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Report of the review of the initial report of the European Community

According to decision 13/CMP.1, each Annex I Party with a commitment inscribed in Annex B to the Kyoto Protocol shall submit to the secretariat, prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later, a report (the 'initial report') to facilitate the calculation of the Party's assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol, and to demonstrate its capacity to account for emissions and the assigned amount. This report reflects the results of the review of the initial report of the European Community conducted by an expert review team in accordance with Article 8 of the Kyoto Protocol.

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I. Introduction and summary

A. Introduction

1. This report covers the in-country review of the initial report of the European Community (EC), coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, in accordance with guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1). The review took place from 2 to 7 July 2007 in Brussels, Belgium, and was conducted by the following team of nominated experts from the roster of experts: generalist – Ms. Helen Plume (New Zealand); energy – Mr. Takeshi Enoki (Japan); industrial processes – Mr. Jos Olivier (the Netherlands); agriculture – Mr. Sergio González (Chile); land use, land-use change and forestry (LULUCF) – Mr. Rizaldi Boer (Indonesia); waste – Mr. Seungdo Kim (Korea). Ms. Helen Plume and Mr. Sergio González were the lead reviewers. In addition, the expert review team (ERT) reviewed the national system, the national registry, and the calculations of the Party's assigned amount and commitment period reserve, and took note of the LULUCF parameters and the elected Article 3, paragraph 4, activities. The review was coordinated by Ms. Astrid Olsson and Mr. Tomoyuki Aizawa (UNFCCC secretariat).

2. In accordance with the Guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1), a draft version of this report was communicated to the European Commission, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Summary

1. Timeliness

3. The GHG inventory of the EC under the Kyoto Protocol covers the 15 member States (EU-15) that were part of the EC on 1 January 1995.

4. Decision 13/CMP.1 requests Parties to submit the initial report prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later. The initial report was submitted on 18 December 2006, which is in compliance with decision 13/CMP.1. With the initial report the EC submitted a revised greenhouse gas (GHG) inventory compared to its original 2006 GHG inventory submission of 15 April 2006. The EC submitted an updated initial report on 2 February 2007, including a revised national inventory report (NIR) and revised common reporting format (CRF) tables. The Party submitted revised emission estimates on 11 January 2008 in response to questions raised by the ERT during the course of the in-country visit.

2. Completeness

5. Table 1 below provides information on the mandatory elements included in the initial report and revised estimates for the assigned amount and commitment period reserve provided by the Party resulting from the review process. These revised values are based on revisions of estimates of emissions and removals at member State level during the reviews of their respective initial reports (see table 3 and paragraph 118), which resulted in revisions of the total GHG emissions, including base year emissions from 4,278,814,845 tonnes carbon dioxide (CO₂) eq. as reported originally by the Party to 4,265,517,719 tonnes CO₂ eq. (see paragraph 118).

Table 1. Summary of the reporting on mandatory elements in the initial report

Item	Provided	Value/year/comment
Complete GHG inventory from the base year (1990) to the most recent year available (2004)	Yes	1990–2004
Base year for HFCs, PFCs and SF ₆	Yes	3 member States have selected 1990; 12 member States have selected 1995; see table 2 for more details
Agreement under Article 4	Yes	92%; see table 2 for details of burden sharing
LULUCF parameters	Yes	member States have selected different parameters; see table 2 for details
Election of and accounting period for Article 3, paragraphs 3 and 4, activities	Yes	Information on elected Article 3, paragraph 4, activities and accounting period for Article 3, paragraph 3, and Article 3, paragraph 4, activities for each member State is provided in table 2.
Calculation of the assigned amount in accordance with Article 3, paragraphs 7 and 8	Yes	19 682 548 287 tonnes CO ₂ eq.
Calculation of the assigned amount in accordance with Article 3, paragraphs 7 and 8, revised estimate	Yes	19 621 381 509 tonnes CO ₂ eq.
Calculation of the commitment period reserve	Yes	17 714 293 458 tonnes CO ₂ eq.
Calculation of the commitment period reserve, revised estimate		17 659 243 358 tonnes CO ₂ eq.
Description of national system in accordance with the guidelines for national systems under Article 5, paragraph 1	Yes	
Description of national registry in accordance with the requirements contained in the annex to decision 13/CMP.1, the annex to decision 5/CMP.1 and the technical standards for data exchange between registry systems adopted by the CMP	Yes	Registry still under development at the time of the initial review

6. As is noted in table 1 above, table 2 below contains the base year election for hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆), the selected parameters for LULUCF, and the election of and accounting period for activities under Article 3, paragraphs 3 and 4, for each member State.

Table 2. Summary of the base year for F-gases, Article 4 agreement, LULUCF parameters, elected activities under Article 3, paragraph 4, of the Kyoto Protocol and accounting period for Article 3, paragraphs 3 and 4, activities for each member State

Member States	Base year for F-gases	Agreement under Article 4	LULUCF parameters Minimum value for tree crown cover: Minimum tree height: Minimum area for forest land area	Election of Article 3.4 activities (FM, CM, GM)	Accounting period for Article 3.3 and 3.4 activities
Austria	1990	87%	30%: 2 m: 0.05 ha	None	Commitment period
Belgium	1995	92.5%	20%: 5 m: 0.5 ha	None	Commitment period
Denmark	1995	79%	10%: 5 m: 0.5 ha	FM, CM, GM	Annual
Finland	1995	100%	10%: 5 m: 0.5 ha	FM	Commitment period
France	1990	100%	10%: 5 m: 0.5 ha	FM	Annual
Germany	1995	79%	10%: 5 m: 0.1 ha	FM	Commitment period
Greece	1995	125%	25%: 2 m: 0.3 ha	FM	Commitment period
Ireland	1995	113%	20%: 5 m: 0.1 ha	None	Commitment period
Italy	1990	93.5%	10%: 5 m: 0.5 ha	FM	Commitment period
Luxembourg	1995	72%	10%: 5 m: 0.5 ha	None	Commitment period
Netherlands	1995	94%	20%: 5 m: 0.5 ha	None	Commitment period
Portugal	1995	127%	10%: 5 m: 1 ha	FM, CM, GM	Commitment period
Spain	1995	115%	20%: 3 m: 1 ha	FM, CM	Commitment period
Sweden	1995	104%	10%: 5 m: 0.5 ha	FM	Commitment period
United Kingdom	1995	87.5%	20%: 2 m: 0.1 ha	FM	Commitment period

Abbreviation: FM = forest management, CM = cropland management, GM = grassland management.

7. The information in the initial report generally covers the elements as required by decision 13/CMP.1, section I of decision 15/CMP.1, and relevant decisions of the Conference of the Parties serving as the Meeting of the Parties (CMP). At the time the report was submitted, one member State (Greece) had not decided on its election of activities under Article 3, paragraph 4, of the Kyoto Protocol and the initial report did not include the following aspects relating to the registry: name of the Registry Administrator, a list of publicly accessible information, a description of measures to safeguard, maintain and recover data in the event of disaster, and a description of the database structure and capacity. This information relating to Article 3, paragraph 4, and the registry was provided to the ERT during the review.

3. Transparency

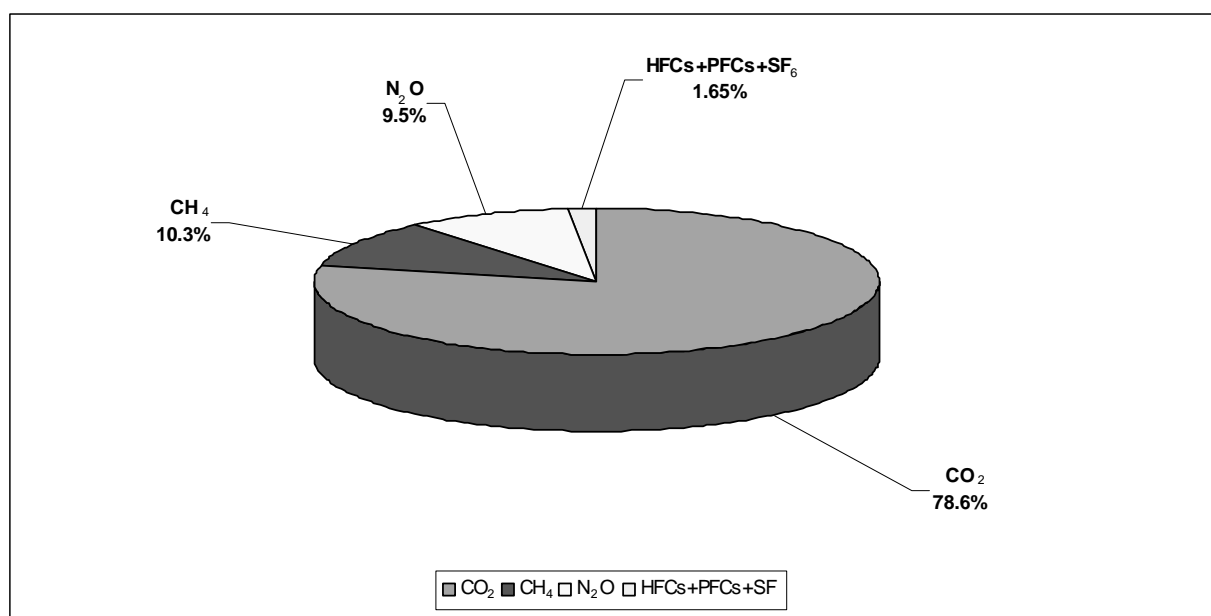
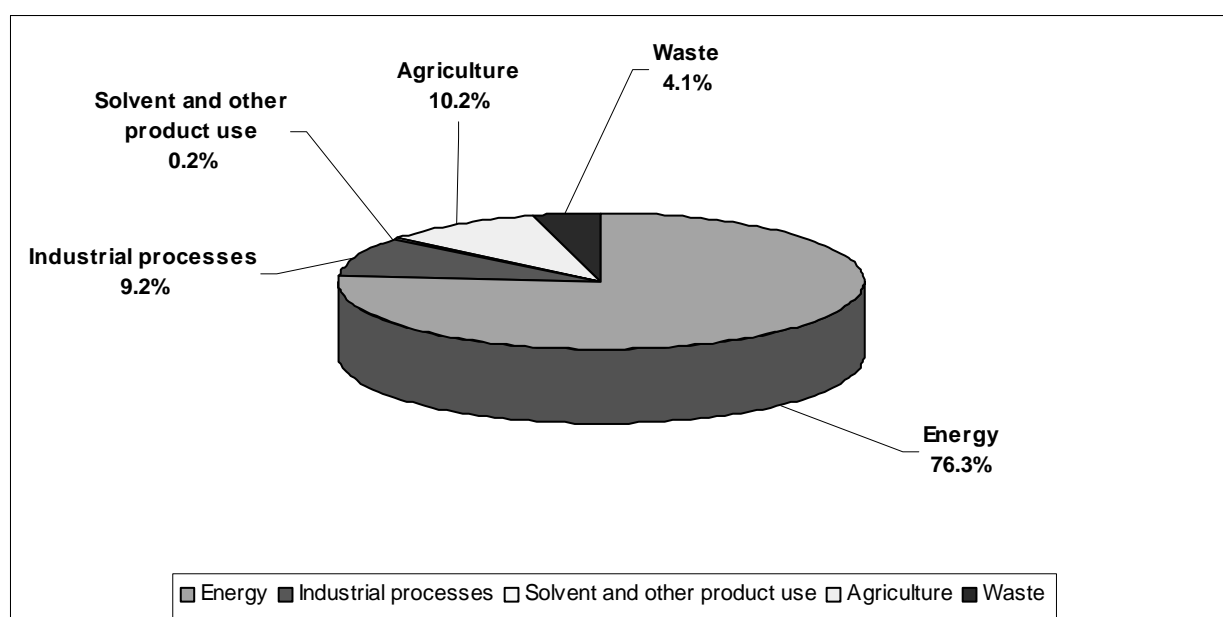
8. The initial report is generally transparent and is structured in accordance with the requirements for the initial report as described in paragraphs 7 and 8 of the Annex to decision 13/CMP.1. Given the different choices of member States on the base year for HFCs, PFCs and SF₆, information on base year emissions could have been more clearly set out in the initial report. This would have facilitated the checking of the calculation of the assigned amount by the ERT. The information in the NIR is for the most part clearly set out, although care needs to be taken with separating information for the EU-15 from the other member States for reviews under the Kyoto Protocol. This will continue to apply to reporting of GHG inventory data in the CRF tables. Transparency could be enhanced by ensuring that where notation keys have been used by member States, explanations are provided where appropriate in the EC CRF.

