



United Nations

FCCC/ARR/2011/EU



Framework Convention on
Climate Change

Distr.: General
26 September 2012

English only

**Report of the individual review of the annual submission of
the European Union submitted in 2011***

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

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I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2011 annual submission of the European Union (EU), coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 12 to 17 September 2011 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Anna Romanovskaya (Russian Federation) and Ms. Kristina Saarinen (Finland); energy – Mr. Steven Oliver (Australia) and Mr. Pedro Torres (Portugal); industrial processes – Ms. Lisa Hanle (United States of America) and Mr. Samir Tantawi (Egypt); agriculture – Mr. Sorin Deaconu (Romania) and Mr. Dionisio Rodriguez (Spain); land use, land-use change and forestry (LULUCF) – Mr. Xiaoquan Zhang (China) and Mr. Vladimir Korotkov (Russian Federation); and waste – Mr. Baek Wonseok (Republic of Korea). Ms. Romanovskaya and Mr. Zhang were the lead reviewers. The review was coordinated by Mr. Vitor Gois Ferreira (UNFCCC secretariat).

2. In accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines), 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 2009, the main greenhouse gas (GHG) in the European Union was carbon dioxide (CO₂), accounting for 82.3 per cent of total GHG emissions¹ expressed in carbon dioxide equivalent (CO₂ eq), followed by methane (CH₄) (8.3 per cent) and nitrous oxide (N₂O) (7.4 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 2.0 per cent of the overall GHG emissions in the European Union. The energy sector accounted for 79.8 per cent of total GHG emissions, followed by the agriculture sector (10.2 per cent), the industrial processes sector (6.7 per cent), the waste sector (3.0 per cent), and the solvent and other product use sector (0.3 per cent). Total GHG emissions amounted to 3,723,858.29 Gg CO₂ eq and decreased by 13.0 per cent between the base year² and 2009. A significant decrease in total emissions occurred between 2008 and 2009 (274,273.39 Gg CO₂ eq, or 6.9 per cent) mostly owing to decreased consumption of fossil fuels and lower activity of industry, particularly in the cement, chemical, iron and steel industries, in the follow-up to the economic down-turn that began in 2008.

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 is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆ for Belgium, Denmark, Finland, Germany, Greece, Ireland, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland, and 1990 for Austria, France and Italy. The base year emissions include emissions from Annex A sources only.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year to 2009^a

	Greenhouse gas	Gg CO ₂ eq								Change Base year–2009 (%)
		Base year ^a	1990	1995	2000	2005	2007	2008	2009	
Annex A sources	CO ₂	3 359	3 359	3 290	3 361	3 472	3 395	3 323	3 063	
		414.40	414.40	118.46	565.61	834.26	607.69	237.22	233.81	–8.8
	CH ₄	450 717.00	450 717.00	419 472.51	376 521.94	329 041.57	318 494.26	314 864.70	309 629.04	–31.3
	N ₂ O	399 056.19	399 056.19	378 532.16	339 129.49	308 969.67	295 467.55	287 351.14	277 422.99	–30.5
	HFCs	40 907.21	28 103.06	41 066.80	45 195.74	55 106.28	60 077.20	63 432.75	65 552.29	60.2
	PFCs	14 906.15	16 830.47	10 946.18	7 281.27	4 117.46	3 409.48	2 868.92	1 946.89	–86.9
	SF ₆	14 313.02	10 890.34	15 462.49	10 192.22	7 712.60	6 800.67	6 376.95	6 073.29	–57.6
KP-LULUCF	Article 3.3 ^b	CO ₂						–11 409.93	–14 997.67	
		CH ₄						183.96	171.53	
		N ₂ O						125.96	128.11	
	Article 3.4 ^c	CO ₂	–21 809.89					–273	–281	NA
		CH ₄	347.36					694.10	793.02	128.3
		N ₂ O	91.78					232.36	238.64	160.0

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

^a “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆ for Belgium, Denmark, Finland, Germany, Greece, Ireland, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland, and 1990 for Austria, France and Italy. The “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

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

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

Table 2

Greenhouse gas emissions by sector and activity, base year to 2009^a

Sector	Base year ^a	Gg CO ₂ eq							Change Base year–2009 (%)		
		1990	1995	2000	2005	2007	2008	2009			
Anne A	Energy	3 273	3 273	3 200	3 252	3 342	3 257	3 196	2 972		
		696.59	696.59	498.14	475.01	131.51	837.71	351.80	878.17	–9.2	
	Industrial processes	367	352	350	308	309					
		199.63	897.11	808.04	955.98	357.93	306 378.64	290 301.20	250 292.40	–31.8	
	Solvent and other product use	13 537.38	13 537.38	12 356.54	11 801.81	10 515.43	10 305.58	9 803.91	9 347.93	–30.9	
	Agriculture	441	441	419	418	392					
		170.62	170.62	242.89	960.15	543.45	387 835.34	386 833.50	378 864.34	–14.1	
Waste	183	183	172	147	123						
	709.75	709.75	692.99	693.32	233.53	117 499.57	114 841.29	112 475.47	–38.8		
LULUCF	NA	–229	–257	–275	–255	–251	–278	–293			
	NA	095.82	339.38	862.17	261.93	843.84	280.38	325.53	NA		
Total (with LULUCF)	NA	4 035	3 898	3 864	3 922	3 828	3 719	3 430			
Total (without LULUCF)	4 279	4 265	4 155	4 139	4 177	4 079	3 998	3 723			
	313.97	011.46	598.60	886.27	781.85	856.85	131.69	858.30		–13.0	
Other ^b	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA	
KP-LULUCF	Article 3.3 ^c	Afforestation and reforestation									
		Deforestation									
		Total (3.3)									
	Article 3.4 ^d	Forest management									
		Cropland management									
		Grazing land management									
		Revegetation									
Total (3.4)											

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.

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^a “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O , and 1995 for HFCs, PFCs and SF₆ for Belgium, Denmark, Finland, Germany, Greece, Ireland, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland, and 1990 for Austria, France and Italy. The “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

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

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

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

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO₂, CH₄ and N₂O 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 report 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.

Table 3

Information to be included in the compilation and accounting database in t CO₂ eq

	<i>As reported</i>	<i>Revised estimates</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	3 063 225 978	3 063 233 811		3 063 233 811	
CH ₄	309 492 990	309 629 039		309 629 039	
N ₂ O	277 422 991			277 422 991	
HFCs	65 552 287			65 552 287	
PFCs	1 946 886			1 946 886	
SF ₆	6 073 286			6 073 286	
Total Annex A sources	3 723 714 417			3 723 858 299	
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	-38 572 089			-38 572 089	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	508 821			508 821	
3.3 Deforestation for current year of commitment period as reported	23 365 236			23 365 236	
Activities under Article 3, paragraph 4, for current inventory year^d					
3.4 Forest management for current year of commitment period	-277 633 538			-277 633 538	
3.4 Cropland management for current year of commitment period	-1 872 822			-1 872 822	
3.4 Cropland management for base year	2 645 228			2 645 228	
3.4 Grazing land management for current year of commitment period	-777 921			-777 921	
3.4 Grazing land management for base year	-304 253			-304 253	
3.4 Revegetation for current year of commitment period	NA			NA	
3.4 Revegetation in base year	NA			NA	

Abbreviation: NA = not applicable.

^a "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

^b “Final” includes revised estimates, if any, and/or adjustments, if any.

^c “Accounting quantity” is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.

^d Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2011 annual inventory submission was submitted on 15 April 2011; it contains a complete set of common reporting format (CRF) tables for the period 1990–2009 and a national inventory report (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 the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2011. The annual submission was submitted in accordance with decision 15/CMP.1.

7. The European Union submitted a revised NIR on 27 May 2011 and revised SEF tables on 4 July 2011. The European Union officially submitted revised emission estimates on 28 October 2011, in response to the list of potential problems and further questions raised by the expert review team (ERT) in the course of the review, including information on KP-LULUCF. The Party submitted revised estimates for CH₄ emissions from fugitive emissions from natural gas (transmission and distribution), CO₂ from lime production, and CH₄ from solid waste disposal on land. The values in this report are those submitted by the Party on 28 October 2011.

8. Where necessary, the ERT also used the previous year’s submission during the review. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.³

9. During the review, 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. The full list of information and documents used during the review is provided in annex I to this report.

Completeness of inventory

10. The European Union’s GHG inventory covers all source and sink categories for the period 1990–2009 and is complete in terms of years and geographic coverage. The European Union has provided a complete set of CRF tables with notation keys used throughout. Due to a large volume of data, few CRF tables (e.g. summary 2, tables 8(a) and 9) were submitted as separate files. The European Union has provided also an NIR. In

³ The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), 6(c) and 6(k), under the auspices of the international transaction log 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.

general, the information in the NIR is presented for the set of all member States and for each member State as well.

