



**Report of the individual review of the annual submission of France  
submitted in 2010**

**Note by the secretariat**

The report of the individual review of the annual submission of France submitted in 2010 was published on 19 May 2011. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2010/FRA, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.





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

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## I. Introduction and summary

1. This report covers the review of the 2010 annual submission of France, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 13 to 18 September 2010 in Paris, France, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Ms. Anke Herold (Germany); energy – Mr. Marc Schuman (Luxembourg); industrial processes – Mr. Menouer Boughedaoui (Algeria); agriculture – Mr. Chang Liang (Canada); land use, land-use change and forestry (LULUCF) – Mr. Daniel Martino (Uruguay) and Mr. Nalin Srivastava (India); and waste – Mr. Faouzi Senhaji (Morocco). Ms. Herold and Mr. Martino were the lead reviewers. The review was coordinated by Mr. Vitor Gois Ferreira (UNFCCC secretariat).

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

3. In 2008, the main greenhouse gas (GHG) in France was carbon dioxide (CO<sub>2</sub>), accounting for 74.1 per cent of total GHG emissions<sup>1</sup> expressed in CO<sub>2</sub> eq, followed by nitrous oxide (N<sub>2</sub>O) (12.3 per cent) and methane (CH<sub>4</sub>) (10.4 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>) collectively accounted for 3.1 per cent of the overall GHG emissions in the country. The energy sector accounted for 71.3 per cent of total GHG emissions, followed by the agriculture sector (18.6 per cent), the industrial processes sector (7.7 per cent), the waste sector (2.2 per cent) and the solvent and other product use sector (0.2 per cent). Total GHG emissions amounted to 528,089.71 Gg CO<sub>2</sub> eq and decreased by 6.2 per cent between the base year<sup>2</sup> and 2008.

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector, respectively. In table 1, CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

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

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<sup>1</sup> In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> eq excluding LULUCF, unless otherwise specified.

<sup>2</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year emissions include emissions from Annex A sources only.

Table 1  
**Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year to 2008<sup>a,b</sup>**

	Greenhouse gas	Base year <sup>a</sup>	Gg CO <sub>2</sub> eq							Change Base year–2008 (%)	
			1990	1995	2000	2005	2006	2007	2008		
Annex A sources	CO <sub>2</sub> <sup>b</sup>	395 719.12	395 719.12	393 613.87	407 346.93	419 518.99	405 705.88	395 889.86	391 242.71	-1.1	
	CH <sub>4</sub>	65 485.01	65 485.01	65 830.83	61 502.67	56 100.68	55 294.15	55 102.54	55 117.56	-15.8	
	N <sub>2</sub> O	92 024.05	92 024.05	89 532.93	76 978.83	67 094.58	64 745.85	64 173.37	65 184.57	-29.2	
	HFCs	3 696.83	3 696.83	3 188.55	7 392.17	12 373.65	13 559.85	14 397.87	15 284.35	313.4	
	PFCs	4 293.45	4 293.45	2 561.81	2 486.86	1 430.37	1 166.58	920.20	553.84	-87.1	
	SF <sub>6</sub>	2 021.82	2 021.82	2 243.89	1 587.85	1 009.10	877.75	758.53	706.70	-65.0	
KP-LULUCF	Article 3.3 <sup>c</sup>	CO <sub>2</sub>							4 561.59		
		CH <sub>4</sub>							329.20		
		N <sub>2</sub> O							96.62		
	Article 3.4 <sup>d</sup>	CO <sub>2</sub>	NA							-84 461.81	NA
		CH <sub>4</sub>	NA							578.60	NA
		N <sub>2</sub> O	NA							61.74	NA

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

<sup>a</sup> “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The “base year” is not applicable for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol for France.

<sup>b</sup> The table does not reflect the adjusted estimates for the category CH<sub>4</sub> emissions from managed solid waste disposal on land in the waste sector (see chapter II.G below) after adjustment procedures under decision 20/CMP.1 were applied. It reflects the estimates contained in the 22 October 2010 submission that was subject to these adjustments. The adjustments lead to an increase in total GHG emissions for 2008 of 8,096.47 Gg CO<sub>2</sub> eq.