4. Emission profile in the base year, trends and emission reduction target

9. Based on the CRF data provided as part of the initial report, in the base year (1990 for CO₂, methane (CH₄) and nitrous oxide (N₂O), and either 1990 or 1995 for HFCs, PFCs and SF₆ depending on the decisions made by individual member States as set out in table 2 above), the most important GHG in

the EC was CO₂, contributing 78.6 per cent to total¹ EC GHG emissions expressed in CO₂ eq., followed by CH₄, 10.3 per cent, and N₂O, 9.5 per cent (see figure 1). HFCs, PFCs, and SF₆ taken together contributed 1.7 per cent of the overall GHG emissions in the base year. The energy sector accounted for 76.3 per cent of the total GHG emissions in the base year followed by the agriculture sector, 10.2 per cent, the industrial processes sector, 9.2 per cent, the waste sector, 4.1 per cent and the solvent and other product use 0.2 per cent (see figure 2). In the base year, total GHG emissions (excluding LULUCF) amounted to 4,264,127.53 Gg CO₂ eq. and decreased by 1.0 per cent from the base year to 2004. The trends for the different gases and sectors are generally well explained in the NIR and further information was provided to the ERT during the course of the review.

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

Figure 1. Shares of gases in total GHG emissions, base year**Figure 2. Shares of sectors in total GHG emissions, base year**

10. Table 3 provides information on the EU-15 member States' national total estimates, both as reported and as a result of the review process. Tables 4 and 5 show the GHG emissions by gas and by sector, respectively.

11. The European Community's quantified emission limitation is 92 per cent as included in Annex B to the Kyoto Protocol.

Table 3. National total estimates (tonnes CO₂ eq.)

Member State	National total estimates for base year as reported	National total estimates for base year resulting from the review ^a	Years covered by revision	Assigned amount as reported	Assigned amount after the review	Commitment period reserve after review
Austria	78 959 404	79 049 657	1990 and 2004	343 473 407	343 866 009	309 479 408
Belgium	146 890 526	145 728 763	1990 and 2004	679 368 682	673 995 528	606 595 975
Denmark	69 323 336	unchanged	NA	273 827 177	unchanged	246 444 459
Finland	71 096 195	71 003 509	1990 and 2004	355 480 975	355 017 545	319 515 791
France	563 925 328	unchanged	NA	2 819 626 640	unchanged	2 537 663 976
Germany	1 232 536 951	1 232 429 543	1990–2004	4 868 520 955	4 868 096 694	4 381 287 024
Greece ^b	111 054 072	106 987 169	NA	694 087 947	668 669 806	601 802 826
Ireland	55 780 237	55 607 836	1990–2004	315 158 338	314 184 272	282 765 845
Italy	519 464 323	516 850 887	1990–2004	2 428 495 710	2 416 277 898	2 174 650 108
Luxembourg	12 686 610	13 167 499	1990 and 2004	45 671 796	47 402 996	42 662 696
Netherlands ^b	214 588 451	213 034 498	1990–2004	1 008 565 720	1 001 262 141	901 135 927
Portugal	60 938 032	60 147 642	1990–1995 and 2004	386 956 503	381 937 527	343 743 774
Spain	289 385 637	289 773 205	1990–2004	1 663 967 412	1 666 195 929	1 499 576 336
Sweden	72 281 599	72 151 646	1990–2004	375 864 317	375 188 561	337 669 705
United Kingdom ^c	779 904 144	776 337 201	NA	3 412 080 630	3 396 475 254	3 056 827 729
EC 15	4 278 814 845	4 265 517 719	1990, 1995 and 2004	19 682 548 287	19 621 381 509	17 659 243 358

^a These estimates include revised estimates provided by the Party in response to the review, any adjustments if applicable or a combination thereof.

^b Emissions in the energy sector for Greece and deforestation emissions for the Netherlands were adjusted during the review. The adjusted values are included in this table.

^c The review of the United Kingdom did not result in any revisions of the emission estimates. However, the over-seas territories and the crown dependencies of the United Kingdom are not part of the EC and are thus excluded from the emission estimates of the United Kingdom under the EC for the purposes of the implementation of Article 4 of the Kyoto Protocol.

Table 4. Greenhouse gas emissions by gas, 1990–2004

GHG emissions (without LULUCF)	Gg CO ₂ equivalent								Change BY–2004 (%)
	Base year ^a	1990	1995	2000	2001	2002	2003	2004 ^a	
CO ₂	3 352 485.58	3 354 306.62	3 277 341.09	3 348 810.04	3 414 171.22	3 409 861.71	3 479 160.01	3 498 987.61	4.4
CH ₄	438 174.52	438 309.39	412 037.69	364 774.83	353 107.86	342 744.23	331 260.24	321 089.35	–26.7
N ₂ O	403 072.24	405 183.24	385 972.50	348 393.30	341 247.01	333 737.73	333 131.20	332 597.08	–17.5
HFCs	41 005.48	27 999.94	40 948.61	45 913.41	44 798.34	47 027.73	51 254.02	52 425.71	27.9
PFCs	15 008.62	16 824.70	10 949.62	7 276.78	6 490.17	8 223.26	6 597.55	5 383.52	–64.1
SF ₆	14 381.08	10 954.84	15 394.67	10 711.24	10 127.26	9 264.53	8 952.11	8 974.49	–37.6

Note: BY = Base year; LULUCF = Land use, land-use change and forestry; NA = Not applicable.

^a The European Community submitted revised estimates (Summary 2 table of the CRF) for the base year, 1995 and 2004 in the course of the initial review on 11 January 2008. These estimates differ from the EC's GHG inventory submitted in 2006. In addition, the adjusted emission estimates for Greece and the Netherlands under Article 5, paragraph 2, of the Kyoto Protocol are reflected in the base year only.

Table 5. Greenhouse gas emissions by sector, 1990–2004

Sectors	Gg CO ₂ equivalent								Change BY–2004 (%)
	Base year ^a	1990	1995	2000	2001	2002	2003	2004 ^a	
Energy	3 251 749.85	3 255 816.75	3 176 325.70	3 235 093.12	3 304 619.66	3 298 864.28	3 363 465.22	3 374 138.41	3.8
Industrial processes	392 585.16	377 969.47	375 377.74	330 148.56	322 124.17	320 152.44	326 501.34	332 343.68	–15.3
Solvent and other product use	10 229.33	10 229.33	9 093.45	8 921.44	8 570.57	8 537.70	8 219.99	8 199.23	–19.8
Agriculture	434 595.65	434 595.65	413 437.32	413 375.61	404 750.39	398 988.59	394 434.15	392 045.11	–9.8
LULUCF ^b	NA	–205 901.11	–240 353.41	–251 796.57	–282 531.58	–292 374.15	–279 487.89	–286 974.75	NA
Waste	174 967.54	174 967.54	168 409.96	138 340.87	129 877.06	124 316.19	117 734.43	112 731.33	–35.6
Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	NA	4 047 677.63	3 902 290.77	3 874 083.02	3 887 410.28	3 858 485.04	3 930 867.24	3 932 483.01	NA
Total (without LULUCF)	4 264 127.53	4 253 578.74	4 142 644.18	4 125 879.67	4 169 941.93	4 150 859.26	4 210 355.20	4 219 457.76	–1.0

Note: BY = Base year; LULUCF = Land use, land-use change and forestry; NA = Not applicable.

^a The European Community submitted revised estimates (Summary 2 table of the CRF) for the base year, 1995 and 2004 in the course of the initial review on 11 January 2008. These estimates differ from the EC's GHG inventory submitted in 2006. In addition, the adjusted emission estimates for Greece and the Netherlands under Article 5, paragraph 2, of the Kyoto Protocol are reflected in the base year only.

^b Four member States identified emissions from conversion of forests and the LULUCF sector as a net source for these member States. In accordance with decision 13/CMP.1, total base year emissions for the purpose of the calculation of the assigned amount under the Kyoto Protocol shall include GHG emissions from conversion of forests (deforestation). In 1990, emissions from deforestation for the United Kingdom amounted to 365.593 Gg CO₂ eq., for the Netherlands 38.676 Gg CO₂ eq., for Ireland 4.719 Gg CO₂ eq., and for Portugal 981.203 Gg CO₂ eq. Emissions from deforestation are neither shown separately nor included as a separate element of the emissions from the LULUCF sector in the rows for total emissions in this table. However, they were added to the total base year emissions for the purpose of the calculation of the assigned amount (see chapter II.C of this report).

II. Technical assessment of the elements reviewed

A. National system for the estimation of anthropogenic GHG emissions by sources and sinks

12. The EC's national system has been developed in accordance with the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1) and can perform the general and specific functions as required by the national systems guidelines annexed to decision 19/CMP.1. The ERT encourages the EC to keep its national system under review, including with respect to staff competencies and responsibilities, to ensure that it can continue to perform all the functions required by the guidelines.

13. Table 6 shows which of the specific functions of the national system are included and described in the initial report.

Table 6. Summary of reporting on the specific functions of the national system

Reporting element	Provided	Comments
Inventory planning		
Designated single national entity*	Yes	See section II.A.1
Defined/allocated specific responsibilities for inventory development process*	Yes	See section II.A.1
Established process for approving the inventory*	Yes	See section II.A.1
Quality assurance/quality control plan*	Yes	See section II.A.2
Ways to improve inventory quality	Yes	See section II.B.3
Inventory preparation		
Key category analysis*	Yes	See section II.B.1
Estimates prepared in line with IPCC guidelines and IPCC good practice guidance*	Yes	See section II.B.2
Sufficient activity data and emission factor collected to support methodology*	Yes	See section II.B
Quantitative uncertainty analysis*	Yes	See section II.B.2
Recalculations*	Yes	See section II.B.2
General QC (tier 1) procedures implemented*	Yes	See section II.A.2
Source/sink category-specific QC (tier 2) procedures implemented	Yes	See section II.A.2
Basic review by experts not involved in inventory	Yes	See section II.A.2
Extensive review for key categories	No	See section II.A.2
Periodic internal review of inventory preparation	Yes	See section II.A.2
Inventory management		
Archive inventory information*	Yes	See section II.A.3
Archive at single location	Yes	See section II.A.3
Provide ERT with access to archived information*	Yes	See section II.A.3
Respond to requests for clarifying inventory information during review process*	Yes	See section II.A.1

* Mandatory elements of the national system.

1. Institutional, legal and procedural arrangements

14. During the in-country visit, the EC officials explained the institutional arrangements, as part of the national system, for preparation of the inventory. The European Commission, Directorate General Environment is the designated single national entity. The European Environment Agency (EEA), through the work of its European Topic Centre on Air and Climate Change (ETC/ACC), Eurostat and the

Joint Research Centre (JRC) are also involved in the preparation of the inventory. The EEA annual management plan and annual implementation plan outline the specific tasks of the partner organizations in the preparation and development of the EC inventory.

15. The EEA through the work of its ETC/ACC implements the quality assurance/quality control (QA/QC) procedures as outlined in the EC QA/QC programme (including initial checks, status reports and consistency and completeness reports); consults with member States in order to clarify the data and other information provided; and assists member States in their reporting, for example through the provision of software tools, and with preparation of the final EC inventory report (CRFs and NIR) and maintenance of inventory databases and archives. The tasks of the EEA and its ETC/ACC are facilitated by the European environmental information and observation network (Eionet). Eurostat assists with the QA/QC activities, focusing on activity data (AD), in particular from the energy sector. The JRC also assists with QA/QC activities, focusing on the agriculture and LULUCF sectors. The JRC does this in close cooperation with member States and the research community.

16. The EC has a robust institutional structure and well defined procedures for compiling the inventory and the NIR. The legal basis for the compilation of the EC inventory is Decision 280/2004/EC together with its implementing provisions in Decision 166/2005/EC. The two decisions set out the requirements for the EC national system together with the procedures and timetable for the compilation of the EC inventory and the NIR, and describe the responsibilities of the member States for compiling and reporting their inventory information and data.

