even if it is not a key category.

Fugitive emissions – HFCs

54. HFC emissions from fugitive emissions decreased by 88.9 per cent between 1992 (1,590.05 Gg CO₂ eq) and 1993 (176.69 Gg CO₂ eq), but no explanation for this trend is provided in the NIR. The European Union explained to the ERT that the decrease is due to the emissions decline in France following the installation of abatement technologies (thermal oxidizer) in HCFC-22 production, and that this category is not described in the NIR because it is not identified as a key category. Until 1993, France was the only member State to report emissions in this category and in 1993 Spain began to report emissions as

well. In 2008, Spain was emitting approximately 75 per cent of all emissions in this category. The French emissions have decreased considerably since 1990 (–95 per cent) due to the implementation of abatement technologies. The ERT encourages the European Union to provide information on this category in order to improve transparency in the NIR, even if it is not identified as a key category.

D. Agriculture

1. Sector overview

55. In 2008, emissions from the agriculture sector amounted to 389,491.30 Gg CO₂ eq or 9.7 per cent of total GHG emissions. Since the base year, emissions have decreased by 12.1 per cent. The key drivers for the fall in emissions are the reduction in agricultural soil emissions due to the decreasing application of nitrogen (N) fertilizer and manure and the reduced emissions from enteric fermentation resulting from decreasing livestock numbers.

56. Within the sector, 51.2 per cent of the emissions were from agricultural soil, followed by 31.7 per cent from enteric fermentation, 16.4 per cent from manure management and 0.6 per cent from rice cultivation. The remaining 0.1 per cent were from field burning of agricultural residues. Most of the emissions were N₂O emissions, which accounted for 56.8 per cent of sectoral emissions; CH₄ emissions accounted for 43.2 per cent.

57. The reporting for the agriculture sector is complete, covering all categories, gases and member States. Emissions from prescribed burning of savannas do not occur in the European Union, and are reported by the EU-15 as “NO”.

58. The NIR provides information on the methods, AD, EFs, relevant parameters, and uncertainties in each category. The NIR contains useful summaries of sources of AD and background information on the application of the methods, EFs and parameters. The emissions trend and key related parameters for all categories are provided.

59. Recalculations have been performed in all categories except rice cultivation. Recalculations performed in the 2010 submission resulted in a 5.7 per cent increase in total agricultural emissions in 1990 and a 4.9 per cent increase in total agricultural emissions in 2007 compared to the 2009 submission. Detailed sector-specific background information on the recalculations for each member State is also provided in the NIR.

60. Most of the recommendations made by the previous ERT have been addressed in the 2010 submission. With regard to the issue of Germany applying the methods and default values contained in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines), the previous review report mentioned that, in order for Germany to use those methods and default values, it must provide an explanation as to why the default values contained in the 2006 IPCC Guidelines are more appropriate to its particular circumstances than the methods and default values contained in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) elaborated by the IPCC good practice guidance. The 2010 NIR of the European Union states that the German NIR contains an extensive table describing in detail the difference between the methods and default values contained in the Revised 1996 IPCC Guidelines and the 2006 IPCC Guidelines, and justifying the use of the default factors contained in the 2006 IPCC Guidelines. The EU has informed the ERT that Germany has subsequently revised and reduced its use of factors from the 2006 IPCC guidelines. To facilitate the review of the European Union’s inventory, the ERT recommends that the European Union include this information in its NIR, updated appropriately, in the next annual submission.

61. The previous ERT had encouraged the European Union to explore the possibility of developing an alternate inventory using the IPCC tier 1 methods and default factors along with data from readily available international sources; however, the NIR states that this exercise has been postponed due to a lack of resources and time. In response to a question raised by the ERT during the review as to whether the European Union is planning to implement the previous review report's suggestion, the Party informed the ERT that a project has been carried out at the European Commission Joint Research Centre (JRC), which was commissioned to evaluate the contribution of the livestock production in Europe to overall European Union GHG emissions, the results of which will be included in the 2011 annual submission. The ERT encourages the European Union to include the results obtained from this approach this project and to compare them with member States' submissions in its 2011 annual submission.