11. The GHG inventory of the European Union submitted under the Kyoto Protocol comprises the sum of the national inventories compiled by the 15 member States making up EU-15.⁴ The ERT noted a systematic difference in the time-series between the total GHG emissions reported by the European Union's inventory and the sum of emissions for the 15 member States. Responding to the ERT during the review week, the EU clarified that this is due to the difference in the geographical coverage of some member States between their national submission and their submissions to the European Union. Indeed, the inventory of the European Union covers the total area of most member States, with exceptions for Denmark (excluding Greenland and Faroe Islands), France (excluding New Caledonia, Wallis and Futuna, Austral and Antarctic territories), the Netherlands (excluding Aruba and the Netherlands Antilles and including a 12-mile zone from the coastline) and for United Kingdom of Great Britain and Northern Ireland (excluding Gibraltar). The ERT recommends that the European Union clarify this issue in the NIR of its next annual submission.

12. The European Union has also provided the CRF tables for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol for 1990, 2008 and 2009. The reporting in KP-LULUCF CRF tables is complete and notation keys are used throughout.

13. Since the completeness of the Party's inventory is dependent on the completeness of the member States' inventories, the European Union has in place a set of procedures towards complementing the existing procedures and improving the completeness regarding categories not estimated ("NEs") in the member States's inventories, including a specific software program to identify and document "NE" categories, the preparation of annual status reports for each member State listing missing estimates and a procedure for "gap-filling". The ERT concluded that the procedures are explained in the NIR appropriately, in response to the recommendation in the previous review report.⁵

14. The ERT noted that as a result of these specific actions undertaken by the European Union the completeness of the 2011 annual submission improved in comparison to the 2010 annual submission and the total list of categories "NE" decreased by 29 per cent since last year submission (82 categories). Most "NEs" is reported for LULUCF sector, following by the industrial processes sector and by energy sector. Only few categories are listed for agriculture and wastes. It must be noted, however, that for the 2010 annual submission of EU-15 no gap-filling procedures were undertaken, and for those categories reported as "NE" no methodologies are available in the Revised 1996 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories (hereinafter referred to as the Revised 1996 IPCC Guidelines) or the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance).

15. The ERT concluded during the review week that in the European Union's original submission emissions were reported unexpectedly as not occurring ("NO") by some member states (CH₄ from transmission and distribution of natural gas from Sweden), or were under-estimated for other categories, such as CO₂ from lime production in the United Kingdom, and CH₄ from solid waste disposal on land in Greece). Responding to the list of

⁴ The EU-15 includes the European Union's member States that agreed to fulfill their commitments under Article 3 of the Kyoto Protocol jointly, in accordance with Article 4, of the Kyoto Protocol. These Parties are: Austria; Belgium; Germany; Denmark; Finland; France; Greece; Ireland; Italy; Luxembourg; Netherlands; Portugal; Spain; Sweden; United Kingdom of Great Britain and Northern Ireland.

⁵ FCCC/ARR/2010/EU, paragraph 14.

potential problems and further questions, the European Union submitted revised estimates for these categories, and the ERT concluded that the inventory is now complete for all categories and member States.

16. During the review week and responding to the ERT, the European Union provided information on procedures to increase the consistent usage of notation keys during preparation of 2011 annual submission. The European Union informed the ERT that, for reporting of LULUCF sector and activities, the Joint Research Centre (JRC) developed decision trees on notation keys for carbon pools (tables 5(KP-I)) and for GHG sources (tables 5(KP-II)) in order to ensure more harmonized use of notation keys, as well as to identify incompleteness issues in due time as automatic check. For other sectors the completeness checking procedure (see para. 13 above) also led to more consistent use of notation keys. The EU also provided information on planned improvements, including the EU-internal review and ways forward to improve the completeness of member States reporting. The ERT recommends that the Party continue its efforts to enhance the usage of notation keys, to guarantee that it is transparent to the ERT that reported emissions are not underestimated. The ERT also recommends that the Party report on the results of actions undertaken for every submission and progress achieved in relation to these issues in future annual submissions.

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

Overview

17. The ERT concluded that the national system continued to perform its required functions. The Party described the changes of the national system since the previous annual submission and these changes are discussed in chapter II.G.3 of this report.

Inventory planning

18. The NIR and additional information submitted by the European Union described the national system and institutions involved in preparing the inventory. The Directorate-General for Climate Action (DG Climate Action) has overall responsibility for the European Union inventory and its final approval. Other organizations are also involved in the preparation of the inventory: firstly, member States of the European Union are involved, since the inventory is based for the compilation of the national GHG inventories of its member States, each being responsible for the preparation of its own inventory that is submitted to the European Union for compilation (each member State appoints an expert responsible for its contribution to the European Union's inventory). Secondly, other European institutions have a role in the preparation of the inventory: the European Environment Agency (EEA) and its European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM) are responsible for the initial quality control checks of member States' inventories, the preparation of the European Union's CRF tables and NIR and archiving database; Eurostat is responsible for the reference approach and quality assurance/quality control (QA/QC) checks; and the JRC is involved in QA/QC procedures related to the agriculture and LULUCF sectors.

19. The legal basis of the compilation of the European Union inventory is European Union decision 280/2004/EC concerning a mechanism for monitoring greenhouse gas emissions and for implementing the Kyoto Protocol. Under its provisions, member States must report to the Commission their national GHG inventories no later than 15 January each year. The ERT concluded that the Party has in place the institutional, procedural and legal arrangements for estimating and the timely reporting of the annual GHG inventories.

Inventory preparation

Key categories

20. The European Union has reported key category tier 1 and tier 2 analyses, both level and trend assessment, as part of its 2011 annual submission. The key category analysis performed by the Party and that performed by the secretariat⁶ produced different results owing to different disaggregation of categories. The European Union has included the LULUCF sector in its tier 1 key category analysis, which was performed in accordance with the Revised 1996 IPCC Guidelines 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).

21. However, the ERT noted that the tier 2 key category analysis does not include the LULUCF sector, while large uncertainties associated with the categories of this sector usually have significant influence in the final results of the analysis. The Party indicated its intention to include the LULUCF sector in the tier 2 analysis to be prepared for the next annual submission and to determine the key categories for KP-LULUCF activities. The ERT commends the intention by the EU and recommends that it report on improvements made in the next annual submission.

22. The key category analysis is used by the Party for the prioritizing and planning of QA/QC procedures at the union level.

Uncertainties

23. The European Union has reported a tier 1 uncertainty analysis in its NIR (detailed in annex 1.1 to the NIR), which is based on individual uncertainty analyses prepared by the EU-15 member States. The estimate of uncertainties covers all categories, including the LULUCF sector (for level assessment). The cumulative uncertainty of the total GHG emissions by the level assessment for 2009 is 7.0 per cent excluding LULUCF and 7.3 per cent including LULUCF. The trend uncertainty is 1.6 per cent, excluding LULUCF. The ERT recommends that the European Union include the LULUCF sector in its trend uncertainty analysis in its next annual submission. During the review, the European Union informed the ERT that complete assessment of LULUCF sector for both tier 1 and 2 uncertainty analyses is likely to be included in the 2012 annual submission.

24. Descriptions of uncertainty estimates are presented in sectoral chapters of the NIR. However, the ERT noted the recommendations in the previous review report to improve the transparency of uncertainty analyses and to present an overview of estimates from individual member States in the NIR. During the review week, the European Union explained to the ERT that a more extensive documentation of uncertainty estimates at member State level and category level was not included in the NIR due to time constraints, but the Party plans to do this in the next annual submission. Also, for its 2012 annual submission the European Union will explore the possibility of using Monte Carlo analysis, in accordance with the recommendations of the previous review report. The ERT supports

⁶ 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 Intergovernmental Panel on Climate Change *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

these intentions by the Party and recommends that the EU report on achievements made in its next annual submission.

Recalculations and time-series consistency

25. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. Information on recalculations by each member State is provided in annex 1.4 to the NIR and an overview of recalculations with explanations of their impacts are described in the NIR and in CRF table 8(b). The ERT commends this transparent reporting by the Party. The ERT noted that recalculations reported by the EU for the period 1990 to 2008 were performed for all sectors and were undertaken to take into account the following:

(a) Improvements and changes in activity data (AD) such as updates in European Union Emission Trading Scheme (EU ETS) data (e.g. for CO₂ emission from energy industries in Portugal, and CO₂ emissions from manufacturing industries and construction in Germany);

(b) Improvements of emission factors (EFs) or parameters (e.g. CO₂ emission from energy industries in Italy; CO₂ emissions from road transportation in the United Kingdom; N₂O emissions from chemical industries in Germany; direct N₂O emissions from agricultural soils in Germany; CH₄ emission from waste water handling in Greece);

(c) Revision of methodologies and models (e.g. CO₂ emissions from transport in Spain, CO₂ emissions for energy industries in Belgium, N₂O emissions from agricultural soils in the Netherlands, CH₄ emissions from solid waste disposal on land in the United Kingdom);

(d) Reallocation of categories (e.g. CO₂ emission from energy industries and CO₂ emissions from manufacturing industries and construction in Germany, CO₂ emissions from transport in the United Kingdom, CO₂ emissions from other sectors in the Netherlands and the United Kingdom);

(e) Correction of noticed errors.

26. However, overall the major changes were made for the categories' CO₂ emissions from metal production and HFCs emissions from the production of halocarbons and SF₆ for both 1990 and 2008, followed by N₂O emissions from transport and CH₄ emissions from solid waste disposal on land. The magnitude of the impact includes: an increase in the estimated total GHG emissions in 1990 (0.5 per cent); and an increase in 2008 (0.7 per cent); which did not have significant implications on the overall trend of GHG emissions.