17. Working Group 1 'Annual Inventories' has been established under the Climate Change Committee (Decision 280/2004/EC) as a regular body for the exchange of information between the European Commission (DG Environment, Eurostat, JRC) EEA (ETC/ACC) and member States. Working Group 1 has a number of objectives and tasks relating to the timely delivery of member States' inventory reports, the improvement of all aspects of the quality of the inventories, exchange of practical experience on inventory preparation, evaluating the organizational process and proposals for improvements, and the promotion of the implementation of the guidelines on national systems. The ERT considers Working Group 1 to be a particular strength of the national system. The ERT recommends that the EC considers enhancing the objectives and tasks of Working Group 1 with a view to taking on more of a leadership role regarding recommendations to member States on priority setting for improving the overall quality of member States' inventories (relating to AD, emission factors (EFs), methods, consistency and completeness) and hence enhancing the quality of the EC inventory.

18. The ERT notes that the EC benefits from apparent good relationships with its member States and partner organizations. In particular this is demonstrated through Working Group 1. This is a very positive aspect of the EC's national system and provides potential for further improvement of the EC inventory and national system. The ERT notes that the relationship with member States is reinforced through legislation, and that the member States have a critical role in reviewing the draft EC inventory before submission. The ERT encourages the EC to continue to strengthen the relationship with the member States including through Working Group 1.

19. During the review, the EC provided information on its preparations for covering Article 3, paragraphs 3 and 4, activities in its national system. This preparation includes trialling Kyoto Protocol reporting tables for Article 3, paragraphs 3 and 4, activities. Article 3, paragraphs 3 and 4, activities are already explicitly included in the QC procedures for compilation of the EC inventory.

20. In the EC there is an established process for the official consideration and approval of the inventory, including recalculations, prior to its submission and for responding to any issues raised by the inventory review. The responsible organization is the European Commission, Directorate General Environment, which, as the designated national entity, is the conduit for information to and from

member States during the review process. The EC was able to respond to requests and questions raised during the review, including those questions that needed to be answered at member State level.

2. Quality assurance/quality control

21. The EC has elaborated and implemented a QA/QC programme in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). This includes general QC procedures (tier 1) as well as some source/sink category-specific procedures for key categories, for example, in the energy sector through Eurostat. The European Commission (DG Environment) is responsible for coordinating QA/QC activities for the EC inventory and the EEA is responsible for the annual implementation of the QA/QC procedures. The programme includes procedures for review by experts who have not been involved with the preparation process, procedures for pre- and post-submission review, and QA procedures including sector-specific workshops to address major problems/follow-up activities to improve inventory quality. Under the EC QA/QC programme, the member States have also implemented QA/QC procedures in order to comply with the IPCC good practice guidance.

22. The EC conducts a series of QC procedures such as emission and implied emission factor (IEF) checks, time-series checks, trend checks, and minimum/maximum checks for all key categories. When IEF anomalies are identified by the EC inventory compilers, it asks member States for clarification. In addition, the EC conducts internal reviews and EU workshops to improve the quality of the EC and member State inventories. The ERT commends the EC on these activities and encourages the EC to continue its efforts to work with member States to resolve issues identified by the EC QC checks.

23. The ERT recognizes the importance of the EC's QA/QC processes given that the inventory is based on the annual inventories of member States, and thus the quality of the EC inventory depends on the quality of the member States' inventories, the QA/QC procedures at member State level and the quality of the compilation process of the EC inventory. The ERT concludes that the QA/QC plan is comprehensive and in line with the IPCC good practice guidance, but it does not explicitly include specific review procedures for key categories or procedures to be undertaken where significant changes have occurred. The ERT encourages the EC to build such specific procedures into the QA/QC plan.

3. Inventory management

24. The EC has a centralized archiving system, which includes the archiving of disaggregated EFs, AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification as well as planned inventory improvements. On behalf of DG Environment, the EEA manages and maintains the EC GHG inventory database and the documentation of the inventory information. The electronic archive was demonstrated to the ERT during the review.

B. Greenhouse gas inventory

25. In conjunction with its initial report, the EC has submitted a complete set of CRF tables for the years 1990–2004 and an NIR. The EC submitted a revised NIR and revised CRF tables on 2 February 2007 in conjunction with its updated initial report. Where needed the ERT also used previous years' submissions, including the CRF tables for the years 1990–2003.

26. During the review, the EC provided the ERT with additional information sources. These documents are not part of the initial report submission. The full list of materials used during the review is provided in the annex to this report.

1. Key categories

27. The EC reported a tier 1 key category analysis, both level and trend assessment, as part of its initial report submission. The EC carried out this analysis both including and excluding LULUCF, although the summary table provided in the body of the NIR does not include LULUCF. A level assessment was carried out for all years between the base year and 2004 and a trend assessment was performed for the base year to 2004. The NIR states that the EU-15 key category analysis is carried out to identify those categories for which overviews of member States' methodologies, EFs, quality estimates and emission trends are provided in the NIR. The EU-15 key category analysis helps to identify those categories that should receive special attention with regard to QA/QC at the EC level. The member States use their key category analysis to improve the quality of emission estimates at member State level. The results of the key category analysis are used extensively in the presentation of information in the NIR, but it is less clear that the results are used in the prioritization of resources for inventory improvement. The ERT encourages the EC to use the results of the key category analysis to prioritize its approach to working with member States on inventory improvement.

28. The key category analysis performed by the Party and the secretariat² produced similar results, noting that the EC uses a much higher level of disaggregation. Although the EC has included the LULUCF sector in its key category analysis, the summary table provided in the body of the NIR does not include LULUCF. The ERT recommends that the EC provide a summary key category table including LULUCF in the main body of future NIRs.

2. Cross-cutting topics

29. Recognizing that the EC inventory is a compilation of the inventories of the member States, the inventory is generally in line with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and the IPCC good practice guidance.

30. The inventory is compiled in accordance with Article 7, paragraph 1, and decision 15/CMP.1.

Completeness

31. The EC inventory is complete in terms of the time series (1990 to 2004), geographic coverage as determined at member State level, source/sink categories and GHGs (including the reporting of actual and potential emissions). The CRF tables have been almost completely filled in. There are missing AD in CRF table 1.B.2 as well as missing AD and IEFs in CRF table 3.A-D, and CRF table 2(II).F is not provided. Some IPCC categories are only partially reported, for example, CO₂ from solvents and other product use. The ERT recommends that the EC work with member States to fill all remaining gaps in the inventory. The NIR is generally complete. However, the ERT recommends that the EC should continue the improvement of the structure of the sectoral chapters of the NIR to make them fully compliant with the "Guidelines for the preparation of national communications by Parties included in annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the UNFCCC reporting guidelines). For example, the sections of the sectoral chapters, except for LULUCF, do not follow the recommended structure and sections are missing on time-series consistency, category-specific verification (if applicable) and category-specific planned improvements (where applicable).

² The secretariat identified, for each Party, those source categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance for LULUCF. Key categories according to the tier 1 trend assessment were also identified for those Parties that provided a full set of CRF tables for the base year. 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.

Transparency

32. The NIR provides much of the information necessary to assess the inventory, recognizing that the detail on the methods used for estimating emissions and removals are described at the member State level. Some additional information could improve the transparency of the NIR. For example: some more detailed explanation of trends (to assist with the assessment of the time-series consistency) and recalculations (where sometimes no explanation is reported at the member State level); information on AD, IEFs, technologies and abatement technologies in the industrial processes sector; better explanation of notation keys; and better explanation of the allocation of emissions between the energy and industrial processes sectors. Improved transparency in the NIR will facilitate future reviews, particularly centralized and desk reviews. The ERT encourages the EC to provide brief explanations in the NIR covering the issues listed.

33. The ERT has noted that the initial report and the NIR contain information for both the EU-15 and other member States. This information is often provided in separate tables, but sometimes information on all member States is presented in the same table. The ERT recommends that in future NIRs the EC continue to separate the information for the EU-15 from that of the other member States in order to facilitate future reviews under the Kyoto Protocol.

Consistency

34. The ERT has noted the particular challenges faced by the EC in compiling its inventory report from the inventory reports of member States. It is important that EU-15 data be reported in a manner that is consistent with that of the member States in order to meet the requirements under the Kyoto Protocol. The ERT has noted the procedures put in place to ensure that the EC inventory information submitted to the UNFCCC secretariat by 15 April each year is consistent with that submitted by member States. The ERT recommends that the EC ensure consistency between the totals reported by the member States and the totals reported by the EC, and that the geographic coverage of member States with respect to the Kyoto Protocol is consistent with the geographic coverage of the EC.

Comparability

35. The EC inventory is compiled from the inventories of the member States. In this way it differs from the inventories provided by all other Annex I Parties. The EC inventory, however, is comparable to other inventories in terms of the reporting formats used and the allocation of categories.

Accuracy

36. The ERT concludes that, with a few exceptions, the inventory is accurate as defined in the UNFCCC reporting guidelines, in that emissions are neither systematically over nor under true emissions or removals and that uncertainties are reduced as far as practicable. The exceptions relate to those categories where the inventories of member States have been adjusted during the course of their initial reviews. The ERT recommends that the EC address this matter through the normal recalculation procedures in its next submission.

Recalculations

37. The national system can ensure that recalculations of previously submitted estimates of GHG emissions by sources and removals by sinks are prepared in accordance with the IPCC good practice guidance. Recalculations are performed at member State level and the EC NIR provides an overview of the major recalculations performed by member States and their quantitative effects on the inventory.

38. The ERT noted that recalculations of the time series from 1990 to 2003 reported by the EC had been undertaken to take into account reallocation of emissions, inclusion of new categories and changes in methods, AD and EFs at the member State level. Given that the EC inventory is a compilation of the

inventories of member States, recalculations occur in all inventory categories. The major changes to the base year inventory compared to previously submitted data include: CO₂ from metal production (mainly due to the reallocation of German process-related CO₂ emissions from iron and steel production from manufacturing industry and construction (energy sector) to iron and steel (industrial process sector)), CO₂ from chemical industry and CH₄ from manure management. The rationale for these recalculations is provided in the NIR, although there are some gaps in the summary information in the NIR on recalculations at member State level. The total effect of these recalculations is a 0.6 per cent increase for 1990 and a 0.9 per cent increase for 2003 (excluding LULUCF). When LULUCF is included these percentages change to 1.1 per cent and 1.6 per cent, respectively. The rationale for these recalculations is provided in the NIR and these recalculations have resulted in real improvements to the inventory. The recalculations are the result of improvements made by member States, often in response to UNFCCC reviews. The ERT recommends that the EC fill the gaps in the explanations of recalculations at member State level as summarized in the NIR.

Uncertainties

39. Using a modified tier 1 analysis, the EC has provided an uncertainty analysis for each inventory category and for the entire inventory, following the IPCC good practice guidance. The ERT noted that the EC is not explicitly using the results of the uncertainty analysis to prioritize improvements in the inventory (e.g. a tier 2 key category analysis). The EC bases its uncertainty analysis on the uncertainties reported by member States. The combined quantitative approach covers all sectors of the inventory except LULUCF (because of significant gaps in member State information) and covers both level and trend. The overall uncertainty level is estimated to be between 4 and 11 per cent, and the overall trend uncertainty is estimated to be between 1 and 2 per cent. The uncertainty estimates appear in line with many country-specific estimates. However, they may be improved by comparison with the weighted average values of uncertainties provided by member States and with specific measurement data, if available. The ERT recommends that the EC extend its overall uncertainty analysis to include LULUCF, and recommends the EC to consider ways to make use of the uncertainty analysis to prioritize improvements in the inventory.

3. Areas for further improvement identified by the Party

40. The NIR identifies several areas for improvement. The following activities are planned in 2006–2007 at EC level with a view to improving the EC GHG inventory:

- (a) Continue sector-specific QA/QC activities within the EC internal review;
- (b) Test the newly developed CRF Aggregator database in order to ensure full functionality for the 2007 submission;
- (c) Prepare for providing background data in the CRF table for industrial processes (in particular table 2(II).F) and for waste;
- (d) Compare emission estimates for aviation with Eurocontrol flight data;
- (e) Further develop the EC QA/QC activities on the basis of the experience in 2006.