2. Key categories

Enteric fermentation – CH₄

62. CH₄ emissions from enteric fermentation is a key category for cattle and sheep. Ninety-six per cent of CH₄ emissions from enteric fermentation at the EU-15 level have been estimated using a tier 2 method, in line with the IPCC good practice guidance. The parameters related to enteric fermentation provided in the 2006 IPCC Guidelines were applied in the estimation of CH₄ emissions in the German inventory; the use of these parameters resulted in an increase in emissions compared to the previous method used.

63. The ERT noted that the CH₄ conversion rates of dairy cattle (18.6 per cent) and swine (16.9 per cent) for Germany reported in the NIR are much higher than the values reported by other member States and the IPCC default values. During the review, the European Union informed the ERT that the CH₄ conversion rates reported by Germany at the time of the review were wrong and that those values were not used for the calculation of CH₄ emissions. Subsequently Germany has corrected the CH₄ conversion rates for dairy cattle and swine. Reported values are now 6 per cent for dairy cattle and 0.6 per cent for swine, in accordance with the Revised 1996 IPCC Guidelines. The ERT recommends that the European Union check the values indicated in the NIR as well as the calculation of those emissions in its next annual submission.

Manure management – N₂O

64. The N₂O IEF (0.005 kg N₂O-N/kg-N) from solid storage provided in the 2006 IPCC Guidelines was applied in the estimation of N₂O emissions from solid storage and dry lot by Germany, which is lower than the default N₂O EF provided in the Revised 1996 IPCC Guidelines, and lower than the N₂O EF (0.02 kg N₂O-N/kg-N) from dry lot provided in the 2006 IPCC Guidelines. The ERT recommends that the European Union provide further information to justify the use of lower values in its next annual submission.

Agricultural soils – N₂O

65. Most member States rely on the IPCC default EF to estimate N₂O emissions from agricultural soils.

3. Non-key categories

Rice cultivation – CH₄

66. The IEF of CH₄ emissions from rice cultivation in Portugal increased from 31.9 g CH₄/m² in 1990 to 69.8 g CH₄/m² in 2008. There is no explanation of the reasons for the rising IEF value. The ERT recommends that the European Union provide related

background information to explain the change in this IEF in its NIR in the next annual submission.

E. Land use, land-use change and forestry

1. Sector overview

67. In 2008, net removals from the LULUCF sector amounted to 250,533.13 Gg CO₂ eq. Since the base year, net removals have increased by 19.6 per cent. Overall, the LULUCF sector offsets 6.3 per cent of the total EU-15 emissions from Annex A categories. The key drivers for the rise in removals are the European Union's agricultural and environmental policies, which have resulted in less intensive agricultural practices and an increase in forest and woodland conservation areas. This led to a significant increase in forest land sinks in most member States during the 1990s. Within the sector, 330,633.79 Gg CO₂ eq of removals were from forest land, followed by emissions of 65,245.48 Gg CO₂ eq from cropland, removals of 13,938.47 Gg CO₂ eq from grassland, emissions of 4,958.08 Gg CO₂ eq from wetlands and 27,842.87 Gg CO₂ eq from settlements and removals of 4,172.45 Gg CO₂ eq from other land. The remaining emissions of 165.16 Gg CO₂ eq were categorized as other (LULUCF).

68. In 2008, the largest LULUCF carbon sink was Italy, whose sink estimate increased by 66 per cent from 2007. The second largest was France and the third largest was Spain. In most member States, carbon sinks increased between 1990 and 2008; the most significant increases were experienced in Ireland (752 per cent), Luxembourg (180 per cent) and Portugal (171 per cent). There were notable decreases in the carbon sinks of Germany (245 per cent) and Denmark (260 per cent) between 1990 and 2008. The conversion of lands to grassland and other land is the main driver of emissions from the LULUCF sector in the European Union.