Verification and quality assurance/quality control approaches

27. In its NIR, the European Union has provided information on QA/QC procedures that are in line with the IPCC good practice guidance. Responding to the ERT during the review week, the European Union provided further clarification of the legal status of its QA/QC plan, indicating that Article 4, paragraph 2, of European Union decision 280/2004/EC, on the monitoring mechanism, obliged DG Climate Action to adopt, by 30 June 2006, an inventory system for the union, including a QA/QC plan. The Party also informed the ERT that the QA/QC plan is the basis for the implementation of QA/QC activities at the European Union level. Additional QA/QC activities to the monitoring mechanism were established as a follow up to recommendations made in the review reports as well as at the regular meetings under the working group on annual inventories under the Climate Change Committee (WG1), the EU internal review process, workshops and expert meetings. The ERT commends the Party for its explanation and recommends that the Party include this information in the NIR of the next annual submission.

28. The ERT noted that the NIR of its 2011 annual submission does not provide updated information on developments of QA/QC procedures. Responding to the ERT during the review, the European Union provided such information, and the major improvements include the establishment of a detailed checking procedure of inventory completeness, which was prepared in consultation with the member States, and a “completeness check” on LULUCF CRF tables. In addition, the EU implemented an “internal review” of major LULUCF issues identified in the list of potential problems and further questions for member States in previous submissions.

29. The ERT noted that the European Union has not provided descriptions of any independent peer-review in the NIR. Responding to a question raised by the ERT, the Party explained that:

(a) The EU internal review by member States is an external independent peer review of the EU inventory since it includes experts from member States reviewing the EU inventory;

(b) COPERT⁷ workshops (road transportation) are held on a regular basis and the next is planned to take place in October 2011 to allow for technical discussions and the review of methodologies used. Changes to the COPERT methodology, which is used to estimate emissions from road transportation, and its EFs are also peer reviewed each year by the transport expert panel of the Task Force on Emission Inventories and Projections under the United Nations Economic Commission for Europe (UNECE)’s Convention on Long Range Transport of Air Pollution;

(c) Technical workshops on LULUCF issues were conducted in 2010 and more are planned for autumn 2011;

(d) Eurostat launched a project to estimate CO₂ emissions based on Eurostat energy balance data for the sectoral approach and to compare these emissions with the member States’ emissions as reported in the CRF tables.

30. The ERT concluded that these actions represent QA procedures and recommends that the Party describe in the NIR of its next annual submission the results of the implementation of these actions. The ERT commends the efforts of the European Union in the continuous improvement of its QA/QC procedures and recommends that it update related information in the NIR on a regular basis.

31. In the NIR of its 2011 annual submission, the European Union has included a detailed description of the principles used to include EU ETS data in the inventory and has provided information about the QA/QC procedures implemented on this data, particularly to do with the verification of installation-specific CO₂ emissions (energy and manufacturing industries). The usage of EU ETS data is described in detail for each member State as well. During the review, the European Union provided additional information on recent developments of EU ETS data coverage, indicating that between 2008 and 2009 the number of installations increased by 97 and between 2009 to 2010 it decreased by 55 installations. The ERT recommends that the Party continue to describe the annual changes and improvements in the usage and verification of EU ETS data in the NIR of future annual submissions.

⁷ COPERT 4 is a software tool used world-wide to calculate air pollutant and greenhouse gas emissions from road transport. Available at <<http://www.emisia.com/copert/General.html>>.

Transparency

32. The NIR of its 2011 annual submission provides, in general, highly transparent information on the inventory, both at the EU level and also for each member State. A number of annexes to the NIR increase transparency by providing information on uncertainties, key categories, the reporting of recalculations and other general issues as well as sectoral reporting. In accordance with the NIR, some improvements in transparency are planned for the next annual submission, particularly related to the description of uncertainty estimates and key category analyses. The ERT supports the intention of the European Union to continue improving the transparency of its annual reporting.

Inventory management

33. The European Union has a centralized archiving system, which includes the archiving of disaggregated emission factors (EFs) and AD, and documentation on how these factors and data have been generated and aggregated in the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification, and on planned inventory developments. It includes draft and final versions of CRF tables and NIR for each submission, spreadsheets for inventory estimates, all related information received from each member State, checklists, and reports of all QA/QC procedures applied. The archived information is kept by EEA and its ETC/ACM and additional copies is archived at Umweltbundesamt in Vienna. The ERT concluded that inventory management and the archiving of inventory information is in line with the annex to decision 19/CMP.1.

3. Follow-up to previous reviews

34. The NIR provides detailed information on the follow-up to recommendations from 2008, 2009 and 2010 reviews at the EU inventory level and on the responses of each member State to the results of their own reviews. The ERT noted that most recommendations were implemented by the Party or where they were not, additional explanations are provided. Some recommendations from the 2010 review are still ongoing due to the prioritization of improvements or a need of time to respond (e.g. inclusion of LULUCF sector in the tier 2 uncertainty analysis, development of key categories for KP-LULUCF activities at the EU level, conducting tier 2 Monte-Carlo uncertainty analysis for all sectors, detailed descriptions of uncertainty analysis).

35. Major improvements include: the establishment of the completeness checking procedure and actions undertaken to improve consistency in the usage of notation keys by member States, improved transparency in the NIR allowing for the general assessment of the completeness and descriptions of recalculations undertaken at the sectoral level. The ERT commends the transparent and comprehensive reporting of the EU on actions taken in response to the recommendations of previous reviews.

4. Areas for further improvementIdentified by the Party

36. The 2011 NIR identifies several areas for improvement at the EU level, including further implementation of the recommendations from the past reviews; continuation of sector-specific QA/QC activities within the EU internal review and the further development of EU QA/QC activities on the basis of the experience of previous years.

Identified by the expert review team

37. During the review, the ERT identified cross-cutting issues for improvement. These are listed in paragraph 133 below.

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

B. Energy

1. Sector overview

39. The energy sector is the main sector in the GHG inventory of the Party. In 2009, emissions from the energy sector amounted to 2,972,878.17 Gg CO₂ eq, or 79.8 per cent of total GHG emissions. Since 1990, emissions have decreased by 9.2 per cent. The key driver for the fall in emissions was a 28.7 per cent decrease since 1990 (182,686.36 Gg CO₂ eq) in emissions from manufacturing industries and construction, followed by decreases of: 106,182.97 Gg CO₂ eq, or 9.1 per cent since 1990, in emissions from energy industries; 64,354.98 Gg CO₂ eq, or 9.8 per cent since 1990, in emissions from other sectors; and 48,497.08 Gg CO₂ eq, or 50.2 per cent, in fugitive emissions from fuels. This trend was partly offset by an increase in emissions from transport by 116,246.96 Gg CO₂ eq, or 16.8 per cent increase since 1990. Within the sector, 35.7 per cent of the emissions were from energy industries, followed by 27.2 per cent from transport, 20.0 per cent from other sectors and 15.2 per cent from manufacturing industries and construction. Fugitive emissions from fuels accounted for 1.6 per cent and other accounted for 0.2 per cent.

40. The Party has made recalculations for the energy sector between the 2010 and 2011 submissions following recalculations by member States, in particular Germany, which has reallocated emissions, and France and the United Kingdom, which revised their activity data sets and improved their methods of calculation. The impact of these recalculations on the energy sector is an increase in emissions of 0.7 per cent for 2008. The main recalculations are as follows:

(a) The major recalculation occurred in category manufacturing industries and construction. The largest recalculations in 2008 were due to Germany with the reallocation of CO₂ emissions from blast furnace gas combustion in sinter plants and rolling mills from the metal production category to the manufacturing industries and construction category;

(b) Significant recalculations also occurred in in the energy industries category (10,805.71 Gg CO₂ eq increase, or 0.8 per cent);

(c) N₂O recalculations in the transport category, with a decrease of 5,541.58 Gg CO₂ eq, or 0.7 per cent, were mainly influenced by recalculations in France due to a revision of COPERT equations.

41. The inventory of the European Union is complete in terms of gases and covers all categories for all member States. A single case was identified as a potential under-estimation of emissions for fugitive methane emissions from distribution and transmission of natural gas (see paras. 50–52 below) but the Party submitted revised estimates in response to the list of potential problems and further questions raised by the ERT that solved the issue during the review. Methodologies, uncertainty analysis, recalculations and planned improvements are reported transparently for this sector.

42. The European Union has a well-developed QA/QC system for the energy sector. However, the ERT noted several instances of errors in tables in the NIR (e.g. tables referring to fugitive CO₂ and CH₄ emission data associated with venting/flaring and natural gas). The Party confirmed to the ERT that these were errors in the NIR tables and the

emission data reported in the CRF tables were correct. In addition, the ERT identified that the table reporting on methodologies used by the EU-15 member States was incorrect. The EU informed the ERT that the table had not been updated from the previous year, but confirmed that data reported in the CRF tables were correct. Although the ERT recognizes the significant task in compiling the NIR of the European Union, it recommends that the EU enhance its QA/QC procedures, particularly regarding fugitive emissions, in order to prevent these errors from occurring in future annual submissions.