4. Areas for further improvement identified by the ERT

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

- (a) Build on the existing relationships with member States to work on improving the overall quality of the member States' inventories (relating to AD, EFs and methods) and hence to enhance the quality of the EC inventory;

- (b) Extend the uncertainty analysis to include LULUCF, and consider ways to use the complete uncertainty analysis to prioritize inventory improvement;
- (c) Work with member States to fill all remaining gaps in the inventory;
- (d) Continue improvement of the structure of the sectoral chapters of the NIR to fully comply with the UNFCCC reporting guidelines;
- (e) Work with member States to move to higher tiers in their inventories where this is appropriate according to IPCC good practice guidance;
- (f) Include a summary table showing the key category analysis including LULUCF in the NIR and use the full key category analysis to prioritize the approach to working with member States on inventory improvement.

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

5. Energy

Sector overview

43. In the base year, the energy sector accounted for 76.3 per cent of the total EC GHG emissions, excluding LULUCF. Total GHG emissions from the sector increased by 3.6 per cent from the base year to 2004 (3,251,749.85 Gg CO₂ eq. in the base year to 3,374,138.41 Gg CO₂ eq. in 2004) and its share of total GHG emissions increased by 3.7 per cent to 80.0 per cent in 2004. The most important energy-related gas is CO₂, contributing 96.1 per cent of emissions from the energy sector. CH₄ and N₂O accounted for 2.9 and 1.0 per cent of emissions from the energy sector in the base year, respectively.

44. From the base year to 2004, the largest increases in the energy sector were observed in transport (a 26.2 per cent increase) and energy industries (a 3.5 per cent increase). There were large decreases in other (1.A.5) (a 60.5 per cent decrease), manufacturing industries and construction (a 9.5 per cent decrease) and fugitive emissions from solid fuels (a 63.3 per cent decrease). Emissions from road transportation show a gradual increase throughout the time series, whereas emissions from public electricity and heat production, residential and many other categories fluctuate throughout the time series for a variety of reasons, such as the reunification of Germany, fuel switching in the UK and seasonal temperature variability.

Reference and sectoral approaches

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

45. CO₂ emissions from fuel combustion have been calculated using both the reference approach and the sectoral approach. The EC's reference approach for CO₂ from fossil fuel combustion is based on Eurostat energy data. Energy statistics are submitted annually to Eurostat by member States along with the five joint Eurostat/IEA/UNECE questionnaires on solid fuels, oil, natural gas, electricity and heat, and renewables and wastes. On the basis of this information, Eurostat compiles the annual energy balances which are used by the EC to estimate CO₂ emissions from fossil fuels.

46. For the base year, the difference between the two approaches is 0.09 per cent³ in CO₂ emission estimates with the reference approach being higher. The NIR provides a description of the methodology

³ The value provided is based on the EC's submission of 2 February 2007. In response to the issues raised during the initial review the EC submitted revised estimates in table summary 2 of the CRF for the base year, 1990, 1995 and 2004. Table summary 2 provides inventory data at an aggregate level and cannot be used for detailed inventory

used in estimating the reference approach. Although the overall difference between the two approaches for the EC is very small, the ERT notes that at the member State level differences of more than 5 per cent are reported for Belgium, Finland, Greece and Sweden. The main reasons for diverging energy data and CO₂ emissions, according to the NIR, are the differences in the treatment of non-energy use of fossil fuels and carbon stored, and the use of country-specific EFs. The ERT commends the progress made by the EC in improving the match between the sectoral and the reference approaches. The ERT encourages the EC to continue the analysis, and to advance improvements to the countries with the greatest differences between reference and sectoral approaches, such as Belgium, Finland, Greece and Sweden.

Feedstocks and non-energy use of fuels

47. The NIR does not contain a section on how feedstocks and non-energy use of fuels are accounted for in the inventory, as required by the UNFCCC reporting guidelines. Nor do the NIRs of several member States contain such information. For transparency and to assess completeness, the ERT recommends that the EC include this information in its next NIR.

Country-specific issues

48. The ERT noted that because the EC inventory is a compilation of data from 15 member States that use different methodologies, there is a difficulty in reporting information in the CRF in a consistent manner. For example, the allocation of CO₂ emissions from iron and steel production is different for member States. It ranges from including almost all emissions in the energy sector to reporting almost all emissions in the industrial processes sector or using a split according to the IPCC good practice guidance, the UNFCCC reporting guidelines and/or based on country-specific information. Sulphur dioxide scrubbing from the use of limestone in Germany is included under energy industries but should be included under limestone and dolomite use. The level of aggregation for other (manufacturing industries and construction) also varies between member States. The ERT encourages the EC to briefly describe these issues in the NIR and to facilitate the harmonization of methods and allocations of emissions by member States without compromising the accuracy of estimations.

49. There is an inconsistency among member States in the categories that are estimated. For example, Finland reports indirect N₂O emissions from emissions of nitrogen oxides in other (energy (1.A.5)) and the Netherlands estimates these emissions and reports them in other (industrial processes (2.G)), whereas other member States do not estimate these emissions at all. The EC informed the ERT that as a result of the Dutch initial review, the Netherlands decided not to report indirect N₂O emissions in other (industrial processes (2.G)). Some member States report indirect CO₂ emissions from CH₄ and non methane volatile organic compounds (NMVOC) in oil and natural gas whereas other member States do not estimate these indirect CO₂ emissions at all. To improve the consistency of the EC inventory, the ERT encourages the EC to work with the member States to facilitate the harmonization of categories where emissions are estimated and to report these emissions in a consistent manner.

Key categories

Stationary combustion: solid, liquid, gas – CO₂

50. During the review, several unusual IEFs and time-series fluctuations were identified for solid, liquid and gas fuels in public electricity and heat production. During the initial review, the EC explained the impact of the reunification of Germany on emission trends, the fluctuation of the CO₂ IEF in the Spanish inventory between 1990 and 1993, the growing amount of solid fuel consumption in Spain and the decreasing amount in the UK, the increased share of blast furnace gas used in Sweden since 1996, the commissioning of a power station in Scotland using sour gas in the early 1990s and the changing

information. Some values in this report are therefore based on the submission of 2 February 2007 instead of the submitted revised estimates. This is clearly indicated in the report.

contributions of the member States. The ERT encourages the EC to include information on national circumstances that helps to explain the trend for public electricity and heat production as this is the largest emitting category in the EC inventory.

Stationary combustion: other – CO₂

51. The trend of the CO₂ IEF for other fuels decreases over time for some categories. For example, the CO₂ IEF for public electricity and heat production decreased from 95.06 t/TJ in 1990 to 82.15 t/TJ in 2004. The CO₂ IEF for chemicals decreased from 106.13 t/TJ in 1990 to 75.24 t/TJ in 2004⁴. During the initial review, the EC explained that the IEF of several of the member States, such as Germany for public electricity and heat production and Belgium for chemicals, decreased. The IEF trend for these categories also fluctuates. The ERT encourages the EC to work with the member States to analyse the reasons for these trends.

52. During the initial review, the EC informed the ERT that member States include different fuels as other fuels. For example, in Finland peat is included as other fuels instead of solid fuels. The ERT encourages the EC to work with Parties that allocate fuels differently to facilitate the harmonization of fuel categorization. The ERT also encourages the EC to include information in the NIR on what is included in other fuels.

Road transportation: liquid – N₂O

53. Germany's N₂O IEF for gasoline from road transportation is significantly lower than those of the other member States throughout the time series and also has a different trend. During the initial review, the EC explained that Germany revised its EFs for N₂O from gasoline-powered cars with catalytic converters in its 2006 inventory submission. Recent measurements indicate that the newer gasoline-powered cars with catalytic converters (Euro II and Euro III technologies) have lower N₂O emissions than the older cars. Therefore, the IEF in Germany decreased when new technologies penetrated the market, whereas in those countries using a constant EF for all gasoline cars with catalytic converters the IEF increases with the penetration of catalytic converters in the vehicle fleet. This issue is expected to be resolved in the next submission when member States will use the COPERT IV model which includes lower EFs for newer gasoline-powered cars. The ERT noted that not all member States use the COPERT model to estimate emissions from road transportation. The ERT encourages the EC to continue to follow-up this issue with the member States that do and do not use the COPERT model.

54. Germany's N₂O IEF for diesel from road transportation is significantly lower than the IEFs of other member States. The ERT was informed that the German emission factors are based on the updated version of the: "Handbuch Emissionsfaktoren des Straßenverkehrs 2.1"; UBA Berlin, BUWAL Bern, UBA Wien; August 2004. This handbook is a compilation of published EFs based on measurements. The new EFs are more detailed and are generally lower than those used before. The old EFs were based on "Carbotech 1998: NOREM-Database for non-regulated emissions from motor vehicles; BUWAL Bern". The ERT encourages the EC to further investigate the reasons for these differences and to continue its work with the member States to improve the accuracy of the inventory.

Fugitive emissions: oil and natural gas – CH₄

55. AD on oil and natural gas fugitive emissions are not reported because member States use different AD for a variety of methodologies including the default IPCC method, CORINAIR and country-specific methods. The ERT recommends the EC to fill in the cells with appropriate values or notation keys.

⁴ The values provided are based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

56. The EC informed the ERT of recent efforts on the part of the EC to group countries according to methodologies used. The ERT commends the EC on these efforts and encourages the EC to continue to work with member States to facilitate harmonization of methodologies in order to improve comparability without compromising accuracy.

Non-key categories

Stationary combustion: liquid – N₂O

57. The N₂O IEF in Greece for solid fuels in the category public electricity and heat production (15.94 kg/TJ in 1990) is higher than in other major emitters (Germany 3.67 kg/TJ, Italy 6.23 kg/TJ and United Kingdom 2.66 kg/TJ in 1990) throughout the time series⁵. During the initial review, the EC explained that Greece used the EMEP/CORINAIR approach to estimate these emissions. The Greek estimates were adjusted during the Greek initial review.

6. Industrial processes and solvent and other product use

Sector overview

58. In the base year, the industrial processes sector accounted for 9.2 per cent of total EC GHG emissions (without LULUCF). From the base year to 2004, emissions from the sector fell by 15.3 per cent, mainly due to decreases of 55.3 per cent in N₂O emissions from the chemical industry and decreases in production of halocarbons and SF₆ (85.2 per cent) and PFC emissions from metal production (75.8 per cent). HFC emissions from refrigeration have increased significantly since 1990. Only actual emissions of individual fluorinated gases (F-gases) are reported; potential emissions are reported at the aggregate level for total HFCs, total PFCs and SF₆. Indirect CO₂ emissions from solvent and other product use decreased by 19.8 per cent from 1990 to 2004. CO₂ from cement production and from iron and steel production are the largest categories, each accounting for about 20 per cent⁶ of the sector total.

59. The CRF tables are filled in completely, except for the sectoral background data table 2(II).F which has not been provided. In response to the draft review report, the EC stated that this information has been provided in the 2007 inventory submission. Emission estimates are made for all gases. However, the CRFs of individual member States indicate that some non-mandatory (sub)categories may not have been estimated completely for all 15 member States, in particular for CO₂ from non-combustion uses of lubricants and waxes, indirect CO₂ from NMVOC emissions in solvent and other product use and CO₂ from limestone and dolomite use (e.g. for flue gas desulphurization (2.A.3.)). To improve coverage at EC level, also of non-mandatory categories, the ERT recommends that the EC encourage member States to consider estimating these categories, where applicable, and to provide more complete estimates of other categories where member States report emissions as not estimated (“NE”).

60. The ERT commends the EC on the substantial improvements made by using higher tier methods for key categories and plant-specific or country-specific EFs, which are now used for the larger part of the emissions of all key categories, and concludes that methodology and plant-specific data used for key categories are mostly in line with the IPCC good practice guidance. A significant exception is CO₂ emissions from ammonia production where only 40 to 45 per cent are estimated using higher tier methods, mainly due to the use of a tier 1 method in Germany, which contributes 31 per cent to the total emissions in this category. The ERT recommends that the EC encourage member States to improve this. The ERT also encourages the EC to work with member States to increase the share of higher tier

⁵ The values provided are based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

⁶ The value provided is based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

methods used in estimating emissions from the production of aluminium and HCFC-22 (currently each about 70 per cent).⁷

61. The EC has also made significant improvements in its documentation of this sector in the NIR. However, transparency and comparability of reported emissions, which are often based on plant-specific or country-specific data, could still be improved. The ERT recommends that the EC provide, for each gas, a description of the main activities and the methodologies used in subcategories other (chemical industry(2.B.5)), other (production of halocarbons and SF₆ (2.E.3)), and other (2.G).