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

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

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

	Sector	Base year <sup>a</sup>	Gg CO <sub>2</sub> eq							Change	
			1990	1995	2000	2005	2006	2007	2008	Base year–2008 (%)	
Annex A	Energy	382 558.80	382 558.80	381 951.98	394 602.81	403 837.27	390 523.78	380 181.12	376 576.25	–1.6	
	Industrial processes	58 381.04	58 381.04	56 810.23	44 364.72	42 685.25	41 764.67	42 346.99	40 727.98	–30.2	
	Solvent and other product use	2 063.90	2 063.90	1 807.33	1 818.67	1 460.95	1 404.92	1 368.48	1 274.12	–38.3	
	Agriculture	107 617.93	107 617.93	101 668.96	103 410.76	97 048.29	95 496.74	95 741.68	98 066.99	–8.9	
	Waste <sup>b</sup>	12 618.59	12 618.59	14 733.38	13 098.35	12 495.62	12 159.94	11 604.11	11 444.38	–9.3	
	Other	NO	NO	NO	NO	NO	NO	NO	NO	NA	
	LULUCF	NA	–33 321.41	–47 329.73	–45 806.56	–69 663.52	–69 622.67	–69 547.79	–67 558.26	NA	
	<b>Total (with LULUCF)</b>	<b>NA</b>	<b>529 918.87</b>	<b>509 642.15</b>	<b>511 488.75</b>	<b>487 863.85</b>	<b>471 727.38</b>	<b>461 694.59</b>	<b>460 531.46</b>	<b>NA</b>	
	<b>Total (without LULUCF)</b>	<b>563 240.28</b>	<b>563 240.28</b>	<b>556 971.88</b>	<b>557 295.31</b>	<b>557 527.36</b>	<b>541 350.06</b>	<b>531 242.38</b>	<b>528 089.71</b>	<b>–6.2</b>	
KP-LULUCF	Article 3.3 <sup>c</sup>	Afforestation & reforestation							–7 677.29		
		Deforestation							12 664.69		
		<b>Total (3.3)</b>							<b>4 987.40</b>		
	Article 3.4 <sup>d</sup>	Forest management								–83 821.47	
		Cropland management	NA							NA	NA
		Grazing land management	NA							NA	NA
		Revegetation	NA							NA	NA
		<b>Total (3.4)</b>	<b>NA</b>							<b>–83 821.47</b>	<b>NA</b>

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

<sup>a</sup> “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The “base year” is not applicable for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol for France.

<sup>b</sup> The table does not reflect the adjusted estimates for the category CH<sub>4</sub> emissions from managed solid waste disposal on land in the waste sector (see chapter II.G below) after adjustment procedures under decision 20/CMP.1 were applied. It reflects the estimates contained in the 22 October 2010 submission that was subject to these adjustments. The adjustments lead to an increase in total GHG emissions for 2008 of 8,096.47 Gg CO<sub>2</sub> eq.

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

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

Table 3  
Information to be included in the compilation and accounting database in t CO<sub>2</sub> eq

	<i>As reported</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>	<i>Accounting quantity<sup>c</sup></i>
<b>Commitment period reserve</b>	2 537 663 976		2 537 663 976	
<b>Annex A emissions for current inventory year</b>				
CO <sub>2</sub>	391 242 708		391 242 708	
CH <sub>4</sub>	54 054 239	8 096 472	63 214 029	
N <sub>2</sub> O	65 184 566		65 184 566	
HFCs	15 284 348		15 284 348	
PFCs	553 838		553 838	
SF <sub>6</sub>	706 695		706 695	
<b>Total Annex A sources</b>	<b>527 026 394</b>	<b>8 096 472</b>	<b>536 186 184</b>	
<b>Activities under Article 3, paragraph 3, for current inventory year</b>				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	-13 591 420		-7 677 292	-7 677 292
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA, NO		NA, NO	0
3.3 Deforestation for current year of commitment period as reported	12 348 940		12 664 693	12 664 693
<b>Activities under Article 3, paragraph 4, for current inventory year<sup>d</sup></b>				
3.4 Forest management for current year of commitment period	-83 971 205		-83 821 465	-16 133 333
3.4 Cropland management for current year of commitment period				0
3.4 Cropland management for base year				
3.4 Grazing land management for current year of commitment period				0
3.4 Grazing land management for base year				
3.4 Revegetation for current year of commitment period				0
3.4 Revegetation in base year				

*Abbreviations:* NA = not applicable, NO = not occurring.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the ERT has calculated one or more adjustment(s).