69. In response to recommendations made in previous review reports, the 2010 NIR of the European Union shows continued improvements in the completeness of reporting of emissions and removals of all categories/subcategories, and in the reporting of carbon pools. However, some categories/subcategories are still reported as "NE" by several member States, such as the carbon stock changes in dead organic matter (DOM), as well as the emissions due to biomass burning in several land-use categories, and significant gaps exist in the reporting of all carbon pools. The European Union has provided information on its continuous efforts to encourage all member States to improve their LULUCF inventories, including for the reporting of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol for future submissions. The ERT welcomes the improvements in the reporting of the LULUCF sector and recommends that the European Union continue to encourage its member States to develop the ability of the various national systems to report complete emissions and removals from the LULUCF sector and identify activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. It further encourages the Party to provide further support to those member States that are still unable to fulfil the requirements of reporting a complete LULUCF inventory under the Convention.

70. In response to comments made in previous review reports and to concerns raised by the ERT with regard to the comparability and differences in the definitions and methods used between member States in terms of both land-use definitions and the reported time series, the European Union indicated that some harmonization efforts have been made. However, the Party acknowledges that there are unavoidable differences in the definitions and methodologies used by member States, due to the fact that statistics are prepared in different ways in the member States and the type of data available also differs among the member States. The European Union indicated that, as long as the methodologies used by member States are consistent with the IPCC good practice guidance for LULUCF, the comparability of the methods used for the estimation of emissions has been achieved and

the aggregated data can be used to assess emission trends. The ERT welcomes the efforts of the European Union and encourages the Party to continue its efforts to improve comparability and consistency among member States in future submissions.

71. In response to recommendations made in previous review reports regarding discrepancies between the values of net CO₂ emissions and removals in the land-use change matrix of lands from forests in table 7.4 of the NIR for the years 1990 and the corresponding totals in CRF table 5 for the same year, improvements have been made in harmonizing the information in the 2010 inventory. Discrepancies between NIR table 7.4 and CRF table 5 still exist, but are much smaller than in the previous annual submission. The ERT commends the European Union for these improvements and recommends that the Party continue to provide support to member States to improve consistency between the NIR and the CRF tables.

72. As noted in the previous review report, the total area of organic soil reported in the LULUCF sector does not match the area of cultivated organic soil reported in the agriculture sector (CRF table 4.D). For instance, the areas reported in the LULUCF sector for 2007 are 11,254.64 kha of forest land, 1,382.23 kha of cropland and 1,324.94 kha of grassland, whereas the total area reported in the agriculture sector is 2,221.33 kha. The European Union has provided some additional information on these inconsistencies, noting differences in the definitions and methodologies among member States as the causes of such inconsistencies. The ERT encourages the European Union to continue to support member States in their efforts to improve accuracy and transparency in the reporting of these sectors.

73. Several recalculations have been performed in the LULUCF sector due to methodological improvements, such as the revision of AD or the use of improved or new EFs, and the correction of previously identified errors. In the 2010 submission, the impact of the recalculations was a 3.3 per cent decrease in net removals in 1990 and a 22.9 per cent decrease in net removals in 2007. The largest quantitative effect of the recalculations is reported by Germany and Denmark, both of which reported significant decreases in the estimation of removals.

2. Key categories

Forest land remaining forest land – CO₂

74. In response to a question raised by the ERT regarding the significant decrease in DOM for forest land remaining forest land between 1999 and 2000, the European Union explained that this change is due to France reporting a significant decrease in the DOM pool after a storm event in 1999. The European Union provided the answer given by France in response to its question on the same issue. France informed the European Union that the change was due to a large storm which increased the amount of dead wood at the end of 1999. France noted that the amount of dead wood in the forest was high in 2000 and has decreased since then towards its lower original stock. This answer does not explain why the 2000 value should drop so significantly. The ERT recommends that the European Union explain the dynamics of the DOM pool in France since 1999 in response to the storm, and provide the details in its NIR in the next annual submission.

75. The ERT notes that an issue raised during previous reviews regarding Germany's lack of reporting on several subcategories in this key category has been significantly improved. Germany has reported all subcategories for forest land remaining forest land and land converted to forest land except for mineral soils in forest land remaining forest land. This marks a significant improvement compared to the previous year. The ERT commends the European Union for its role in supporting member States to improve the completeness of reporting for the key categories.