62. EC IEFs are generally missing because some member States have AD missing or reported as confidential (“C”) or included elsewhere (“IE”), or because inconsistent definitions are used by member States in allocating combustion and process emissions of CO₂. Since this hinders assessment of time-series consistency, the ERT recommends improving transparency and comparability at the EC level by the EC encouraging member States to provide quantitative data at subcategory level whenever possible. Until these data are available, the ERT encourages the EC to provide its own estimates of total EC-level AD, where possible, and report these in the NIR for information purposes. In its response to the draft report, the EC noted that providing its own AD estimates along with member States ones could lead to inconsistencies with the national inventories of the member States. The EC will continue to assist its member States in improving the quality and amount of data reported.

63. Moreover, to assess time-series consistency and improve transparency, the ERT encourages the EC to provide information in the NIR time series on shares in total EC production of plants or production technologies with distinctly different EFs and with emission abatement, if available and if confidentiality can be maintained where required. For the industrial processes sector, the separate EEA trend and projections report does not give sufficiently detailed information to provide an understanding of the time-series consistency of the emissions, and the ERT recommends that the EC provide this in its reporting.

64. Last year, sector-specific QA/QC through internal review was introduced for several large key categories in the industrial processes sector. The QA/QC system for data received by the inventory compilation team from the member States focuses on detecting, checking and explaining outliers in level (also comparing between member States) and trend in member States’ emissions and AD. However, AD and IEFs are not provided for many subcategories in this sector, for example, for reasons of confidentiality, so the ERT recommends that the EC verify that category-specific QC has been performed by member States for key categories in this sector. The ERT recommends the EC to provide summary information on this subject in the NIR. For recalculations, in order to improve transparency the ERT recommends that the EC present the changes at relevant subcategory levels, instead of only at sector and member State level. In response to the draft review report, the EC stated that this information is provided in the 2007 inventory submission.

65. The uncertainty estimates for this sector appear to be in line with many country-specific estimates. The ERT recommends that the EC take a more active role in improving and – where possible – harmonizing the approaches taken in member States’ inventories, particularly in the industrial processes sector, in which quality assessment is also hindered at the EC level by the frequent use of the notation keys confidential (“C”), included elsewhere (“IE”) and not estimated (“NE”), and where there is not a uniform approach to AD and allocation of emissions.

⁷ The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 16 for further information.

Key categories

Cement production – CO₂

66. The ERT recommends that the EC include in the NIR the explanations for unexpected AD changes over time, for example, the 11 per cent⁸ decrease in 1990–1993, and for the determination of the EFs, including the cement kiln dust correction factor where applicable, provided during the initial review.

Lime production – CO₂

67. The ERT recommends that the EC include in the NIR the explanation of unexpected AD changes over time, for example the 8 per cent⁹ decrease from 1990 to 1992, provided during the initial review.

Limestone and dolomite use – CO₂

68. Eight member States report CO₂ from limestone and/or dolomite used in wet flue gas desulphurization (FGD) of flue gases in power generation. The ERT recommends that the EC encourage member States which do not mention this category in their NIR to report where this category is included. The ERT further recommends the EC to encourage member States to ensure that all activities are covered, where applicable, with a view to reporting more complete estimates.

Ammonia production – CO₂

69. Currently, 40 to 45 per cent of emissions are estimated using higher tier methods. The ERT was informed that Germany, which uses a tier 1 method and has a 31 per cent share of total emissions in the category, is investigating how to change to a higher tier method.¹⁰ The ERT recommends that the EC encourage larger emitters to use higher tier methods. The ERT also recommends the EC to allocate emissions from Greece, which are currently included in the energy sector (1.A.2.c), in accordance with the Revised 1996 IPCC Guidelines. Moreover, the ERT recommends that the EC ensure that all energy-related emissions from Belgium are (re)allocated to the energy sector as recommended in the Revised 1996 IPCC Guidelines.

Nitric acid production – N₂O

70. The large IEF variations for the United Kingdom were explained by the fact that some production data between 1990 and 1994 are unknown and had to be estimated from surrogate parameters, and for Belgium by the use of abatement measures, changes in monitoring methods as well as changes in the contributions of individual plants due to plant closures. The ERT recommends that the EC include this information in the NIR, including the trend in the EC IEF, which is calculated excluding member States that report AD as confidential; and provide explanations of changes caused by alterations in the mix of technologies with higher and lower EFs and of changes in the fraction of emissions abated. Furthermore, the ERT recommends the EC to encourage the United Kingdom to improve the emissions split between nitric acid production and adipic acid production, e.g. using production capacities as proxy, and encourage member States to provide production indices where AD are reported as confidential (Netherlands and Portugal).

⁸ The value provided is based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

⁹ The value provided is based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

¹⁰ The values provided are based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

Other (chemical industry) – N₂O

71. The ERT observed that the Netherlands reports constant emissions for 1990–2002, not taking into account actual trends in production. These emissions were revised during the member State review. Italy reports N₂O emissions from caprolactam as 0.04 Gg, which is equivalent to using an IEF that is a factor of 10 lower than that of Germany and the Netherlands/Belgium as inferred from national production estimates from industry consultants (e.g. SRIC). Spain does not report N₂O emissions from this activity although industry consultants report production of caprolactam. The ERT recommends that the EC encourage member States to add these activities, where applicable, as current reporting could lead to an underestimate of emissions.

Iron and steel production – CO₂

72. The ERT recommends that the EC provide more accurate information on the fraction of CO₂ emissions estimated using higher tier methods, including an assessment of the tier level of country-specific methods. Although not mandatory, the EC might find it useful, as part of its QA/QC activities, to compare the EC CRF data with that of other Parties with a view of increasing their comparability. In this regard, the ERT recommends that the EC encourage harmonization between the approach taken by member States regarding the allocation of CO₂ emissions between the energy sector and the industrial processes sector, and to provide in the NIR total steel production as AD at both the EC and the member State level, which could be used to estimate overall IEFs that in turn could give indications of possible double counting or gaps in reporting.

Aluminium production – PFCs

73. To improve comparability and to assess time-series consistency, the ERT recommends that the EC encourage the United Kingdom to consider, if confidentiality can still be maintained where required, separating by-product PFC emissions from PFC emissions from PFC use, which are currently aggregated into a single value for reasons of confidentiality, and Greece to consider reporting AD that are available from other publicly available AD sources (e.g. Eurostat (ProdCom), World Bureau of Metal Statistics (WBMS), Euromines, USGS and the UNSD). The ERT encourages the EC to encourage other larger emitters to use higher tier methods (70 per cent is currently estimated using a higher tier method)¹¹ in compliance with the IPCC good practice guidance. However, it is noted that in response to the draft review report, the EC stated that in the 2007 inventory submission all member States use higher tier methods for recent years. The ERT also noted that some member States use a 1/10 or 10:90 ratio for estimating C₂F₆ emissions, even though the default ratio is not 1/10 for all process types, and 10:90 is not the correct interpretation of the default ratio. The ERT recommends that the EC work with member States to improve emission estimates in this category.

HCFC-22 production – HFC-23

74. In the NIR, the IEF trend of HCFC-22 production and of other (2.E.2/3) are not well explained, partly because member States report emissions as confidential (“C”) or included elsewhere (“IE”), but methodology information for production of halocarbons and SF₆ is provided. In line with the IPCC good practice guidance, the ERT recommends that the EC assess and discuss this key subcategory of by product emissions from production of HCFC-22 (2.E.1) separately in the NIR and provide more specific information on abatement applied, if such information is not confidential (e.g. year/fraction applicable and destruction efficiency). Several member States use country-specific or higher tiers and country-specific or plant-specific EFs. The ERT recommends that the EC encourage larger emitters to use higher tier methods, and to separate HFC-23 emissions from HCFC-22 production from other subcategories, if such information is not confidential. Moreover, in order to improve transparency at the

¹¹ The value provided is based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

EC level the ERT recommends that the EC encourage those member States currently reporting “C” or “IE” for by-product emissions from production of HCFC-22 to reconsider separating the reporting of their by-product F-gas emissions from emissions due to the use of F-gases, and to report them in the appropriate categories (production of halocarbons and SF₆, consumption of halocarbons and SF₆, and metal production), if confidentiality allows.

Consumption of halocarbons and SF₆ – HFCs

75. In commercial and industrial refrigeration the annual leakage rate (‘product life factor’) varies by a factor of 100 (from 0.1 per cent to 10 per cent) and several entries are left blank without notation keys, although similar technologies are likely and values are low compared to the IPCC default ranges. For mobile air-conditioning the product life factor is about 15 per cent, except for three member States which report values of 0.1 per cent or 0 per cent which are lower than the IPCC default ranges and also lower compared to several other similar countries¹². The ERT recommends that the EC check the present country-specific values with member States and encourage improvement where warranted, as the current approach could lead to an underestimate of emissions. The ERT recommends that the NIR provide an explanation of the differences in the country-specific leakage rates used. Moreover, the ERT recommends that the EC add any missing notation keys at the EC level based on complete use of notation keys by member States. In order to increase transparency, in cases where the IEF for large categories is “NA” for reasons of confidentiality, the ERT recommends that the EC include in the NIR the trend in leakage rates (product life factors) per member State for those that do report them.

Other (2.G) – CO₂

76. CO₂ emissions from the non-combustion use of lubricants and waxes are explicitly reported by only a few member States, even though the AD for the non-energy use is readily available in the energy statistics (see the reference approach for CO₂). To further improve the coverage of the EC inventory, the ERT recommends that the EC encourage its member States to consider reporting these activities, where applicable. In addition, the ERT recommends that the EC indicate how feedstocks and non-energy use of all fuels are accounted for in the inventory, in the energy or industrial processes sector, and encourage its member States to do likewise.

Non-key categories

Other (mineral products) – CO₂

77. The NIR does not explicitly mention CO₂ emissions from glass production in Ireland, Sweden or the United Kingdom. The EC explained during the initial review that CO₂ emissions from glass production were included in other categories in Sweden and the United Kingdom and that Ireland had not yet estimated these emissions. The ERT notes that this does not comply with the UNFCCC reporting guidelines and recommends that the EC include this information in the NIR and encourage Ireland to estimate this category.

Solvent and other product use – CO₂

78. Three member States (Belgium, Germany and United Kingdom), representing 45 to 50 per cent of NMVOC emissions in this sector, do not report indirect CO₂ emissions. Moreover, the average ratio of CO₂ to NMVOC of member States’ reporting both emissions suggest an average carbon content of the NMVOC emissions of about 40 to 45 per cent, which is low compared to the default values found in recent emission factor guidebooks (e.g. 60 per cent).¹³ The ERT recommends that the EC describe in the

¹² The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

¹³ The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

NIR the assumptions used to estimate the CO₂ emissions, and add NMVOC emissions as AD in table 3.A-D, where applicable. With reference to the note to table 3, Sectoral Report, in the appendix of the UNFCCC reporting guidelines, although not mandatory, the EC might find it useful to consider including in the NIR the activities not (completely) considered in the inventory, and the reason for their exclusion when (partly) not reported. The ERT also encourages the EC to work with member States to add these activities, where applicable.

7. Agriculture

Sector overview

79. In the base year, emissions from agriculture were 434,595.65 Gg CO₂-eq., contributing 10.2 per cent to total EC emissions. Emissions decreased by 9.8 per cent from the base year to 2004, mainly due to EC/member State regulations which led to reductions in the number of cattle and in the use of nitrogen. CH₄ and N₂O emissions represented 42.1 and 57.9 per cent, respectively, of agriculture emissions, maintaining a fairly constant distribution through the time series.

80. The EC inventory is complete in terms of gases, categories, territories, number of member State submissions and use of notation keys. Transparency was significantly improved compared to the last submission as relevant information is included in the NIR. However, supporting information on agriculture driving forces (N regulations, milk production agreements and epidemic animal disease incidence) and explanations of unusual issues/trends should be included or expanded in the next submission. The key category analysis was performed at the subcategory level, giving a better focus on the most important issues.

81. Recalculations were performed to account for important shifts to higher tier methods, harmonization of animal categories and conceptual changes for agriculture soils. For the base year, CH₄ and N₂O emissions changed by -14.5 and +1.5 per cent, respectively. A sectoral tier 1 uncertainty analysis has been carried out and an improved methodology is under development. A sectoral QA/QC programme is in place, which starts with the electronic transfer of member State submissions to one file, followed by the performance of a series of internal checks and clarification with member States' experts to finalize consistency checks.