<sup>b</sup> "Final" includes revised estimates, if any, and/or adjustments, if any.

<sup>c</sup> "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.

<sup>d</sup> Activities under Article 3, paragraph 4, of the Kyoto Protocol are relevant only for Parties that elected one or more such activities.

6. The GHG 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), the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). However, the ERT concluded that estimates of CH<sub>4</sub> emissions from managed solid waste disposal on land and CH<sub>4</sub> recovery from the same category had not been estimated in accordance with the IPCC good practice guidance, and for that reason applied an adjustment.

7. The ERT concludes that the inventory submission of France has been prepared and reported in accordance with the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories” (hereinafter referred to as the UNFCCC reporting guidelines). The 2010 inventory submission is generally of a high quality, shows improvements related to issues raised in previous review reports or issues included in the national inventory improvement plan, and is complete in terms of geographical coverage, years, sectors, categories and gases.

8. The Party has submitted supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol in accordance with chapter I of the annex to decision 15/CMP.1.

9. France has chosen to account for activities under Article 3, paragraph 3, of the Kyoto Protocol annually. The Party has elected forest management activity under Article 3, paragraph 4, of the Kyoto Protocol and has chosen annual accounting. France has reported information on activities under Article 3, paragraph 3, of the Kyoto Protocol and the elected activity under Article 3, paragraph 4, of the Kyoto Protocol in accordance with decisions 15/CMP.1, 16/CMP.1 and 6/CMP.3.

10. However, during the review, in the list of potential problems and further questions, the expert review team (ERT) identified a potential underestimation of GHG emissions or an overestimation of removals in 2008 in the submission made on 12 April 2010:

(a) France reported CH<sub>4</sub> recovery from landfills with an unusually high recovery efficiency of 80 per cent. The ERT considers that the Party is not properly documenting this unusually high recovery efficiency, which is not in accordance with the IPCC good practice guidance;

(b) The Party did not provide adequate documentation of the human-induced nature of afforestation and reforestation (Article 3, paragraph 3, of the Kyoto Protocol) occurring on the totality of the area of land reported in the common reporting format (CRF) table 5(KP-I)A.1.1;

(c) France has not reported CO<sub>2</sub> emissions from biomass burning due to wildfires in land areas subjected to forest management activity (CRF table 5(KP-II)5);

(d) The Party did not account for emissions from the deadwood pool in the units of land subject to deforestation (Article 3, paragraph 3, of the Kyoto Protocol), and did not provide any verifiable information demonstrating that the pool is not a net source of GHG emissions;

(e) France reported CO<sub>2</sub> emissions from lime application on lands subjected to deforestation activity as not occurring (“NO”) in CRF table 5(KP-II)4, and did not provide documentation in the national inventory report (NIR) to justify the assumption that there is no lime application on cropland areas included in the “deforestation” land category.

11. France acknowledged these findings at the end of the review and carried out improvements to its GHG inventory. The Party showed the results of the efforts made by resubmitting the full set of CRF tables on 17 September 2010 and again on 22 October 2010. The ERT was satisfied with the responses and improvements made by France for all the issues identified (see para. 10 above), except with regard to the reported CH<sub>4</sub> recovery from landfills, which the ERT still considers to be unresolved. The ERT therefore applied an adjustment for the category CH<sub>4</sub> emissions from managed solid waste disposal on land (see chapter II.G of this report).

12. By submitting the revised inventories and supplying the additional information requested by the ERT, France has demonstrated sufficient capacity to comply with the UNFCCC reporting guidelines.