76. An issue identified in previous review reports continues to be observed in the current inventory. In table 7.2 of the NIR, Italy's share of LULUCF sinks is reported to be 34.1 per cent of the total share of all 15 member States. According to Italy's 2008 inventory submitted in 2010, the area of forest land remaining forest land equals 8,838.7 kha, the implied carbon stock change factor for living biomass is 0.96 Mg C/ha, and the implied carbon stock change factor for soils is 0.86 Mg C/ha. By comparison, France's implied carbon stock change factor is 0.33 Mg C/ha for living biomass, and 0.01 Mg/C/ha for soils. As noted in the previous review report, Italy's approach assumes that soils build up their carbon stock almost as fast as vegetation. This assumption is not supported by adequate evidence and thus may lead to an overestimation of the increase in soil carbon stocks under growing forest vegetation. Hence, the approach is not fully consistent with the IPCC good practice guidance for LULUCF. The ERT recommends that the European Union continue to work with member States like Italy, which have elected to report forest management under Article 3, paragraph 4, of the Kyoto Protocol to improve the reporting of forest land remaining forest land and to ensure that the reported values are as accurate as possible.

Land converted to forest land – CO₂

77. The ERT notes an improvement in the completeness of reporting in this category since the last annual submission. Further, the European Union has provided additional information on questions raised by the ERT during the review concerning carbon fluxes in France and the United Kingdom. However, the European Union also noted in its NIR that information provided by France regarding the large area reported in this category is not sufficiently transparent to evaluate. The ERT therefore recommends that the European Union follow up with France regarding this issue and report any results in the NIR in its next annual submission.

78. The ERT acknowledges the difficulties in harmonizing the reporting in this category given the range of methodologies used by member States. The ERT commends the European Union for the improvements made with regard to transparency and completeness in this category and encourages the Party to continue to encourage member States to improve their methodologies and make efforts to harmonize their reporting approaches with other reporting Parties.

Cropland remaining cropland – CO₂

79. This category represents both an important sink and source for individual member States, with an overall source of 21,080.66 Gg CO₂ for the EU-15. Italy has reported a sink, which encompasses the majority of the sink for the European Union for this category, while Germany has reported a source, which is the major contribution to emissions in this category.

Land converted to cropland – CO₂

80. Most member States report land conversions to cropland with emissions exceeding any reported removals. In an improvement compared to last year's report, the NIR includes table 7.9, which lists the EFs used by member States for many subcategories. The ERT commends the European Union for this improvement, and some member States still use lower-tier method to estimates emissions/removals. Given the importance of this category for the European Union, the ERT encourages the Party to continue to support member States in improving the reporting in this area by using a higher-tier method where possible, as well as by improving the completeness of reporting.

Grassland remaining grassland – CO₂

81. The area of grassland has steadily increased in the European Union since 1990, with a small decrease reported between 2007 and 2008. Overall, this category is a source, with

emissions of 11,859.79 Gg CO₂. Germany is the largest contributor to the emissions, with 12,743 Gg CO₂. Italy has reported the largest sink, with removals of -7,032 Gg CO₂. Only four member States have reported biomass data for this category. The ERT recommends that the European Union support member States to improve the completeness of reporting of this category.

Land converted to settlements – CO₂

82. The previous ERT noted that, although most member States report emissions and removals from the conversion of land to settlements, the corresponding EFs are not provided in the NIR. The ERT reiterates the recommendations of the last two review reports that member States include the EFs used in their NIRs in order to improve the transparency of reporting.

F. Waste

1. Sector overview

83. In 2008, emissions from the waste sector in the EU-15 amounted to 4,000,086.34 Gg CO₂ eq or 2.4 per cent of total GHG emissions. Since the base year, emissions have decreased by 39.1 per cent. The main drivers for the fall in emissions are the early implementation of the 1999 European Union landfill waste directive, the reduction in the amount of solid waste disposal on land, the decline in the amount of biodegradable waste going to landfills, and the increase in landfill gas recovery. Within the sector, 74.1 per cent of the emissions in 2008 were from solid waste disposal on land, followed by 20.5 per cent from wastewater handling, 3.0 per cent from waste incineration and 2.4 per cent from other (waste). The most significant input in the sectoral emissions was from CH₄, which accounted for 86.9 per cent, while N₂O accounted for 10.7 per cent and CO₂ for 2.4 per cent.