2. Reference and sectoral approaches

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

43. For 2009, CO₂ emission estimates according to the reference approach are 0.16 per cent higher than according to the sectoral approach. The IPCC reference approach for CO₂ from fossil fuels for the EU-15 is based on Eurostat energy data (NewCronos database, April 2011 version). The ERT notes the current study being prepared by the EU to assess the differences between the Eurostat data and the national reference data for member States and encourages the EU to include the results of this project in the NIR of its next annual submission. The ERT commends the European Union for implementing the recommendations in the previous review report⁸ and having used correct notation keys in the reference approach.

44. The International Energy Agency does not collect data for the EU, therefore a comparison of the EU data with international data was not provided.

International bunker fuels

45. Emissions from bunker fuels for international aviation and maritime transport are calculated as the sum of the emission estimates from each member State. Between 1990 and 2009, GHG emissions from international bunker fuels increased by 63.7 per cent, emissions from aviation bunker fuels increased by 96.8 per cent and emissions from marine bunker fuels increased by 43.4 per cent.

46. The ERT notes the continuing progress of the EU in comparing the aviation emissions reported by member States with modelling results provided by EUROCONTROL, as a QA/QC procedure. The ERT recommends that the European Union continue such QA exercises and that it work towards making data from EUROCONTROL available to member States on a regular basis for quality checking of the inventories of member States.

3. Key categories

Stationary combustion: solid and other fuels – CO₂

47. The ERT noted that the trend of CO₂ IEF from consumption of other fuels in other (manufacturing industries and construction) decreased, with the 2009 value (69.90 t/TJ) to become 7.1 per cent lower than the 1990 value (75.26 t/TJ). Responding to a question raised by the ERT during the review, the EU explained that the main reason for the overall change in the 1990–2009 period is the declining IEF in Germany, and the importance of emissions from this member State (in 2009, Germany accounted for 82 per cent of EU-15 CO₂ emissions).

48. The ERT recommends that the Party provides explanations of trends in its next annual submission, including information on changing fuel mixes, in particular in situations

⁸ FCCC/ARR/2010/EU, paragraph 35.

where emission trends decouple significantly from activity data trends. This is demonstrated in CO₂ emissions from pulp, paper and print where the overall trend of CO₂ emissions is decreasing: the 2009 value (21 332.09 Gg) is 14.0 per cent lower than the 1990 value (24 819.00 Gg); while over the same period the fuel consumption has increased and the 2009 value (775 955 TJ) is 14.7 per cent higher than the 1990 value (676 370 TJ). The EU explained that the reason for the decoupling of emissions from fuel use is a shift from liquid fuels to gaseous fuels and biomass. Liquid fuel use declined by 58.0 per cent between 1990 and 2009 (and the decrease occurred in almost all member States) whereas gaseous fuel use and biomass use were 44.0 per cent and 37.0 per cent higher in 2009 compared to 1990. Gaseous fuel use increased mainly in Spain, Italy, France and Austria whereas biomass use increased in almost all member States. The ERT encourages the EU, in cases where the distinct decoupling of emissions from fuel use occur, to include such a discussion on the influence of changing fuel mixes in the NIR, so that trends are explained. The ERT considers that it may be most effective to include this in the NIR at the initial discussion of source category CO₂ emissions, prior to a detailed discussion on the IEF trend for fuel types.

49. The previous review report,⁹ noted that the CO₂ IEF from the use of solid fuels was among the lowest of reporting Parties, and this was explained by the fact that Germany reports CO₂ emissions from blast furnace gas under metal production (steel) but the AD are reported under fuel combustion (energy industry, and manufacturing industries and construction). The ERT commends the European Union for having reallocated these emissions in the 2011 submission, and concludes that the issue was solved.

Oil and natural gas – CH₄

50. The ERT noted in the NIR that fugitive methane emissions from distribution and transmission of natural gas are reported as “NO” for Sweden. However the ERT considers that it is most likely that Sweden has a natural gas transmission/distribution network and, therefore, emissions.

51. During the review week the EU informed the ERT that, according to wholesale dealers in Sweden, the gas is delivered in pipelines and fugitive emissions do not occur; in addition emissions occurring from pressure levelling losses of natural gas are reported under other fuel combustion activities (stationary). The ERT considers that emissions reported under this latter category are combustion emissions and cannot be representative of fugitive methane emissions from gas distribution. The ERT considered that the European Union could be under-estimating fugitive CH₄ emissions from natural gas (subcategories distribution and transmission) and included this problem under the list of potential problems and further questions.

52. The EU provided revised its CH₄ emission estimates for both distribution and transmission based on Sweden’s pipeline length and the use of IPCC good practice guidance default EFs (6.15×10^{-4} Gg/year/kilometre of transmission pipeline for distribution 2.90×10^{-3} Gg/year/ kilometre of pipeline for transmission). The ERT considers that the potential problem of under-estimation was solved, and recommends that the EU make efforts so that Sweden provides revised estimates for this category in its next annual submission.

⁹ FCCC/ARR/2010/EU, paragraph 38.

C. Industrial processes and solvent and other product use

1. Sector overview

53. In 2009, emissions from the industrial processes sector amounted to 250,292.40 Gg CO₂ eq, or 6.7 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 9,347.93 Gg CO₂ eq, or 0.3 per cent of total GHG emissions. Since the base year, emissions have decreased by 29.1 per cent in the industrial processes sector, and decreased by 30.9 per cent in the solvent and other product use sector. The key driver for the fall in emissions in the industrial processes sector was the decrease in emissions from the chemical industry (decrease of 76,932.81 Gg CO₂, or 75.0 per cent since the base year), metal production (decrease of 36,509.70 Gg CO₂, or 35.6 per cent since the base year), production of halocarbons and SF₆ (decrease of 36,134.20 Gg CO₂, or 35.2 per cent since the base year), and mineral products (decrease of 20,851.60 Gg CO₂, or 20.3 per cent since the base year), which largely follows the change in economic conditions, in particular the last economic crisis, and the reallocation of some industrial plants to countries in eastern Europe, closure of some emissions intensive facilities in EU countries (e.g. two cement plants in Italy; nitric acid production plants in Denmark, Ireland and France; and iron and steel in Sweden) and adoption of abatement technologies (e.g. nitric acid production and HFC-23 emissions from hydrochlorofluorocarbon-22 production). Within the industrial processes sector, 36.3 per cent of the emissions were from mineral products, followed by 28.0 per cent from consumption of halocarbons and SF₆, 21.5 per cent from the chemical industry and 13.1 per cent from metal production. Production of halocarbons and SF₆ accounted for 0.8 per cent and other production accounted for 0.2 per cent. Emissions from other production represent less than 0.1 per cent of emissions from the industrial processes sector.

54. The Party has made recalculations for the industrial processes sector between the 2010 and 2011 annual submissions in order to rectify identified errors and following changes in activity data and emission factors. The impact of these recalculations on the industrial processes sector is a decrease in emissions of 10.3 per cent for 2008. The main recalculations took place in the following categories:

(a) Metal production, the emissions from which have decreased by 23,703.10 Gg CO₂ eq, or 32.8 per cent. These resulted mostly from recalculations in CO₂ emissions from iron and steel production in Germany due to the reallocation of emissions from blast furnace gas combustion from the industrial processes sector to the energy sector (manufacturing industries and construction). This reallocation has, by far, the greatest impact on the overall recalculation for categories, although it did not impact on overall emissions from the Party;

(b) Smaller recalculations were due to increasing the EF for methanol production in Germany (chemical industry), and updating the activity data in Luxembourg for consumption of halocarbons and SF₆.

55. The Party has made recalculations for the solvent and other product use sector between the 2010 and 2011 annual submissions in order to rectify identified errors. The impact of these recalculations on the solvent and other product use sector was a decrease in emissions of 3.5 per cent for 2008. The main recalculation took place in the category CO₂ emissions from paint application and other non-specified, in particular in Germany.

56. The EU inventory for the industrial processes sector and for the solvent use and other products use sector is complete, with a transparent discussion of the underlying methods to calculate emissions used by each member State, and includes the necessary information on recalculations. The ERT considers that the provision of emissions activity data, emission factors and notation keys by individual member States for each category,

improves the transparency of the reporting. The ERT also commends the EU for including tables in the NIR listing the improvements to member states estimates based on previous ERT recommendations, demonstrating a commitment to continually improving the inventory.

57. Although there is a three-step process for addressing “NEs” in the inventory, the ERT identified several ‘NEs’ remaining in emission estimates for consumption of halocarbons and SF₆ in individual member States. During the review, further communication with the Party revealed that many of these “NEs” should have been reported as “NO”, not applicable (“NA”) or included elsewhere (“IE”). Therefore, the ERT recommends that the EU enhances its QA/QC procedures on notation keys in the next annual submission (see para. 66 below, for further details).

58. Estimating emissions from solvent and other product use is a lower priority for the EU as this does not cover key categories. Nevertheless, the EU continues to describe in the NIR planned improvements to develop and implement QA/QC procedures for this sector. The ERT encourages the EU to continue with its efforts to develop and implement these QA/QC procedures for the solvent and other product category.