82. The main improvements since the last submission are the use of higher tiers for enteric fermentation (mainly non-dairy cattle), the streamlined process of data compilation, the inclusion of more category overview tables on methodological issues and relevant parameters, and graphical trend representations that facilitate comparisons between member States. Some minor issues of inconsistency, incompleteness and/or lack of transparency were found during the review process. During the review, the EC informed the ERT that most of these issues are resolved in the 2007 inventory. The ERT was also informed that the unusual values and trends obtained from member States' inventories that were highlighted during the review are being discussed with member States in order to resolve them.

Key categories

Enteric fermentation – CH₄

83. In the base year, CH₄ emissions from enteric fermentation amounted to 6,494.40 Gg, representing 31.4 per cent of EC agriculture emissions, with cattle and sheep (83.2 and 14.1 per cent,¹⁴ respectively) the main contributors. Eleven member States (representing 70.5 per cent¹⁵ of the EC emissions) use higher tier methods to estimate cattle emissions, while, for sheep, five member States (representing

¹⁴ The values provided are based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

¹⁵ The value provided is based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

65.7 per cent¹⁶ of the EC emissions) use higher tier methods. Emissions from the remaining animal species were estimated mainly applying tier 1 methods and default EFs, which is in line with the IPCC good practice guidance.

84. From 1990 to 2004, cattle emissions decreased by 10.7 per cent due mainly to a 14.3 per cent decrease in animal numbers, although the IEF increased by 4.16 per cent due to increased milk productivity. Sheep emissions decreased by 9.7 per cent in the same period reflecting the effect of the 10.7 per cent decrease in animal numbers, although the IEF increased by 3.4 per cent.¹⁷ AD come mainly from national statistics agencies, which is in line with the IPCC good practice guidance.

85. Some minor issues that need to be resolved are: (a) no information on how the Dutch cattle population was disaggregated at the EC level into dairy and non-dairy; (b) German buffalo and Luxembourg goat populations are included only from 2000 onwards, which could lead to underestimation of CH₄ emissions in the base year; (c) a very low IEF for poultry is reported and is a misleading value as only one member State reports poultry emissions. During the review the EC provided clarifications for all these issues. The ERT recommends that the EC include these clarifications in its next NIR.

Manure management – CH₄

86. In the base year, this category emitted 2,111.37 Gg CH₄, representing 10.2 per cent of sectoral emissions; the main contributors were cattle and swine (52.2 and 41.2 per cent,¹⁸ respectively). Twelve member States (representing 61.3 per cent¹⁹ of the EC emissions) estimated cattle emissions using higher tier methods while eleven member States (representing 74.2 per cent²⁰ of the EC emissions) use higher tier methods for swine. Emissions from the other animal species were estimated mainly applying tier 1 and default EFs, which is in line with the IPCC good practice guidance.

87. Cattle emissions decreased by 12.3 per cent from 1990 to 2004, supported by a 14.3 per cent reduction in animal numbers and a 2.3 per cent increase in IEF values mainly due to changes in animal allocation to AWMS. Swine emissions increased by 13.9 per cent due to IEF increases, mainly in Sweden and Finland. AD come mainly from national statistics agencies and are regularly collected, which is in line with the IPCC good practice guidance.²¹

Agricultural soils – N₂O

88. In the base year, this category emitted 729.99 Gg N₂O, representing 52.1 per cent of sectoral emissions and making it the largest category in the sector. The contributions of “direct”, “indirect” and “pasture, range and paddock manure” emissions are 51.2, 35.5 and 12.7 per cent,²² respectively.

¹⁶ The value provided is based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

¹⁷ The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

¹⁸ The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

¹⁹ The value provided is based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

²⁰ The value provided is based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

²¹ The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

²² The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

89. From 1990 to 2004, direct emissions decreased by 11.3 per cent as a result of the EC nitrogen regulations. The main subcategory is synthetic fertilizers, contributing 53.0 per cent to direct soil emissions. Except for crop residues and other, emissions have decreased in the period. Although a key category for the EC, only three member States (representing 15 per cent of the direct soil emissions (4.D.1)) use higher tier methods, the reason given being that no tier 2 methods are available in the Revised 1996 IPCC Guidelines.²³

90. Pasture, range and paddock manure, and indirect emissions decreased by 9.0 per cent and 13.5 per cent, respectively, in the period, also due to the EC nitrogen regulations. For pasture, range and paddock manure, four member States (representing 12.2 per cent of emissions from this subcategory) use higher tier methods. For indirect emissions, N-leaching and run-off is almost 5 times more important than atmospheric deposition, but both subcategories are showing a decreasing trend. Eleven member States (representing 71 per cent of pasture, range and paddock manure emissions and 82.1 per cent of indirect emissions) apply country-specific methods.²⁴

91. Some minor issues that need to be corrected, are: (a) not enough information in the NIR, on national or regional nitrogen regulations; (b) AD and IEFs for N-fixing crops and crop residues are reported as NE in the CRF although they are reported in the NIR ; (c) the United Kingdom IEF for N-leaching and run-off is 1,000,000 times the IPCC default value (25,000 compared to 0.025); (d) the unusual trend in Sweden of $Frac_{GASM}$ and $Frac_{GASF}$ (there is a need to explain the steep increase of 12.1 per cent from 1995 to 1996 for $Frac_{GASM}$, which continues until 2000, and the increase by 81.6 per cent from 1990 to 1994 followed by a decrease until 1999 for $Frac_{GASF}$).²⁵ During the review the EC informed the ERT that the issues referred to under (b) and (c) have been clarified in the 2007 submission. In addition, the EC provided an explanation for the trend in Sweden for $Frac_{GASM}$ and $Frac_{GASF}$. The ERT recommends that the EC include these clarifications in its next NIR.

Non-key categories

Manure management – N_2O

92. Base year emissions amounted to 80.85 Gg N_2O , corresponding to 5.8 per cent of sectoral emissions; the main contributor being solid storage and dry lot (93 per cent²⁶ of manure management N_2O emissions). The majority of the member States applied tier 1 methods along with country-specific N excretion rates, which is in line with the IPCC good practice guidance.

93. Emissions decreased by 11.0 per cent between 1990 and 2004, reflecting the impact of national and/or regional regulations on nitrogen in agriculture. AD were mainly derived from national statistics agencies and supported with published data and expert judgement.

94. Some minor issues that need to be resolved, are: (a) Italy reports “NA” as the IEF for other in the period 1990–1994; (b) Sweden’s N excretion rates for dairy and non-dairy cattle are seem to be a factor of 1000 higher (100,041.48 and 39,332.75 kg N/head/yr, respectively) than the correct values; (c) buffalo nitrogen excretion rates for 1990, 1995 and 2002 (342.8; 286.6; 107.1 kg N/head/yr, respectively) differ significantly from the IPCC default values for cattle in Western Europe (70–100 kg N/head/yr).²⁷

²³ The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

²⁴ The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

²⁵ The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

²⁶ The value provided is based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

²⁷ The values provided are based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

During the review the EC provided the ERT with further information on issues referred to under (a) and (c). In addition, the EC informed the ERT that the error in Swedish N-excretion rates referred to under (b) will be corrected in the 2008 submission. The ERT recommends that the EC include these clarifications in its next NIR.

8. Land use, land-use change and forestry

Sector overview

95. In the base year, CO₂ removals from the LULUCF sector totalled –205,901.11 Gg, while CH₄ and N₂O emissions were 1,234.79 Gg and 3,555.73 Gg CO₂ eq., respectively. On average, in the period between 1990 and 2004 CO₂ removals increased at a rate of 2.3 per cent per year while CH₄ and N₂O emissions decreased at a rate of about 2.9 per cent and 0.3 per cent per year, respectively. Overall, LULUCF is a net CO₂ sink for the EC. The LULUCF sector offset about 4.8 per cent of the total EC emissions in the base year.

96. The EC inventory is complete in term of gases, categories, territories and number of member State submissions (except for Luxembourg's category split) and the use of notation keys. However, the notation keys not occurring ("NO") or not estimated ("NE") may be used interchangeably with 0 by some member States. The ERT recommends that the EC work with member States to ensure consistent use of notation keys in this sector.

97. Large differences in IEFs among member States were found in some source/sink subcategories. The ERT recommends that to increase transparency, the EC include in subsequent NIRs additional information, including references to supporting documents, that explains the big differences. In response to the draft review report, the EC stated that in its next submission it will make every effort to provide more information to explain the differences in IEFs among member States.

98. The many methodological improvements to and revisions of AD, as well as the use of new or improved EFs led the member States to make a number of recalculations. For the base year, after recalculation, CO₂ removals at the EC level decreased by 6.3 per cent (13,999.20 Gg CO₂ eq.), CH₄ emissions increased by 594.3 per cent (1,063.04 Gg CO₂ eq.) and N₂O emissions increased by 2,566.1 per cent (3,420.63 Gg CO₂ eq.) from the previous (2005) submission.

99. A sectoral QA/QC programme is in place, which involves the electronic transfer of member State submissions to a single file, the performance of a series of internal checks using outlier detection and sending the findings to member States for clarification to finalize consistency checks.

100. Sources of uncertainties in carbon removals have been reported. Estimates of uncertainty at member State level were provided in the NIR, but no uncertainty estimates are provided at the EC level. A programme for the improvement of the LULUCF inventory is in place. A number of workshops and projects have been implemented. A web-based database called AFOLU DATA to store all research outputs related to AD and EFs is under development. The AFOLU DATA website can be accessed by the inventory team of each member State to assist with inventory improvements. The ERT encourages the EC to further improve the accessibility of this information and to encourage member States to use the information.

Key categories

Forest land remaining forest land – CO₂

101. In the base year, the removal of CO₂ from forest land remaining forest land was 248,629.52 Gg. Approximately 91 per cent of the CO₂ removals by forest land remaining forest land was reported by six countries: Germany, Italy, France, Finland, Spain and Sweden. The IEFs of living biomass used by Germany and Italy were much higher than those of France, Finland and Sweden and this leads to much

higher reported carbon removal in Germany and Italy, even though forest area in these two countries is smaller than in Finland and Sweden. The EC LULUCF inventory team explained that in the first two countries, the area of forest being harvested was limited unlike the other two countries. In addition, in central Europe forests are now growing faster mainly because of past management effects. Most forests are relatively young, that is, they are still in an exponential growth phase and are recovering from past overexploitation. Nitrogen deposition is also a contributing factor. The ERT recommends that the EC provide these explanations in the next NIR together with references to supporting data and documentation.²⁸

Land converted to forest land – CO₂

102. In the base year, 39,119.44 Gg of CO₂ was removed by land converted to forest land. About 91 per cent of CO₂ removals from this subcategory come from four countries: Italy, France, Sweden and the United Kingdom. A minor issue that needs to be clarified is that conversion of land to forest land in Sweden leads to a soil carbon decrease, unlike in other member States (e.g. France, Italy and United Kingdom). Normally, converting land to forest will lead to soil carbon increases. The ERT recommends that the EC provide an explanation of this issue in its next NIR.²⁹

Land converted to cropland – CO₂

103. In the base year, the CO₂ emissions from land converted to cropland totalled 39,825.95 Gg. France and the United Kingdom contributed about 98 per cent of the total CO₂ emissions from this subcategory. A minor issue that needs to be clarified is that the IEFs for soil carbon used by France and the United Kingdom are very different. The IEFs for soil carbon for the United Kingdom for forest converted to cropland and grassland converted to cropland for the base year were –0.05 Mg C/ha and –0.02 Mg C/ha, respectively, while for France they were –1.64 Mg C/ha and –1.66 Mg C/ha, respectively. This leads to much higher removals from this category in France. In order to increase transparency, the ERT recommends that the EC provide additional explanations and references to supporting documents to clarify the big differences in the IEFs used by member States.³⁰

Land converted to grassland – CO₂

104. In the base year, conversion of land to grassland resulted in CO₂ removals of 16,562.47 Gg, mainly by the soils. Of this amount, France and the United Kingdom contributed about 97 per cent. A minor issue that needs to be clarified is that the IEFs for soil carbon used by France and the United Kingdom for soils in the conversion of forest land to grassland and cropland to grassland as well as settlements converted to grassland are very different, particularly for cropland converted to grassland and settlements converted to grassland. France reported no change in soil carbon from settlements converted to grassland, while in the United Kingdom the IEF is quite high (1.42–1.61 Mg C/ha). No explanation is provided for such differences. In order to increase transparency, the ERT recommends that the EC provide additional explanations and references to supporting documents to clarify the big differences in the IEFs used by member States. In addition, some member States used very different IEFs for the same subcategory, and the ERT recommends that the EC provide further explanation of this issue.³¹

²⁸ The values provided are based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

²⁹ The values provided are based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

³⁰ The values provided are based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

³¹ The values provided are based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

Non-key categories

Land converted to settlements – CO₂

105. In the base year, CO₂ emissions from conversion of land to settlements totalled 12,868.43 Gg eq.³² However, in some member States, such as the Netherlands and Sweden, land converted to settlements did not lead to CO₂ emissions, while other countries reported emissions from this category. In response to the draft review report, the EC stated that from its next submission it will make all possible efforts to provide more information on the causes of differences among member States in emissions from land converted to settlements.