84. Recalculations have been performed in the categories solid waste disposal on land, wastewater handling and waste incineration to reflect updated data, methodological changes and changes in reporting among the EU-15. The member States' contribution to the recalculations is reflected in table 10.7 of the NIR.

85. Industrial waste is not taken into consideration by six member States in solid waste disposal on land and Sweden does not estimate CH₄ emissions from domestic and commercial wastewater. The ERT encourages the European Union not only to collect and reorganize the information in its NIR and the data included in the CRF tables from member States, but also to create incentives for the assurance of inventory improvements in order to increase the transparency, accuracy and completeness of the European Union's inventory.

2. Key categories

Solid waste disposal on land – CH₄

86. There is a significant difference in the rate of waste generation per capita among the member States (figure 8.3 of the NIR). The European Union explains in its NIR that the waste generation rate is not well defined in the additional information box of the CRF tables or in the NIR of individual member States. It is therefore difficult to explain the difference in the waste generation rate among member States. The ERT encourages the European Union to enhance cooperation with member States and to collect relevant information with a view to better understand the background of the significant difference in waste generation rates among member States (0.18–7.78 kg/capita/day). The NIR notes that there is no consistency between member States in their classification of waste and therefore the consistency and completeness of estimates between countries has not been

demonstrated in the NIR. There is a significant difference in the rate of waste generation per capita among the member States presented in figure 8.3 of the NIR (from 0.18 to 7.78 kg/capita/day); much of this difference may be due to differing definitions of MSW and differing national circumstances. However, the NIR notes that “It is difficult, though, to explain the differences for all Member States from the information available in the NIR” (page 593). The ERT recommends that the European Union develop means to demonstrate that emissions data are comparable and complete, possibly by calculating the waste generation rates of member States based on a consistent and better defined EU dataset and then checking whether the same differences among member States remain when a more consistent dataset is used.

87. Industrial waste is neither mentioned nor considered by six member States in the NIR in solid waste disposal on land (Greece, Ireland, Italy, Luxembourg, Netherlands and Spain). The ERT strongly recommends that the European Union investigate the reasons for this and that the Party encourage member States to eliminate the potential underestimations in this key category for the sake of inventory completeness.

88. Table 8.5 of the NIR, which provides information on the recalculations conducted in 1990 and 2007, does not contain information on the contributors to the emission recalculation results for the period 1990–2007. It provides explanations for the largest recalculations in absolute terms only (Italy and Spain). In response to a question raised by the ERT during the review, the European Union submitted explanations for the recalculations in other member States. The ERT encourages the Party to include more information on recalculations, such as the information provided to the ERT during the review, in the next NIR.

Wastewater handling – CH₄ and N₂O

89. CH₄ emissions from domestic and commercial wastewater handling are a significant emission source in this sector and have been identified as a key category for the European Union. Nevertheless, one member State (Sweden) has reported emissions from this category as “NE” in the CRF tables due to a lack of data. The ERT recommends that the European Union encourage Sweden to eliminate the potential underestimations in this key category in order to improve the completeness of the inventory.

90. Tables 8.8 and 8.10 of the NIR on the recalculations conducted for CH₄ emissions in 1990 and 2007 do not contain information on the contributors to the emission recalculation results. In response to a question raised by the ERT during the review, the European Union submitted explanations for the recalculations in member States. The ERT encourages the Party to include more information on recalculations, such as the information provided to the ERT during the review, in the next NIR.

91. Six member States (Finland, Greece, Italy, Netherlands, Portugal and Spain) reported CH₄ emissions from industrial wastewater in 2008 while Denmark reported these emissions as “IE”, Austria as ‘NA’, France, Germany, Ireland and Luxembourg as ‘NO’ and three member States reported these emissions as ‘NE’ (Belgium, Sweden and the United Kingdom). Six member States (Austria, France, Italy, Luxembourg, Portugal and Sweden) reported N₂O emissions from industrial wastewater, while the remaining member States reported these emissions as “NA”, “NE” and “IE”. The ERT recommends that the European Union encourage those member States reporting these emissions as “NE” to provide emission estimates.