2. Key categories

Lime production – CO₂

59. The emissions estimate of CO₂ from lime production in one member State (United Kingdom) is based on consumption of limestone and application of an EF of 0.44 kg CO₂/kt limestone. The EF assumes all consumption is limestone, but the United Kingdom indicates in its NIR that some of this consumption is dolomite, which has a higher emission factor. According to the IPCC good practice guidance, if data for the type of lime are not known, the default emission factor should assume 85 per cent is high-calcium lime, 15 per cent is dolomitic lime and that no hydraulic lime is produced. Owing to the fact that the current approach does not account for dolomite consumption, the United Kingdom emissions, and consequently the European Union’s, are underestimated. The ERT also notes that this recommendation was included by the review report of the 2005 inventory submission of the United Kingdom. The ERT included this issue in the list of potential problems and further questions.

60. Responding to the list of potential problems and further questions, the EU indicated that the United Kingdom will explore further whether they can identify separate data on limestone and dolomite consumption for use in their next inventory submission. In the absence of the relevant data, the EU prepared revised estimates in accordance with the recommendation of the ERT that the IPCC default assumption should be applied: assumption of 15 per cent dolomite and 85 per cent limestone. The revised estimates resulted in additional emissions of 14.90 kt CO₂ in 1990 and 7.80 kt CO₂ in 2009. The ERT recommends that the European Union continue its efforts together with the United Kingdom in order to prepare estimates using the country-specific information that the Party is preparing.

Limestone and dolomite use – CO₂

61. The ERT welcomes the improvements made in the 2011 annual submission for this category, specifically the provision of transparent documentation of the methods and assumptions underlying emission estimates in France and improving the AD on carbonate consumption in the Netherlands so that the implied emission factor corresponds well with the IPCC default.

62. The ERT observes that there is still a lack of comparability in reporting among individual member States for this category. For example, in Belgium, emissions from limestone and dolomite used in iron and steel are newly added to the iron and steel category in the 2011 annual submission, and not reported under limestone and dolomite use as required in the Revised 1996 IPCC Guidelines. Similarly, Germany and Italy report limestone and dolomite used for iron and steel under metal production, France reports carbonates used for sinter production under limestone and dolomite use, while Austria reports these emissions under other mineral products. During the review, the ERT requested additional information on plans to harmonize reporting for these categories among member States. The EU responded that they have undertaken efforts in the past to harmonize reporting, including the establishment of an expert panel to specifically review allocation in the industrial processes sector. Although the Party indicates that this review cannot occur annually due to competing priorities, the EU intends to further consider allocation issues in the future. Further, the EU notes that allocation decisions in individual member States are often informed by data availability, and that reallocation of emissions is not always a priority as it requires resources, without improving the accuracy of the overall Party estimates.

63. The ERT acknowledges that this is an issue of allocation and not of under-estimation of emissions, but nevertheless recommends that the Party continue to focus on improving comparability with other Parties and the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. In addition, the ERT notes that the allocation of emissions in this category can affect the key category analysis, which could have implications for resource prioritization on inventory improvements. Therefore, the ERT recommends that the European Union strengthen its efforts to achieve comparable reporting by member States. Further, the ERT recommends that the Party consider whether the more detailed information on limestone and dolomite use reported under the EU ETS could help in achieving this objective.

Consumption of halocarbons and SE₆ – HFCs, PFCs and SF₆

64. The ERT acknowledges the improvements made in this category. Specifically, the previous review report identified several “NEs” reported by the EU for fluorinated gases consumed in end use applications at the level of CRF table 2(II), and these were mostly errors. In the 2011 submission, the EU corrected most of these errors (e.g. PFC emissions from foam blowing, aerosols/metered dose inhalers and solvents, and HFC emissions from solvents in Greece). Since improvements for the 2011 annual submission focused on actual emissions, the ERT encourages the Party to continue efforts to ensure complete and transparent reporting for this category, including reviewing the use of notation keys for potential emissions.

65. The ERT noted that the 2011 annual submission contains 49 variables reported as “NE” for emissions from manufacturing, stocks and disposal in CRF table 2(II)F. During the review, the ERT questioned the Party as to whether these emissions were really not estimated, or if they were in fact “NO”. Responding to the ERT, the EU provided partially revised CRF tables indicating that in most cases, the correct notation key should be “NA”, “NO” or “IE”. The ERT reviewed the revised notation keys and compared them with information submitted by other Parties; it accepts the changes in notation keys and recommends that the Party provide the revised notation keys in their next annual submission. By the end of the review, the EU informed the ERT that the revision of the notation keys will be implemented in the 2012 annual submission.

66. The ERT also encourages the EU to consider documenting CRF table 2(II)F in a similar manner to other CRF tables in the EU submission by including a comment, in the CRF tables or in the NIR, that indicates the fluorinated gas value (emissions or AD) or

notation key provided by each member State contributing to the EU total provided in that CRF table. By the end of the review, the EU informed the ERT that it will implement this recommendation in the 2013 annual submission.

3. Non-key categories

Solvent and other product use – CO₂, N₂O

67. The ERT reiterates the recommendations in the previous review report, that the EU implement a QA/QC plan for the solvent and other product use sector. The EU described during the review that they could not implement this for the 2011 annual submission due to efforts required to respond to previous ERT recommendations. The ERT recommends that the EU implement QA/QC procedures in the solvent and other product use sector for the next annual submission.

68. The ERT found in the NIR that “NE” is listed for CO₂ from paint application, degreasing and dry cleaning, chemical products manufacturing, and other in the United Kingdom, and for N₂O emissions in the United Kingdom and Ireland. The ERT encourages the EU to identify plans to achieve complete reporting in its next annual submission.

D. Agriculture

1. Sector overview

69. In 2009, emissions from the agriculture sector amounted to 378,864.34 Gg CO₂ eq or 10.2 per cent of total GHG emissions. Since the base year, emissions have decreased by 14.1 per cent. The key drivers for the fall in emissions were reduction in emissions from agricultural soil (decrease by 42,042.58 Gg CO₂ eq, or 18.2 per cent since base year) due to the decreasing application of nitrogen fertilizer and manure and reduced CH₄ emissions from enteric fermentation (16,425.62 Gg CO₂eq, or 14.1 per cent since base year) resulting from decreasing livestock numbers. Within the sector, 49.7 per cent of the emissions were from agricultural soil, followed by 32.8 per cent from enteric fermentation, 16.7 per cent from manure management and 0.6 per cent from rice cultivation. The remaining 0.1 per cent of emissions from the agriculture sector were from the field burning of agricultural residues. Emissions from categories prescribed as burning of savannahs and other (agriculture) were reported as “NO”, since they do not occur in any member State of EU-15. N₂O emissions accounted for 55.3 per cent of sectoral emissions while CH₄ emissions accounted for 44.6 per cent.

70. The Party has made recalculations for the agriculture sector between the 2010 and 2011 submissions following changes in AD and EFs. The impact of these recalculations on the agriculture sector is a decrease in emissions of 0.7 per cent for 2008. Detailed sector-specific background information on the recalculations for each member State is also provided in the NIR. Recalculations have been performed in all categories except rice cultivation, and the main recalculations took place in the following categories:

(a) N₂O from agricultural soils, emissions for which decreased by 4,342.75 Gg CO₂ eq, or 2.2 per cent;

(b) CH₄ from enteric fermentation, emissions for which increased by 1,810.39 Gg CO₂ eq, or 1.5 per cent.

71. The reporting for the agriculture sector is complete, covering all categories, gases and emissions from all member States. The Party provided detailed AD, EFs and uncertainties for each category.

72. Most of the recommendations made in previous review reports have been addressed in the 2011 annual submission. The NIR contains several background tables that contain data for each member State but the ERT noted that not all tables compile information for all member States. The ERT commends this effort to improve transparency of reporting, but recommends that the Party provide complete background tables with information from all member States in the next annual submission.

73. In the previous review report,¹⁰ the European Union informed the ERT that a project has been carried out at the European Commission JRC, which was commissioned to evaluate the contribution of livestock production in Europe to overall European Union GHG emissions, the results of which will be included in the 2011 annual submission. The ERT commends the Party's efforts and notes that a new section was added to its NIR summarizing the project CGELS (evaluation of the livestock sector's contribution to the EU greenhouse gases) and a comparison with European CAPRI model. The ERT recommends that the Party continue to improve this research and specially develop the objective to compare members States' methodologies, to identify and explain the main differences between member states, and improve the methods utilized. The ERT recommends that the Party continue reporting on this issue in the next annual submission.

2. Key categories

Enteric fermentation – CH₄

74. The ERT found that some tables in the NIR with additional background information on feed intake, animal weight, milk production, feed digestibility for calculating CH₄ emissions for dairy cattle and non-dairy cattle utilize the notation keys "NE", "NA" or do not report data for some member States such as the Netherlands, Sweden and Italy. while these Parties report data in their respective inventories (NIR). During the review, the European Union informed the ERT that these States did not report these data to the European Union. The ERT recommends that the EU continue its efforts with the member states in order to deliver complete background data in the tables in the next annual submission.

Manure management –CH₄

75. The ERT also found inconsistent data in the table showing the allocation of the Animal Waste Management System (AWMS) in the NIR: swine for the Netherlands and Spain are reported as "NO" for all AWMS. During the review week, the European Union informed the ERT that the data for the Netherlands was not provided and Spain is allocated to other systems, which is not included in the NIR. The ERT recommends that the Party add a column with other in this table and to complete the Netherlands' data in the next annual submission.