9. Waste

Sector overview

106. In the base year, GHG emissions from the waste sector, expressed as 174,967.54 Gg CO₂ eq., represented 4.1 per cent of total emissions in the EC. Solid waste disposal on land, wastewater handling, waste incineration, and other accounted for 83.6, 12.7, 3.4, and 0.3 per cent, respectively, of total emissions from the waste sector. The emissions have decreased steadily and by 2004 were 35.6 per cent lower than in the base year. Solid waste disposal on land was responsible for 94.8 per cent of the total reduction in this sector. One major driving force for the reduction of CH₄ emissions from solid waste disposal on land is the European Landfill Directive.

Key categories

Managed solid waste disposal on land – CH₄

107. All EU-15 member States except Luxembourg applied the tier 2 methodology or its modified version reflecting country-specific conditions in accordance with the IPCC good practice guidance. During the review the EC informed the ERT that Luxembourg submitted revised estimates during its initial review calculated using a tier 2 methodology. Waste management practices and statistics in Member States have evolved historically based on country-specific circumstances such as waste composition, political decisions and statistical systems. For that reason, historical data sets and parameters used for emissions estimation are difficult to harmonize. The EU Waste Statistics Regulation may lead to more harmonized waste data in the future. The ERT acknowledges these planned improvements.

Unmanaged solid waste disposal on land – CH₄

108. Six member States (France, Greece, Ireland, Italy, Portugal and Spain) reported CH₄ emissions from unmanaged solid waste disposal on land in the base year. All six member States applied the tier 2 methodology in line with the IPCC good practice guidance. Little information is available in the NIR on methodologies used and key parameters. The ERT recommends that the EC provide more information in future NIR submissions.

Wastewater handling – CH₄

109. All EU-15 member States except Luxembourg and Sweden reported CH₄ emissions from domestic and commercial wastewater handling in the base year in accordance with the IPCC good practice guidance. During the review the EC informed the ERT that Luxembourg had submitted during its initial review CH₄ emission estimates for domestic and commercial wastewater handling. Five

³² The value provided is based on the EC's inventory submission of 2 February 2007. See footnote 3 for further information.

member States (Portugal, Greece, Germany, Italy and Spain) accounted for 82.6 per cent³³ of CH₄ emissions from this subcategory in the base year. Portugal and Greece exhibited high emission rates in comparison with the other member States. Sweden reported emissions from domestic and commercial wastewater handling as included elsewhere (“IE”) and reported under solid waste disposal on land because of sludge disposal to land. Sweden neglected CH₄ emissions from the wastewater treatment process. The ERT recommends that the EC improve its explanation of the abovementioned issues in future NIRs.

Wastewater handling – N₂O

110. All EU-15 member States except Luxembourg reported the emissions of N₂O from domestic and commercial wastewater handling in the base year in accordance with the IPCC good practice guidance. During the review the EC informed the ERT that Luxembourg had submitted during its initial review N₂O emission estimates for domestic and commercial wastewater handling. Five member States (Germany, Spain, United Kingdom, France and Italy) accounted for 77.0 per cent³⁴ of N₂O emissions from this subcategory. Some member States have adopted country-specific per capita protein consumption factors, which are usually much lower than the Food and Agriculture Organization (FAO) of the United Nations factors adopted by most EU-15 member States. It would be recommendable for the 15 member States to harmonize the methodology used to determine the per capita protein consumption factor. However, the ERT admits that it would be quite difficult to develop a common approach to the selection of per capita protein consumption factor at this time.

Non-key categories

Waste incineration – CH₄

111. Nine member States reported CO₂ emissions from waste incineration in the base year in accordance with the IPCC good practice guidance. Some of these member States (Austria, Finland, Italy and Portugal) reported CH₄ emissions from waste incineration, whereas the others did not. The ERT encourages the EC to work with member States to harmonize the estimation of CH₄ emissions in this category.

Wastewater handling – CH₄

112. Eight member States reported CH₄ emissions from industrial wastewater in the base year. Some member States reported these emissions as not estimated (“NE”), leading to an underestimation of CH₄ emissions from this subcategory. Little information is available on the methodologies and key parameter values. The ERT recommends that the EC provide more information in the NIR on the methodologies and IEF values reported by the member States.

Other – CH₄

113. In the base year, 10 member States reported CH₄ emissions in the category other. These amounted to 325.53 Gg CO₂ eq. Nine of these member States identified composting as a major source of CH₄ in this category, the exception being Portugal which reported the open burning of industrial solid wastes under this category. Germany and France also reported CH₄ emissions from biogas production. The ERT encourages the EC to provide more information in the NIR on the emission data of the member States as well as the methodologies applied.

³³ The value provided is based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

³⁴ The value provided is based on the EC’s inventory submission of 2 February 2007. See footnote 3 for further information.

C. Calculation of the assigned amount

114. The assigned amount pursuant to Article 3, paragraphs 7 and 8, is calculated in accordance with the annex to decision 13/CMP.1.

115. The EC's base year is 1990. Since the EC's inventory is reported as being identical to the sum of the 15 Member States inventories, the EC has also defined its emission target and base year as the aggregate of those of its 15 member States. Thus, instead of using one common base year for all F-gas emissions, the EC has chosen 1995 as base year for HFCs, PFCs and SF₆, except for the three member States (Austria, France and Italy) that selected 1990 for these gases for the purposes of the calculation of their assigned amount. The EC's quantified emission limitation is 92 per cent as included in Annex B to the Kyoto Protocol.

116. Land-use change and forestry constituted a net source of GHG emissions in 1990 in three member States: the Netherlands (280,212 t), Portugal (973,829 t) and the United Kingdom (365,593 t). During the respective initial reviews, net GHG emissions from deforestation have been adjusted for the Netherlands (38,676 t) and revised for Portugal (981,203 t); for Ireland, net GHG emissions from deforestation have been identified (4,719 t). The EC's aggregate anthropogenic CO₂ eq. emissions by sources minus removals by sinks in 1990 from land-use change (deforestation) calculated by the EC as the sum of these four member States' emissions is 1,390,191 tonnes CO₂ eq. The ERT notes that the EC as a whole had total net LULUCF removals in the base year. This amount is included in the base year emissions for the purpose of the calculation of the assigned amount.

117. Based on the EC's base year emissions (being the sum of the base year emissions of the 15 member States) including land-use change, 4,278,814,845 Gg CO₂ eq., and its Kyoto Protocol target (92 per cent), the Party calculates its assigned amount to be 19,682,548,287 tonnes CO₂ eq.

118. In response to inventory issues identified during the review the EC submitted revised estimates of its base year inventory, based on updated base year emissions for 12 of its 15 member States and a correction of GHG emissions of the United Kingdom (for the geographical area that is excluded in the EC's territorial definition for the Kyoto Protocol). This has resulted in a recalculation of the assigned amount. Based on the revised estimates for the base year, including emissions from deforestation (4,265,517,719 t CO₂ eq.), the EC calculates its assigned amount to be 19,621,381,509 tonnes CO₂ eq. The ERT agrees with this figure.

119. The ERT notes that the result of this calculation differs from the sum of the 15 member States' assigned amounts by +19,357,532 tonnes CO₂ eq. The ERT notes that the difference arises because of changes to the base year emission estimates of member States made since the agreement entered into force under Article 4 of the Kyoto Protocol.

D. Calculation of the commitment period reserve

120. The calculation of the required level of the commitment period reserve is in accordance with paragraph 6 of the annex to decision 11/CMP.1.

121. In response to inventory issues identified during the review the Party submitted revised estimates of its base year inventory, which resulted in a recalculation of the commitment period reserve. Based on the revised estimates, the Party calculates its commitment period reserve to be 17,659,243,358 tonnes CO₂ eq. The ERT agrees with this figure.

E. National registry

122. In its initial report, the EC partially provided the information on the national registry system required by the reporting guidelines under Article 7, paragraphs 1 and 2, of the Kyoto Protocol (decision 15/CMP.1). The information provided is broadly transparent and in accordance with these

reporting guidelines requirements. However, the ERT noted that the initial report did not provide the following information: (a) the name of the Registry Administrator; (b) a full list of publicly accessible information; (c) a description of measures to safeguard, maintain and recover data in the event of disaster; and (d) a description of the database structure and capacity.

123. During the initial review, the ERT was provided with the name of the Registry Administrator, a more complete list of publicly accessible information, the software and hardware structure, a description of measures to safeguard, maintain and recover data in the event of disaster and a description of the database structure and capacity. The ERT recommends that the EC provide a complete description of the national registry, as required by the reporting guidelines under Article 7, paragraphs 1 and 2, of the Kyoto Protocol (decision 15/CMP.1), in its next inventory report under the Kyoto Protocol.

124. During the initial review, the ERT was provided with additional and updated information on the administrative structure and staffing of the registry, as well as the operating structure and relationship to the Community independent transaction log (CITL).

125. Table 7 summarizes the information on the mandatory reporting elements of the national registry system, as stipulated by decisions 13/CMP.1 and 5/CMP.1.

126. After the in-country visit, the ERT was informed that the internal operational test of the registry for network connectivity was completed on 9 November 2007. The initialization process was completed by 1 February 2008 and the registry is able to be fully operational at any time. Information on the registry will be publicly available through <http://ec.europa.eu/environment/ets/>. For the time being this website is providing publicly available information under the EU Emissions Trading System (ETS).

127. During the initial review the ERT was informed about the procedures and security measures to minimize discrepancies, terminate transactions and correct problems, and minimize operator error. These procedures and security measures will be the same as developed for the EU-ETS and include communications between the national registry and the ITR, validation of entries using ITR checklists, internal earmarking of units, receipt of acknowledgement messages to allow the continuation of a transaction or termination of a transaction if this acknowledgement receipt message is not received, and rolling back of the process. To minimize operator error, the following measures will be in place: access via username and password, actions controlled by a permissions system, all actions recorded by audit, database manipulations only carried out by protected and internally stored procedures, and access to a help desk.

128. The ERT acknowledged the effort made by the EC to put in place adequate procedures and security measures. In particular, the ERT noted that the data included in the national registry will be stored in parallel in two servers in two different locations, thus preventing data losses in the event of a disaster.

Table 7. Summary of information on the national registry system

Reporting element	Provided in the initial report	Comments
Registry administrator		
Name and contact information	No	Provided during the ICR
Cooperation with other Parties in a consolidated system		
Names of other Parties with which the EC cooperates, or clarification that no such cooperation exists.	Yes	EC-NR not operated in a consolidated system with any other Party's registry
Database structure and capacity of the national registry		
Description of the database structure	No	Provided during the ICR and Covered in the Independent Assessment Report (IAR) ^a
Description of the capacity of the national registry	No	Provided on a qualitative basis during the ICR
Conformity with data exchange standards (DES)		
Description of how the national registry conforms to the technical DES between registry systems	Yes	Software adheres to the standards (UN DES Draft 7) and to the functionality (UN DES Draft 7)
Procedures for minimizing and handling of discrepancies		
Description of the procedures employed in the national registry to minimize discrepancies in the transaction of Kyoto Protocol units	Yes	Additional information provided during the ICR. Same approach as for the EU ETS will be adopted
Description of the steps taken to terminate transactions where a discrepancy is notified and to correct problems in the event of a failure to terminate the transaction	Yes	Additional information provided during the ICR
Prevention of unauthorized manipulations and operator error		
An overview of security measures employed in the national registry to prevent unauthorized manipulations and to prevent operator error	Yes	Additional information provided during the ICR and covered in the IAR
An overview of how these measures are kept up to date	No	Information provided during the ICR
User interface of the national registry		
A list of the information publicly accessible by means of the user interface to the national registry	Partially	A list of documents has still to be developed. Information completed during the ICR and covered in the IAR
The Internet address of the interface to EC's national registry	Yes	< http://ec.europa-eu/environment/ets/ >
Integrity of data storage and recovery		
A description of measures taken to safeguard, maintain and recover data in order to ensure the integrity of data storage and the recovery of registry services in the event of a disaster	No	Provided during the ICR and covered in the IAR
Test results		
The results of any test procedures that might be available or developed with the aim of testing the performance, procedures and security measures of the national registry undertaken pursuant to the provisions of decision 19/CP.7 relating to the technical standards for data exchange between registry systems	No	Software was tested and passed initialisation testing with the ITL. Covered in the IAR

^a Pursuant to decision 16/CP.10, once registry systems become operational, the administrator of the international transaction log (ITL) is requested to facilitate an interactive exercise, including with experts from Parties to the Kyoto Protocol not included in Annex I to the Convention, demonstrating the functioning of the ITL with other registry systems. The results of this exercise will be included in an independent assessment report (IAR). They will be also included in its annual report to the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol.