Waste incineration – CO₂

92. Emissions from waste incineration were reported by 10 member States in 2008 (Austria, Belgium, Denmark, France, Greece, Italy, Portugal, Spain, Sweden and the United

Kingdom). A total of 84.8 per cent of EU-15 CO₂ emissions are calculated using higher-tier methods.

3. Non-key categories

Other (waste) – CH₄ and N₂O

93. Altogether, 10 member States reported emissions under the category other (waste) for 2008. Emissions from composting were also reported by 10 member States (Austria, Belgium, Denmark, Finland, France, Germany, Italy, Luxembourg, Netherlands and Spain). Denmark and France have reported their emissions from biogas production, while Spain has provided estimates of emissions from sludge spreading, Germany has provided emission estimates from mechanical-biological waste treatment plants and the Netherlands has provided emission estimates from recycling activities. The information is shown in table 8.28 of the NIR.

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

94. The European Union has provided, in table 11.6 of the NIR, the definitions of forest for all 15 member States, including all required parameters. Denmark, Finland, France, Germany, Greece, Italy, Portugal, Spain, Sweden and the United Kingdom have all elected forest management, Denmark, Portugal and Spain have elected cropland management, while Denmark and Portugal have elected grassland management. Denmark and France have elected annual accounting with all other countries electing end-of-commitment-period accounting. The European Union notes in the NIR that it will neither issue nor cancel units based on the emissions and removals reported by member States for KP-LULUCF activities. The European Union further notes in the NIR that several member States have improved their land identification system and ensured that the definitions and methods used are consistent over the entire time series in order to meet the requirements under the Kyoto Protocol. The NIR states that land transition matrices have been developed, based on available databases and methodologies in each member State, but notes that several member States had difficulties in assessing land-use change. The ERT encourages the European Union to support member States in improving their ability to accurately track land-use change.

95. Tables 11.9 and 11.10 of the NIR list the different approaches used by member States to identify land and units of land. Most member States use a national forestry inventory (NFI) to identify land subject to activities under Article 3, paragraph 3, of the Kyoto Protocol (afforestation and reforestation, and deforestation). While land areas are provided, limited information on whether the countries have provided georeferencing or geographical boundaries for multiple or single activities is provided. The ERT recommends that the European Union work with member States to provide more detailed information on geographical boundaries for land subject to activities under Article 3, paragraph 3, of the Kyoto Protocol, including maps and/or databases to identify the geographical locations and the system of identification codes for the geographical locations.

96. Not all member States have reported the carbon stock changes for each of the five carbon pools as required for all activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. This issue is further addressed in the individual review report of the member States. The ERT recommends that the European Union work with member States to report on all pools for activities under Article 3, paragraphs 3 and 4, or to demonstrate that a

particular pool is not a net source. Not all member States have provided an uncertainty analysis for Kyoto Protocol estimates. The European Union notes that several member States are planning to include uncertainty estimates in their next annual submission. The ERT encourages the European Union to work with member States in order to include uncertainty analyses for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

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

Afforestation and reforestation – CO₂

97. The European Union has included in its NIR a table (11.16) listing the justifications provided by member States as to why afforestation and reforestation activities are directly human-induced. Several member States have not provided adequate information on the size and geographical location of forest areas that have lost forest cover but which are not yet classified as deforested. As the European Union has noted in the NIR, further improvement is needed in this area and the ERT recommends that the European Union work with member States to provide more complete information on this category.

Deforestation – CO₂

98. The European Union has also included information (table 11.17 of the NIR) on how harvesting or forest disturbance is distinguished from deforestation. The information provided is not complete for all member States. The ERT recommends that the European Union support member States in improving the reporting in this category.

99. The ERT notes that there are inconsistencies and inappropriate uses of notation keys in some CRF cells for this category. The European Union has acknowledged this issue and states that it has raised it with individual member States. The ERT recommends that the European Union continue to work with member States to ensure that the appropriate notation keys are used and, where appropriate, to provide explanations for missing data.