76. CH₄ emissions from manure management vary substantially from Party to Party due the use of different classification by climate regions. Most of the member States fall into the cool climate region, but some member States allocate a part of the population livestock into the temperate climate region, which sometimes appears inconsistent considering the reports of neighbour member States. For example, France allocates all its population livestock to the temperate climate region, while Spain and Portugal also consider part of these emissions under the cool climate region (the allocation for the swine population in the temperate climate region, in 2009, is 80 per cent for Portugal, 37 per cent for Spain, and 3 per cent for Italy). During the review, the European Union informed the ERT that the allocation of animals to climate regions is done by member States in accordance with the

¹⁰ FCCC/ARR/2010/EU. paragraph 61.

best national data available. However, in order to improve the consistency and accuracy of the inventory, the ERT recommends that the EU make efforts to achieve consistent reporting. Meanwhile, and for the sake of transparency, the ERT recommends that the Party includes member States' climate data for each country in the next annual submission.

77. In the background information about member States information on methane reductions by slurry treated from biogas in Denmark is not updated to take into consideration this member State's 2011 annual submission (NIR). During the review, the European Union informed the ERT that the text will be updated in the next annual submission.

E. Land use, land-use change and forestry

1. Sector overview

78. In 2009, net emissions from the LULUCF sector amounted to 293,325.53 Gg CO₂ eq. Since the base year, net removals have increased by 28.0 per cent. Overall, the LULUCF sector offsets 7.9 per cent of total emissions from the European Union. 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 forests as sinks in most member States during the 1990s. Therefore, net emissions have increased by 43,248.94 Gg CO₂ eq per year from 1990 to 2009, a 15.7 per cent increase. The increase in net removals was also substantial for land converted to grassland (8,348.22 Gg CO₂ eq per year, or 38.3 per cent since the base year). The increase in net emissions from land converted to settlements partly offset this trend (increased by 3,784.31 Gg CO₂ eq per year, or 24.6 per cent since base year). Within the sector, 350,549.56 Gg CO₂ eq of net removals were from forest land, followed by net removals of 19,582.00 Gg CO₂ eq from grassland, 3,935.95 Gg CO₂ eq from other (LULUCF) and 278.23 Gg CO₂ eq from other land. Cropland accounted for net emissions of 54,219.18 Gg CO₂ eq, settlements accounted for net emissions of 21,473.42 Gg CO₂ eq, and wetlands for 5,327.17 Gg CO₂ eq net emissions.

79. The European Union has made recalculations for the LULUCF sector between the 2010 and 2011 annual submissions in response to the 2010 annual review report, following changes in AD and EFs and in order to rectify identified errors. The impact of these recalculations on the LULUCF sector is an increase in net removals of 11.1 per cent for 2008. The main recalculations took place in the following categories:

- (a) Grassland, for which removals increased by 10,446.02 Gg CO₂ eq, or 74.9 per cent since the base year;
- (b) Cropland, for which net emissions decreased by 7,796.48 Gg CO₂ eq, or 12.2 per cent since the base year;
- (c) Forest land, for which net removals increased by 5,768.26 Gg CO₂ eq, or 1.7 per cent since the base year.

80. Although as a whole, the European Union's LULUCF sector is a net sink in 2009, member States differ regarding this factor: some report very low sink values (e.g. Belgium, Denmark and Ireland); some very high sink values (e.g. Italy, France, Spain, Finland and Sweden); and a few countries report a net source: Germany since 2002, because of very high emissions in cropland, and the Netherlands since 1990, because of emissions from grassland.

81. Forest land is the dominant category in the LULUCF sector. According to the data provided by the member States in their 2011 annual submissions, the total forest area in EU-15 increased from 120,531.17 kha in 1990 to 125,638.08 kha in 2009, or an increase of

4.2 per cent. This trend, reflected in official statistics of the member States and the EU, is due to the decreased grazing and agricultural activities on marginal lands, which promoted natural forest expansion, and also to the existence of national afforestation promotion programmes.

82. The total areas reported under land-use change represent only 9.0 per cent of the total reported land area in EU-15 in 2009, which is less than the percentage reported in the previous annual submission for 2008. This change resulted mostly from recalculations of land converted to forest land, and was mainly due to improvement on data for France on conversions to forest land, which also caused a decrease in conversions to grassland.

83. Significant improvement in the activity data for GHG inventories over recent years was reflected by the better allocation of land from other land to other categories (which was reflected by the fact that the absolute value area in 2009 (1,018.75 kha) is around half that reported in the previous submission for 2008 (2,281.03 kha). The ERT welcomes this improvement and the recalculations made.

84. In response to recommendations made in previous review reports, the 2011 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. The European Union provided information on its continuous efforts to encourage all member States to improve their LULUCF inventories, including in the reporting of KP-LULUCF for future annual 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 enhance the ability of their national systems to report complete emissions and removals from the LULUCF sector. It further encourages the Party to provide additional support to those member States that are still unable to fulfil the requirements of reporting a complete LULUCF inventory under the Convention.

2. Key categories

Forest land remaining forest land – CO₂

85. The area of forest land remaining forestland slightly increased by 3.0 per cent at EU-15 level since 1990, with large differences among member States (e.g. +38.8 per cent in Ireland, +19.7 per cent in Italy and –11.5 per cent in the Netherlands). In absolute terms, most of the increase of forest land remaining forest land was reported by Italy (1,466.33 kha), Sweden (902.55 kha) and the United Kingdom (513.61 kha).

86. At the EU-15 level, this category is a sink of about 310,549.56 Gg CO₂ eq. in 2009, which represents an increase by 15.7 per cent in comparison with 1990 and 6.0 per cent more than in 2008. The strong increase in the sink in 2009 compared with 2008 is largely due to Finland and Sweden. Some member States (i.e. Denmark, Ireland) show fluctuating time trends of ‘net CO₂ emissions/removals’ and IEF. The ERT recommends that the European Union continue to work with these countries to ensure time-series consistency, and report on the results obtained in the next annual submission.

87. An issue identified in previous review reports continues to be observed in the current inventory. As noted in the previous review report, Italy’s approach assumes that soils build up their carbon stock in a year time frame, which is 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 applied by Italy may not be fully consistent with the IPCC good practice guidance for LULUCF. The ERT recommends that the European Union continue to work with member States 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

88. In 2009, the area of land converted to forest land in the EU was around 4.0 per cent of the total forest land area, and increased by about 45.2 per cent since 1990. This increase is partly due to the fact that many member States report only land converted to forest land since 1990. Spain reports the largest land area under this subcategory (1,091.91 kha), while the highest decrease of conversion to forest area is reported by Austria (-43.1 per cent) and United Kingdom (-46.0 per cent). At EU-15 level, in 2009, land converted to forest land is reported as a sink of 31,497.33 Gg CO₂ eq, about double than in 1990 (16,468.95 Gg CO₂ eq). The ERT notes an improvement in the completeness of reporting in this category since the last annual submission. However, heterogeneity in the approaches used by member States to report under this category makes it difficult to identify differences in AD and the implied carbon stock change factors. The ERT acknowledges the difficulties in harmonizing the reporting in this category given the range of methodologies used by member States, and commends the European Union for the improvements made with regard to transparency and completeness in this category. Nevertheless, it encourages the Party to continue to work with member States in order to improve the accuracy of its methodologies and to make efforts to increase the consistency of the reporting approaches among member States.

Cropland remaining cropland – CO₂

89. The area of cropland remaining cropland decreased by 6.6 per cent since 1990. All member States show a decrease in cropland area, with the exception of France (6.0 per cent) and Luxembourg (18.4 per cent). The largest decreases are registered by Italy (-17.5 per cent), Spain (-6.3 per cent) and Portugal (-41.5 per cent).

90. In 2009, this subcategory was a net source of 19,080.94 Gg CO₂ eq (26.9 per cent higher than in 1990). This subcategory represents both an important sink and source for individual member States. This subcategory represents an active sink in those member States where there are large areas of permanent croplands under active management. Mediterranean countries report sinks (e.g. Italy) or almost neutral land categories (i.e. France) owing to large areas of permanent croplands (i.e. olive groves, vineyards), although removal has steadily decreased since 1990. In fact, overall EU-15 removal since 1990 is dominated by Italy's permanent cropland, while overall emission is dominated by Germany's cropland (share linked to the biomass growth in Italy).

Land converted to cropland – CO₂

91. At the EU-15 level, area of land converted to cropland increased by 14.3 per cent since 1990. Overall, in 2009, the area under conversion is about 10.8 per cent of the total cropland area, and it originates mainly in non-forest lands (deforestation represents only 3.5 per cent). Most of such conversions are reported as occurring from grassland (92.8 per cent of area), which can be explained by the practice of swift shift from one use to another under current farming practices, and may not represent true conversion.

92. Some member States still use the lower-tier method to estimate emissions/removals. Given the importance of this category for the European Union, the ERT reiterates its recommendation in the previous review report¹¹ that the Party should continue to support member States in improving the reporting in this area to use a higher-tier method where possible, as well as by improving the completeness of reporting.