129. The ERT gained the overall impression that the EC attached adequate importance, and allocated adequate resources, including human resources, to the development, operation and maintenance of the registry. The ERT took note that the EC has a supplementary transaction log for the EU ETS, but that the EC national registry under the Kyoto Protocol is still under development. (Development is now concluded and the registry software has passed initialization testing with the ITL.) The software, called community registry system “CRS”, has been developed by the developers of CITL and ITL, which should ensure consistency between the registries.

130. The ERT took note of the results of the technical assessment of the national registry, including the results of standardized testing, as reported in the independent assessment report (IAR) that was forwarded to the ERT by the administrator of the international transaction log, pursuant to decision 16/CP.10, on 1 February, 2008. The IAR identified some minor issues concerning documentation, and the Party informed the ERT that it will rectify these issues before the registry is fully operational with the ITL.

131. The ERT reiterated the main findings of this report, including that the registry has sufficiently fulfilled its obligations regarding conformity with the data exchange standards (DES). These obligations include having adequate transaction procedures, adequate security measures to prevent and resolve unauthorized manipulations and adequate measures for data storage and registry recovery.

132. The IAR identified some minor limitations in the state of registry readiness, including the following: no evidence was provided to demonstrate that an adequate level of logging was provided by the application; little evidence was provided for successful operation of backup activities and security management; little evidence was provided as to how the test plan had been modified to test changes since the original test plan had been produced and no evidence was provided to demonstrate that tests were completed successfully; little evidence was provided concerning operational change management and how this process would be managed.

133. Based on the results of the technical assessment, as reported in the IAR, the ERT concluded that the EC’s national registry is sufficiently compliant with the registry requirements as defined by decisions 13/CMP.1 and 5/CMP.1, noting that registries do not have obligations regarding operational performance or public availability of information prior to the operational phase.

F. Land Use, Land-use Change and Forestry parameters and election of activities

134. All member States have provided threshold values for forest definition which are within the range of values defined under Article 3, paragraph 3, of the Kyoto Protocol. The values selected by the member States are within the following range: (a) crown cover between 10 m and 30 m; (b) land area between 0.05 ha and 1.00 ha; and (c) minimum tree height between 2 m and 5 m, and these are consistent with those reported to the FAO. In addition, some member States defined forest width in their forest definition which is in the range of 9–30 m. For election of activities under Article 3, paragraph 4, 10 member States have selected one or more activities. Table 2 above shows the choices of parameters for forest definition as well as elections for Article 3, paragraphs 3 and 4, activities and accounting periods for the 15 member States in accordance with decision 16/CMP.1.

135. As is noted above, in the EC initial report Greece is listed as not having decided on its election of activities under Article 3, paragraph 4, of the Kyoto Protocol. The EC provided the ERT with the missing information during the review.

III. Conclusions and recommendations

A. Conclusions

136. The information provided in the initial report is structured in accordance with the requirements for the initial report described in paragraphs 5, 6, 7 and 8 of the annex to decision 13/CMP.1, section I of the annex to decision 15/CMP.1 and relevant decisions of the CMP.

137. Taking into account that the EC's GHG inventory is a compilation of member State's inventories, the EC's GHG inventory information is generally consistent with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. As part of its initial report, the EC submitted a complete set of CRF tables for the years 1990–2004 and a comprehensive NIR. The inventory covers all categories for the entire period 1990–2004 and it is complete in terms of geographic coverage.

138. Based on the EC's base year emissions (4,265,517,719 tonnes CO₂ eq., including the revised estimates provided during the review) and its Kyoto Protocol emission limitation commitment of 92 per cent, the Party calculates its assigned amount to be 19,621,381,509 tonnes CO₂ eq. and its commitment period reserve to be 17,659,243,358 tonnes CO₂ eq. The ERT agrees with these figures.

139. The ERT did not recommend any adjustments to the EC GHG inventory, and notes that the assigned amount and commitment period reserve, as calculated to include revised estimates during the review, are in accordance with the modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol and decision 11/CMP.1.

140. The EC has also identified all required information on parameters and elections for LULUCF under Article 3, paragraph 3, of the Kyoto Protocol in accordance with decision 16/CMP.1. The EC's parameters to define forest are the choices of the member States and all fall within the ranges for minimum tree crown cover, minimum land area and minimum tree height as stipulated in decision 16/CMP.1. Similarly, the election of activities under Article 3, paragraph 4, activities and the accounting period for activities under Article 3, paragraphs 3 and 4, reflect those of the member States. Five member States (Austria, Belgium, Ireland, Luxembourg and Netherlands) have not elected any activities under Article 3, paragraph 4; seven member States (Finland, France, Germany, Greece, Italy, Sweden and United Kingdom) have elected only forest management; one member State (Spain) has elected forest management and cropland management; and two member States (Denmark and Portugal) have elected forest management, cropland management and grazing land management. All member States except two (Denmark and France) have selected commitment period accounting for activities under Article 3, paragraph 3, and any elected activities under Article 3, paragraph 4.

141. The EC's national system meets the requirements of the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol and can perform the general and specific functions required by these guidelines. It is reported in accordance with the guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol.

142. Based on the results of the in-country review visit and the technical assessment, as reported in the IAR, the ERT concluded that the EC's national registry is sufficiently compliant with the registry requirements as defined by decisions 13/CMP.1 and 5/CMP.1. The reported information is broadly transparent and in accordance with the requirements of the guidelines.

B. Recommendations

143. In the course of the review, the ERT formulated a number of recommendations relating to the completeness and transparency of the EC's information presented in the initial report including in the 2006 GHG inventory submission. The key recommendations³⁵ are that the EC:

- Take more of a leadership role regarding recommendations to member States on priority setting for improving the overall quality of the member States' inventories across all sectors (relating to AD, EFs and methods) and hence further improve the quality of the EC inventory. This could be done by enhancing the objectives and tasks of Working Group 1 'Annual Inventories' established under the EC's Climate Change Committee, and by building this into the inventory improvement plan with priorities both at EC and member State level;
- Work with member States to fill all remaining gaps in the EC inventory, including providing similar quantitative AD in the industrial processes sector and encouraging member States to improve the geographic coverage at EC level of non-mandatory categories;
- Continue to separate the information for the EU-15 from the other member States in future NIRs in order to facilitate future reviews under the Kyoto Protocol;
- Provide the missing information on, and any possible changes to, the national registry, as required by the reporting guidelines under Article 7, paragraphs 1 and 2, of the Kyoto Protocol (decision 15/CMP.1) in the next inventory report under the Kyoto Protocol;
- Improve transparency in the NIR by including additional explanations of and references to supporting documentation for key categories to clarify the big differences in the IEFs of member States whenever these occur in the inventory (including in the LULUCF sector), and by providing: the underlying data required to assess time-series consistency for key categories and to reconstruct emission trends (e.g. subtypes of technology or livestock and fraction of emissions abated by specific emission control measures); the share of emissions of a key category calculated using higher tier methods, including the equivalent tier of country-specific methods; and the share of emissions using country-specific or source-/plant-specific EFs;
- Rectify the minor issues concerning documentation identified in the IAR before the national registry is fully operational with the ITL.

144. The ERT believes that the following topics should be examined in depth in future reviews: the comparability and justification of outlying IEF values of key categories within the 15 member States; and the trend of member State emissions for categories with AD reported as confidential.

145. Future reviews should also check member States' inventories on the reporting of 'new' categories/activities by one or some member States and then check whether reporting of these categories/activities is also applicable to other member States, since consistency and completeness may warrant application of these methods to other member States given that any continued omission of these categories/activities will probably lead to an underestimation of emissions at the EC level.

C. Questions of implementation

146. No questions of implementation have been identified by the ERT during the initial review.

³⁵ For a complete list of recommendations, the relevant sections of this report should be consulted.

Annex I**Documents and information used during the review****Reference documents**

- IPCC. Good practice guidance and uncertainty management in national greenhouse gas inventories, 2000. Available at: <<http://www.ipcc-nggip.iges.or.jp/public/gp/english/>>.
- IPCC. Good practice guidance for land use, land-use change and forestry, 2003. Available at: <<http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>>.
- IPCC/OECD/IEA. Revised 1996 IPCC Guidelines for national greenhouse gas inventories, volumes 1–3, 1997. Available at: <<http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>>.
- UNFCCC. 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/2004/8. Available at: <<http://unfccc.int/resource/docs/2004/sbsta/08.pdf>>.
- UNFCCC. Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention. FCCC/CP/2002/8. Available at: <<http://unfccc.int/resource/docs/cop8/08.pdf>>.
- UNFCCC. Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol. FCCC/KP/CMP/2005/8/Add.3. Available at: <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>>
- UNFCCC. Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol. FCCC/KP/CMP/2005/8/Add.2. Available at: <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>>
- UNFCCC. Guidelines for review under Article 8 of the Kyoto Protocol. FCCC/KP/CMP/2005/8/Add.3. Available at: <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>>
- UNFCCC secretariat. Status report for the European Community. 2006. Available at: <<http://unfccc.int/resource/docs/2006/asr/ec.pdf>>.
- UNFCCC secretariat. Synthesis and assessment report on the greenhouse gas inventories submitted in 2006. FCCC/WEB/SAI/2006. Available at: http://unfccc.int/resource/docs/webdocs/sai/sa_2006.pdf.
- UNFCCC secretariat. The European Community: Report of the individual review of the greenhouse gas inventory submitted in the year 2005. FCCC/WEB/IRI/2005/EC. Available at: <<http://unfccc.int/resource/docs/2005/arr/ec.pdf>>.
- UNFCCC secretariat. The European Community: Independent assessment report of the national registry of the European Community. Reg_IAR_EC_2007_1. Will be available at: <www.unfccc.int>.

Additional information provided by the Party

Responses to questions during the review were received from Ms. Erasmia Kitou (EC), Mr. Bernd Gugele (EEA/ETC ACC), including additional material on the methodology and assumptions used.

CEC Report from The Commission: Progress Towards Achieving the Kyoto Objectives (required under Decision 280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol), 27.10.2006. COM(2006) 658 final.

EEA, Greenhouse gas emission trends and projections in Europe 2006. European Environment Agency, 2006, EEA Report No 9/2006, ISBN 92-9167-885-6.

Quality Management System, European Community Greenhouse Gas Inventory. European Environment Agency, European Topic Centre on Air and Climate Change.

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
EC	European Community
EF	emission factor
ERT	expert review team
EU	European Union
F-gas	fluorinated gas
Gg	gigagram (1 Gg = 10 ⁹ grams)
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
GJ	gigajoule (1 GJ = 10 ⁹ joule)
GWP	global warming potential
HFCs	hydrofluorocarbons
IAR	independent assessment report
IEF	implied emission factor
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1 thousand grams)
LULUCF	land use, land-use change and forestry
Mg	megagram (1 Mg = 1 tonne)
Mt	million tonnes
NA	not applicable
N ₂ O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10 ¹⁵ joule)
QA/QC	quality assurance/quality control
SF ₆	sulphur hexafluoride
Tg	teragram (1 Tg = 1 million tonnes)
TJ	terajoule (1 TJ = 10 ¹² joule)
UNFCCC	United Nations Framework Convention on Climate Change