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

Forest management – CO₂

100. The European Union has also provided a table (table 11.7 of the NIR) listing the hierarchies reported by Denmark, Portugal and Spain for their elected activities under Article 3, paragraph 4, of the Kyoto Protocol. Most member States include all forests as subject to forest management with only a few countries using a more narrow definition.

Cropland management – CO₂

101. Denmark, Portugal and Spain have elected this activity. Portugal has reported CO₂ emissions from this activity in 1990 as “NE” for all carbon pools, and Denmark and Spain have reported emissions from some carbon pools using notation keys, while this activity is net-net accounting. The ERT noted that the European Union will not issue removal units (RMUs) for this activity; however, the ERT encourages the European Union to work with these member States to prepare complete information for the next annual submission.

Grazing land management – CO₂

102. Denmark and Portugal have elected this activity. Portugal has reported CO₂ emissions from this activity in 1990 as “NE” for all carbon pools, Denmark has reported emissions from some carbon pools for this activity in 1990 using notation keys, while this activity is net-net accounting. The ERT noted that the European Union will not issue RMUs

for this activity; however, the ERT encourages the European Union to work with these member States to prepare complete information for the next annual submission.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

103. The European Union 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.⁶ The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10.

104. Information on the accounting of Kyoto 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 transaction log (ITL) 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. The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

105. According to the SEF tables submitted in 2010, in all tables except table 5(a), the Kyoto Protocol units are reported as “NO”. In response to a question raised by the ERT during the review, the Party informed the ERT that no assigned amount units (AAUs) had yet been issued and a decision on the issuance of the 19,357,532 t CO₂ eq was still to be taken by the European Union. After the review week, the European Union informed the ERT that the decision to issue that amount of AAUs had been confirmed in European Commission decision (2010/778/EU)⁷ on 15 December 2010. In the latter stages of the review, the ERT noted that, according to the ITL recorded on 6 January 2011, the European Union registry has issued 19,357,532 of AAUs, which corresponds to the full assigned amount for this registry.

Accounting of activities under Article 3, paragraph 3, of the Kyoto Protocol and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol

106. The ERT noted that the European Union stated in its NIR that: “The EU will neither issue nor cancel units based on the reported emissions and removals from activities under Article 3, paragraph 3 and paragraph 4.”

National registry

107. 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.

⁶ 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.

⁷ Available at:
<<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:332:0041:0042:EN:PDF>>.

The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate.

Calculation of the commitment period reserve

108. The European Union has reported its commitment period reserve in its 2010 annual submission. It reported that its commitment period reserve has not changed since the initial report review (17,659,243,358 t CO₂ 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

109. The European Union reported that there have been a change to its national system since the previous annual submission. New Climate Action Directorate General (DG Climate Action) was created, and the responsibility for the preparation of the inventory of the EU has now moved from DG Environment to the new DG Climate Action. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

110. The European Union reported that there have been minor changes to its national registry since the previous annual submission, such as name of registry administrator. 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

111. The European Union has reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1, in its 2010 annual submission.

112. The reported information is considered complete. The information is very detailed and transparent. The European Union provided information on:

(a) The impact assessment of European Union policies (e.g. the promotion of renewable energy biofuels and biogas, and the inclusion of aviation in the EU ETS);

(b) The progressive reduction or phasing-out of market imperfections, fiscal incentives tax, and duty exemptions and subsidies in all GHG-emitting sectors, taking into account the need for energy price reforms to reflect market prices and externalities;

(c) The removal of subsidies associated with the use of environmentally unsound and unsafe technologies;

(d) Cooperation in the technological development of non-energy uses of fossil fuels and supporting developing country Parties to this end; cooperating in the development, diffusion and transfer of reduced GHG-emitting advanced fossil-fuel technologies and/or technologies relating to fossil fuels that capture and store GHGs and encouraging their wider use; and facilitating the participation of the least developed countries and other non-Annex I Parties in this effort;

(e) Strengthening the capacity of developing country Parties identified in Article 4, paragraphs 8 and 9, of the Convention in improving efficiency in upstream and

downstream activities relating to fossil fuels, taking into consideration the need to improve the environmental efficiency of these activities;

(f) Assisting developing country Parties, which are highly dependent on the export and consumption of fossil fuels in diversifying their economies.