¹¹ FCCC/ARR/2010/EU, paragraph 80.

Grassland remaining grassland – CO₂

93. The area reported under this land subcategory is 4.0 per cent less than in 2009 compared with 1990. The major part of this change was due to Sweden (43.6 per cent decrease) and the United Kingdom (21.8 per cent decrease), which reports a significant decrease partly compensated by the increase in Portugal (341.9 per cent increase) and Germany (14.5 per cent increase). Total annual emissions in 2009 were 11.3 per cent less than in 1990.

94. Several member States report “NO” for this category (i.e. France reports no change in all carbon pools according to the use of a tier 2 methodology, while several member States report no change under tier 1 for living biomass). Carbon stock change in mineral soils on grassland is reported as “NE” by some member States (e.g. Spain). Few member States report the existence of unmanaged grassland (e.g. Ireland, France). The ERT recommends that the European Union support member States in improving the consistency of their assumptions and methods and in the completeness of the reporting of this category whenever appropriate.

F. Waste**1. Sector overview**

95. In 2009, emissions from the waste sector amounted to 112,475.47 Gg CO₂ eq, or 3.0 per cent of total GHG emissions. Since the base year, emissions have decreased by 38.8 per cent. The key drivers for the fall in emissions were the 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. All these actions caused the decrease of emissions from solid waste disposal on land by 69,641.20 Gg CO₂ eq, or 44.8 per cent since the base year. Within the sector, 76.3 per cent of the emissions were from solid waste disposal on land, followed by 18.4 per cent from wastewater handling, 2.9 per cent from waste incineration, and 2.4 per cent from other (waste).

96. Recalculations have been performed in the waste sector including for solid waste disposal on land, wastewater handling, waste incineration and other (waste) to reflect updated activity data, methodological changes, and changing for emission factor. These recalculations resulted in an increase of 7.9 per cent in emissions for 2008. The main recalculations took place in solid waste disposal on land.

2. Key categoriesSolid waste disposal on land – CH₄

97. During the review, the ERT noted that industrial waste is not mentioned nor considered in the NIR for two member States (Greece and Netherlands), and that the inventory of the European Union could be underestimated for this category. In response to questions raised by the ERT, the European Union explained that for the Netherlands, and in accordance with member State’s NIR, AD for landfilling includes industrial waste. Since the Party could not provide a clarification for Greece, this issue was included in the list of potential problems and further questions. In the follow-up, the EU confirmed that emissions from industrial waste were not included in the inventory of Greece and provided revised estimates of CH₄ emissions from industrial waste in Greece and the European Union. The estimates were prepared by Greece using data from inquiries to industries made by Hellenic Statistical Authority (EL.STAT) for some years (2004, 2006 and 2008) and extrapolated/interpolated for the remaining time series (1960–2009). The methodology to

estimate emissions follows the same used for municipal wastes, considering that the wastes are landfilled in common places. The revised estimates added 64.58 Gg CO₂ eq in 2009. The ERT concluded that the issue was solved and recommends that the EU make efforts so that the submission of Greece is recalculated in a consistent manner in the next annual submission.

Wastewater handling – CH₄, N₂O

98. CH₄ emissions from domestic and commercial wastewater handling are a significant emission source for the waste sector and have been identified as a key category for the European Union. Nevertheless, the ERT noted that only 25 per cent of all EU-15 CH₄ emissions from domestic and commercial wastewater handling are calculated using higher tiers, and the rest of the member States only use the check and tier 1 methods. Therefore, the ERT recommends that the European Union continue to encourage member States to move to a higher-tier method to estimate emissions in the next annual submissions in order to improve the accuracy of emissions for this key category.

3. Non-key categories

Waste incineration- CO₂

99. Emissions from this category accounted for 0.1 per cent of total EU-15 GHG emissions and 2.5 per cent of waste sector emissions in 2009. Nine member States reported emissions from this category, while four member States (Denmark, Finland, Luxembourg and Netherlands) reported these emissions as “IE” and two member States (Germany and Ireland) reported them as “NO” in CRF tables. The ERT recommends that the European Union encourages member States to be consistent in using the notation key as “IE” and “NO” for this category and to make the appropriate correction in its next annual submissions.

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

100. The European Union has accounted for mandatory activities under Article 3, paragraph 3, of the Kyoto Protocol (afforestation and reforestation, and deforestation). In what concerns the elected activities under Article 3, paragraph 4, of the Kyoto Protocol, since EU reporting is a compilation of reporting by the 15 member States that compose EU-15, the elected activities differ by member State. Five Parties did not elect any activity (Austria, Belgium, Ireland, Luxembourg and the Netherlands); seven Parties elected only forest management (Finland, France, Germany, Greece, Italy, Sweden and United Kingdom); one Party (Spain) elected forest management and cropland management; and two Parties elected forest management, cropland management and grassland management (Denmark and Portugal). All Parties have chosen to account for all activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol at the end of the commitment period, except two (Denmark and France).

101. The EU has provided in the NIR complete information on the mandatory requirements outlined in decision 15/CMP.1, annex, paragraphs 5–9.

102. The Status Report 2011¹² indicates that the EU did not provide the information required in decision 15/CMP.1, annex, paragraph 9(c), in particular information that demonstrates that emissions by sources and removals by sinks resulting from elected Article 3, paragraph 4, activities are not accounted for under activities under Article 3, paragraph 3. In response to questions raised by the ERT during the review, the EU provided a detailed description of QA/QC procedures, included in the monitoring mechanism, in relation to the requirements of decision 15/CMP.1, annex, paragraph 9(c), as implemented for compilation of the information of all member States. The EU also provided information on the results of the checks performed for the 2011 annual submission for all member States that way showing that emissions by sources and removals by sinks resulting from elected Article 3, paragraph 4, activities are not accounted for under activities under Article 3, paragraph 3.

103. The following QC checks are applied by the EU to the reports by member States:

(a) Checking of consistent reporting for each member States' KP-LULUCF table NIR2, comparison among tables and comparison between KP-LULUCF CRF tables and LULUCF sector CRF tables. In case of problems, the EU addresses the concerned member States. In QA/QC 2011, 59 issues related to land inconsistency were identified and highlighted to member States for response. From this set, some of these issues were solved already in 2011 annual submissions, while other countries indicated they would solve the issues in 2012 annual submissions. Moreover, the EU inventory team informed the ERT that it will check these issues and communicate with the countries before the 2012 inventory annual submission;

(b) Checking of reported areas in the KP-LULUCF table regarding the "units of land otherwise subject of ..." (i.e. forest management and deforestation areas) or if areas reported under 5(KP-I) A1.1. are not doubled reported in 5(KP-I) A1.2.;

(c) Analysing the statements of the member States in its NIR on the hierarchy of land activities implemented and the surveys of NIR information if the method used is implemented consistently (i.e. checking if for forests, the related hierarchy is deforestation – afforestation/reforestation – forest management for all member States, as mentioned in section 11.1.4.5 of the EU NIR 2011).

104. The EU has made recalculations for KP-LULUCF activities between the 2010 and 2011 annual submissions in response to the 2010 annual review report and in order to revise AD and EFs. The impact of these recalculations on each KP-LULUCF activity for 2008 is as follows:

(a) For afforestation and reforestation – significant increase removals from –36,460.66 to –42,291.52 CO₂ eq;

(b) For deforestation – significant increase in emissions from 25,360.64 to 44,469.51 CO₂ eq;

(c) For forest management – small decrease in removals from –270,173.61 to –262,306.78 CO₂ eq;

(d) For cropland management – significant increase in removals from –1,147.58 to –2,270.26 CO₂ eq;

(e) For grazing land management – significant decrease in removals from –768.32 to –3.86 CO₂ eq.

¹² FCCC/ASR/2011/EU.

Activities under Article 3, paragraph 3, of the Kyoto Protocol*Afforestation and reforestation – CO₂*

105. Most of the area reported in 2009 as afforestation/reforestation is located in Italy (1,543.35 kha), Spain (1,091.91 kha) and France (1,100.74 kha), which together account for 64.1 per cent of the total area reported in EU-15. The highest removals are also reported by France, Spain and Italy, all three achieving more than half (52.1 per cent) of the total net sink of EU-15 from afforestation/reforestation activities in 2009. Among all member States, only Finland reports net emissions from afforestation/reforestation (202.08 Gg CO₂ eq), which is explained by emissions from soils, both mineral and organic soils, in 2008 and 2009.

Deforestation – CO₂

106. Most of the deforested area is reported by France, Finland and Sweden. France is responsible for 39.2 per cent of the total area and 43.3 per cent of total emissions from deforestation in EU-15, Finland and Sweden are each responsible for 15.8 and 15.3 per cent of net emissions, respectively. All Parties report net emissions for this activity.

Activities under Article 3, paragraph 4, of the Kyoto Protocol*Forest management – CO₂*

107. All member States report carbon stock change for all pools except: Spain, which reported “NE” for carbon stock change for litter, dead wood and mineral soil; and Portugal, which reported “NE” for carbon emission from lime application. The ERT encourages the European Union to work with these member States to prepare complete information for the next annual submission.