13. France has reported information on its accounting of Kyoto Protocol units in accordance with chapter I.E of the annex to decision 15/CMP.1, and has used the standard electronic format (SEF) tables as required by decision 14/CMP.1.

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

15. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

16. France has reported transparent and consistent information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1, in its NIR.

17. In the course of the review, the ERT formulated a number of recommendations relating to: (a) the enhancement of general transparency for all sectors, in particular where country-specific methods are used, and continuing the efforts to better balance the share of information between the main part of the NIR and the Organisation et méthodes des inventaires nationaux des émissions atmosphériques (OMINEA) report contained in annex 3 to the NIR; (b) the improvement of the key category analysis, the uncertainty analysis, the reporting of recalculations and the QA/QC plan; and (c) the improvement of the sectoral estimates (the most important improvements relate to: increasing the timeliness of the availability and approval of the detailed energy balance; increasing the consistency of estimates for related categories in the agriculture sector; collecting monitored data for CH<sub>4</sub> recovery from all landfills; improving the cooperation with data providers for the LULUCF sector; and achieving a consistent representation of land use over the whole time series).

## **II. Technical assessment of the annual submission**

### **A. Overview**

#### **1. Annual submission and other sources of information**

18. The 2010 annual inventory submission was submitted on 12 April 2010; it contains a complete set of CRF tables for the period 1990–2008 and an NIR. France also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol; accounting of Kyoto Protocol units; changes in the national system and in the national registry; and minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto

Protocol. The SEF tables were submitted on 13 April 2010 and resubmitted on 14 April 2010. The annual submission was submitted in accordance with decision 15/CMP.1.

19. France officially submitted revised CRF tables on 7 May 2010, and submitted revised emission estimates on 17 September 2010 in response to questions raised by the ERT during the course of the review. The Party also officially submitted revised emission estimates on 22 October 2010 in response to the list of potential problems and further questions raised by the ERT during the review. The overall impact of these revised estimates was an increase in total GHG emissions of 1,063.32 Gg CO<sub>2</sub> eq (0.2 per cent) in 2008, whereas the estimates for 1990 were maintained. For total GHG emissions including LULUCF, the estimates of emissions in 1990 increased by 1,400.17 Gg CO<sub>2</sub> eq (0.3 per cent) and in 2008 by 867.22 Gg CO<sub>2</sub> eq (0.67 per cent). France also submitted revised information and data for activities under Article 3, paragraph 3, of the Kyoto Protocol (KP-LULUCF CRF tables) on 22 October 2010 in response to the list of potential problems and further questions raised by the ERT during the review. Where necessary, the ERT also used the previous year's submission during the review. The values in this report are based on the submission of 22 October 2010.

20. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.<sup>3</sup>

21. During the review, France provided the ERT with additional information and documents which are not part of the annual submission. The full list of materials used during the review is provided in annex I to this report.

#### Completeness of inventory

22. The inventory covers all source and sink categories for the period 1990–2008 and is complete in terms of years and geographical coverage. Indeed, only GHG emissions from multilateral operations (memo item) are reported as not estimated (“NE”). France has provided a complete set of CRF tables, except CRF table 7 (key categories) and CRF table 8(b) (explanations of recalculations). However, related information on recalculations is included in the NIR. CRF table NIR-3, on the key category analysis of LULUCF activities under the Kyoto Protocol, has also not been provided. The ERT recommends that France provide the missing CRF tables in its next annual submission. The ERT commends the Party for providing emission estimates for those categories where the previous inventory review report identified areas of incompleteness:<sup>4</sup> CO<sub>2</sub> emissions from ferroalloys production; CH<sub>4</sub> emissions from ethylene, styrene and dichloroethylene (reported under the category other (chemical industry)); and CH<sub>4</sub> emissions from industrial wastewater handling and from sludge from wastewater handling. The ERT also notes that the Party still reports N<sub>2</sub>O emissions from domestic and commercial wastewater handling as not applicable (“NA”) instead of as “NO”. LULUCF categories and pools reported as “NE” or not reported in the inventory are discussed in chapter II.E of this report.