III. Conclusions and recommendations

113. The European Union made its annual submission on 15 April 2010 and revised it on 27 May 2010 and submitted a revised version on 15 November 2010. 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 (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units and changes to the national system and the national registry, and minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

114. The ERT concludes that the inventory submission of the European Union has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and the Party has submitted a complete set of CRF tables for the years 1990–2008 and an NIR; these are complete in terms of geographical coverage, years, sectors and gases, and generally complete in terms of categories. Some of the categories, particularly in the LULUCF and industrial processes sectors, were reported as “NE” by some member States. During the review, the European Union provided the ERT with information on the procedure to deal with the completeness issue. The ERT concluded that the procedure should guarantee a substantial improvement in future annual submissions.

115. 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. Not all member States have reported the carbon stock changes for each of the five carbon pools as required for all activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. This issue is further addressed in the individual review reports of the member States.

116. The Party’s inventory is in line with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

117. The European Union has provided information on activities under Article 3, paragraph 3 and 4, of the Kyoto Protocol in its NIR with respect to the requirements outlined in paragraphs 5–9 of the annex to decision 15/CMP.1. However, not all member States have reported the carbon stock changes for each of the five carbon pools as required for all activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as mentioned in paragraph 115.

118. The European Union 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.

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

120. The national registry continues to perform the functions as 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.

121. The European Union has reported the information requested in 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 2010 annual submission. The information is considered complete and transparent.

122. In the course of the review, the ERT formulated a number of recommendations relating to the completeness of the annual submission and the transparency of the information presented in the European Union’s annual submission. The key recommendations are that the European Union:

(a) Endeavour to reduce the amount of categories/subcategories which are reported as “NE” and to harmonize the use of notation keys by member States;

(b) Include the information on the general assessment of completeness and the procedure for ensuring the completeness of its inventories and the general information in its NIR in the next annual submission;

(c) Focus the description of the key category analysis and the uncertainty analysis on the overall analyses of the European Union instead of member States’ individual analyses;

(d) Complete CRF table 9(a) by including explanations for the categories reported as “IE”;

(e) Use the correct notation keys in the energy and industrial processes sectors and explain the reasons for their use in the NIR;

(f) Work with member States to provide more detailed information on geographical boundaries for land subject to activities under Article 3, paragraph 3, of the Kyoto Protocol;

(g) Work with member States to report on all pools for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol or to demonstrate that a particular pool is not a net source.

IV. Questions of implementation

123. 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/gp/landuse/gp/landuse.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>>.

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Synthesis and assessment report on the greenhouse gas inventories submitted in 2010. Available at <<http://unfccc.int/resource/webdocs/sai/2010.pdf>>.

FCCC/ARR/2009/EC. Report of the individual review of the greenhouse gas inventory of the European Community submitted in 2009. Available at <<http://unfccc.int/resource/docs/2010/arr/ec.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. Erasmia Kitou (European Commission, DG Climate Action) including additional material on the methodologies and assumptions used.

Annex II

Acronyms and abbreviations

AAU	assigned amount unit
AD	activity data
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRF	common reporting format
DG	Directorate-General
DOM	dead organic matter
EEA	European Environment Agency
EF	emission factor
ERT	expert review team
ETS	emissions trading scheme
EU	European Union
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆ without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
LULUCF	land use, land-use change and forestry
Mg	megagram (1 Mg = 1 tonne)
NA	not applicable
NE	not estimated
NFI	national forestry inventory
NO	not applicable
N ₂ O	nitrous oxide
NIR	national inventory report
ODS	ozone-depleting substance
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
RMU	removal unit
SEF	standard electronic format
SF ₆	sulphur hexafluoride
SIAR	standard independent assessment report
SO ₂	sulphur dioxide
TJ	terajoule (1 TJ = 10 ¹² joule)
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change