Cropland management – CO₂

108. Denmark, Portugal and Spain have elected this activity. Denmark, Portugal and Spain have reported CO₂ emissions from this activity in 1990, 2008 and 2009. Portugal has reported “NE” for carbon stock changes in dead wood and Spain has reported “NE” for carbon stock changes in litter and dead wood. 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

109. Denmark and Portugal have elected this activity. Denmark and Portugal has reported CO₂ emissions from this activity in 1990, 2008 and 2009. However, Portugal has reported “NE” for CO₂ emissions from lime application. 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 unitsStandard electronic format and reports from the national registry

110. 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 and recommendations included in the SIAR on the SEF

tables and the SEF comparison report.¹³ The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

111. 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.

National registry

112. 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 that from the SIAR and its finding 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 also continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguards and disaster recovery measures in place and its operational performance is adequate.

113. However, the SIAR proposed some recommendations. The Party should clearly state in its next annual submission what public information, if any, has changed since the prior submission by being declared confidential or by becoming publicly available. In addition, the Party is encouraged to report, in the next annual submission, on changes made in its registry database, infrastructure and or procedures to support a user authentication mechanism in 2011 as suggested by the ITL Administrator Change Advisory Board. Therefore, the ERT recommends that the Party addresses these problems and reports on the actions that it has taken to solve them in its next annual submission.

114. The Party provided access to information from its national registry that substantiated or clarified the information reported in its annual submission. The information provided, which is in accordance with the requirements in the annex to decision 13/CMP, is publicly available on the European Commission website.¹⁴

Calculation of the commitment period reserve

115. The European Union has reported its commitment period reserve in its 2011 annual submission. The reported commitment period reserve is 17,659,243,358 t CO₂ eq and has not changed since the initial report review 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

116. The European Union reported that there are changes in its national system since the previous annual submission. These changes include the following:

¹³ 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.

¹⁴ Available at <http://ec.europa.eu/environment/climat/gge_registry.htm>.

(a) Establishing of the ETC/ACM to replace the previous European Topic Centre on Air and Climate Change. It results from a contract between the lead organization Rijksinstituut voor Volksgezondheid en Milieu in the Netherlands and EEA to carry out specific tasks identified in the EEA strategy;

(b) Including the private company EMISIA S.A. in the ETC/ACM consortia has provided additional expertise in the transport sector;

(c) Enhancing the QA/QC programme in response to the list of potential problems and further questions identified in the review of the 2010 annual submission, and which is focused on the assessment of completeness.

117. 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

118. The European Union has reported that there are changes in its national registry since the previous annual submission. These changes related to the release of a new software version (CR V5.0), the primary reason for which was to refine the functioning of the EU national registry to the rules of Commission Regulation 994/2008; however, the core of the required changes was limited to EU ETS processes and did not affect existing Kyoto Protocol operations. Additionally, the EU national registry was adapted to accommodate the DES change request for the new transaction message flow and the CR was changed to be backward compatible and to ignore out-of-sequence messages.

119. 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 also continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

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

120. In the NIR, the European Union reported that there are changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, since the previous annual submission. The ERT concluded that the information provided continues to be complete and transparent.

121. The new initiatives of the EU include, inter alia:

(a) Adoption by the Commission in 2010 of a report on sustainability requirements for the use of solid biomass and biogas in electricity, heating and cooling together with an impact assessment with recommendations for those member States that wish to introduce a scheme at the national level, in order to avoid obstacles to the functioning of the internal market for biomass;

(b) The recent communication from the Commission on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (2010/C 160/01), which sets up a system for certifying sustainable biofuels, including those imported into the EU, to ensure substantial reductions in greenhouse gas emissions and that biofuels do not result from forests, wetlands and nature protection areas;

(c) Publication in 2010 of a report on the feasibility of drawing up lists of areas in third countries with low greenhouse gas emissions from cultivation;

(d) Council decision 2010/787/EU of 10 December 2010 on State aid to facilitate the closure of uncompetitive coal-mines adopted a new coal regulation enabling member States to grant State aid to facilitate the closure of uncompetitive mines until 2018;

(e) An expanded list of other Annex I and non-Annex I Parties involved in cooperation with the EU in the Carbon Sequestration Leadership Forum (CSLF). The new release in 2010 of a Technology Roadmap by CSLF indicated that significant international progress has been made in the past year on advancing carbon capture and storage, but that a number of important challenges still remain;

(f) Creation of new website¹⁵ where further information on the EU-GCC Clean Energy Network and its recent activities can be found.

III. Conclusions and recommendations

122. The European Union made its annual submission on 15 April 2011. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (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.

123. 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 1990–2009 and an NIR; these are complete in terms of geographical coverage, years and sectors, as well as complete in terms of categories and gases.

124. 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.

125. The Party's inventory is in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The ERT noted the improvements in completeness, consistency and transparency of the annual submission, and the ERT commended the efforts of the Party to deal with these issues and on the progress achieved during the preparation of its 2011 annual submission.

126. The Party has made recalculations for the inventory between the 2010 and 2011 annual submissions in response to the 2010 annual review report, improvements and changes in AD, including updates in EU ETS data, improvements of EFs or parameters, revision of methodologies and models, reallocation of categories and correction of noticed errors. The impact of these recalculations on the national totals is an increase in emissions of 0.7 per cent for 2008. The main recalculations took place in the following sectors/categories:

- (a) CO₂ emissions from metal production in the industrial processes sector;
- (b) HFC emissions from the production of halocarbons and SF₆ in the industrial processes sector;
- (c) N₂O emissions from transport in the energy sector;
- (d) CH₄ emissions from solid waste disposal on land in the waste sector.

127. The EU has provided in the NIR complete information on the mandatory requirements outlined in decision 15/CMP, annex, paragraphs 5–9, including the required information related to decision 15/CMP.1, annex, paragraph 9(c), that was not included in the previous year's submission. The information provided by the EU is a compilation of the

¹⁵ Available at <<http://www.eugcc-cleanenergy.net>>.

information provided by member States, but the Party has QA/QC procedures in place to ensure that estimates are complete and in accordance with decision 15/CMP.1. Nevertheless, the ERT noted that some member States still report “NE” for specific pools (see paras. 107–109 above).

128. The EU has made recalculations for the KP-LULUCF activities between the 2010 and 2011 submissions in response to the 2010 annual review report and in order to revise AD and EFs. The impact of these recalculations on each KP-LULUCF activity for 2008 is as follows:

(a) For afforestation and reforestation – a significant increase in removals from –36,460.66 to –42,291.52 CO₂ eq;

(b) For deforestation – a significant increase in emissions from 25,360.64 to 44,469.51 CO₂ eq;

(c) For forest management – a small decrease in removals from –270,173.61 to –262,306.78 CO₂ eq;

(d) For cropland management – a significant increase in removals from –1,147.58 to –2,270.26 CO₂ eq;

(e) For grazing land management – a significant decrease in removals from –768,32 to –3,86CO₂ eq.

129. 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 has used the required reporting format tables as required by decision 14/CMP.1.

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

131. 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 also continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

132. The European Union has reported information under chapter I.H of the annex to decision 15/CMP.1, “Minimization of adverse impacts in accordance with Article 3, paragraph 14” as part of its 2011 annual submission. The information was provided on 15 April 2011. The ERT concluded that the information provided continues to be complete and transparent.

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

(a) To continue collaboration with Parties in order to increase the accuracy of the inventory and consistency of reporting, and, in particular, to continue the efforts to enhance the consistent usage of notation keys;

(b) To improve the tier 2 key category analysis by inclusion of LULUCF sector and the determination of key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol;

(c) To improve the transparency by improving the description of uncertainty estimates, key category analysis and QA/QC procedures (including regularly updated information on developments in QA/QC procedures, any evidences of effectiveness of internal EU reviews, planned workshops, changes in scope and principles of usage of EU ETS data, etc.), and ensure that tables containing information per member State include information for all member States (see paras. 72 and 76 above);

(d) Improve QC checks for tables reported in the NIR (see para. 44 above) and implement a QA/QC plan for the solvent and other product use sector (see para. 67 above).

134. In the course of the review, the ERT formulated a number of recommendations relating to the information presented in European Union's annual submission. The key recommendations are that Party:

(a) Continue to use Eurocontrol data as a QA/QC procedure to increase the accuracy of emission estimates from civil aviation and international bunkers;

(b) Explain time trends not only by changes in data from member States, but to also consider the overall changes in fuel mixes (see paras. 47 and 48 above);

(c) Improve the consistency of the reporting of emissions from limestone and dolomite use among member States, in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance;

(d) Continue efforts to evaluate the contribution of livestock production in Europe (see para. 73 above);

(e) Make efforts to achieve a consistent definition of climate regions in the agriculture sector;

(f) Encourage member States to improve the completeness and accuracy of reporting for the LULUCF sector and for KP-LULUCF activities.

IV. Questions of implementation

135. 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>>.

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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>>.

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B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Erasmia Kitou (European Commission) and Mr. Ricardo Fernandez (European Environmental Agency), including additional material on the methodologies and assumptions used.

Annex II

Acronyms and abbreviations

AD	activity data
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
EU	European Union
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
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	Land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
NA	not applicable
N ₂ O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF ₆	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10 ¹² joule)
UNFCCC	United Nations Framework Convention on Climate Change