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

<sup>4</sup> FCCC/ARR/2009/FRA, paragraph 10.

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

Overview

23. The ERT concluded that the national system continues to perform its required functions. France described the changes to the national system since the previous annual submission, and these changes are discussed in chapter II.H.3 of this report.

Inventory planning

24. During the review, France explained the institutional arrangements for the preparation of the inventory. The Ministère de l'Écologie, de l'Énergie, du Développement Durable et de la Mer (MEEDDM) has overall responsibility for the national inventory and is the designated single national entity. MEEDDM, in particular the Direction générale de l'énergie et du climat (DGEC) coordinates with other ministries, attributes responsibilities to different institutions and organizations and has final responsibility for the distribution of the inventory results.

25. The preparation of the GHG inventory is delegated to CITEPA (Centre Interprofessionnel Technique d'Études de la Pollution Atmosphérique). CITEPA collects the data from other institutions, selects the methods, prepares the inventory, implements quality assurance/quality control (QA/QC) procedures and archives the inventory and related documents. The Ecole des Mines de Paris is responsible for the estimation of the emissions of fluorinated gases (F-gases) and provides these emission estimates to CITEPA.

26. The Groupe de concertation et d'information sur les inventaires d'émission (GCIIE), coordinated by MEEDDM and composed of all relevant ministries, discusses the results of each annual inventory, advises and approves the methodological changes and the inventory improvement plan, provides recommendations and proposes actions and research activities for the improvement of the inventory.

27. MEEDDM provides CITEPA with access to all data reported to MEEDDM in accordance with legal requirements in France. Other key data providers are the Service de l'observation et des Statistiques (CGDD/SOeS) in the energy sector and AGRESTE (the statistical office of the Ministry of Agriculture) in the agriculture sector.

28. France's national system ensures excellent direct access of the inventory agency to a large amount of plant-specific data collected by local authorities. The inventory system goes beyond the GHG inventory and includes air pollutants in order to fulfil various international and national commitments. This approach ensures consistency across different gases and years. The national system is characterized by a high level of coordination and cooperation between the institutions involved. Relevant legal provisions were established and have been implemented.

29. France has established a 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 MEEDDM.

30. Not all institutions involved in the inventory preparation process are mentioned in the description of the national system in the NIR, for example: the Ecole des Mines de Paris is not mentioned in the general description, but is responsible for the estimation of F-gases; and the Agence de l'Environnement et de la Maîtrise de l'Énergie (ADEME) has an important role in the waste sector but is also not mentioned in the general description. Further, data providers and data sources are often not clearly identified and described in the NIR. The ERT recommends that France improve the general description of the national

system in the NIR. The ERT also recommends that the Party include additional descriptions of the national system for each sector (e.g. with flow charts describing the institutions that are key data providers and those that are involved in the estimation of emissions or in the QA/QC procedures). The ERT recommends that the Party further strengthen the cooperation with data providers in the LULUCF sector, such as forest authorities (e.g. the national forest inventory (NFI) and the National Forest Agency (NFA)) in order to ensure that forest data collection is in line with the specific requirements of the IPCC good practice guidance for LULUCF. In response to the draft annual review report, France informed the ERT that improvements related to these issues will be included in the 2011 annual submission.

### Inventory preparation

#### *Key categories*

31. France has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2010 submission. The key category analysis performed by France and that performed by the secretariat<sup>5</sup> produced broadly similar results. Differences can be explained by the higher level of disaggregation in the national key category analysis which allows an improved identification of the important subcategories. France has included the LULUCF sector in its key category analysis, which was performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. France followed the recommendations from previous review reports<sup>6</sup> and treated the subcategories of N<sub>2</sub>O emissions from agricultural soils separately in the key category analysis in the 2010 annual submission.

32. Previous review reports have recommended that France apply a tier 2 key category analysis, following the IPCC good practice guidance.<sup>7</sup> As France has not yet done so, the ERT reiterates the recommendation that France apply a tier 2 key category analysis in its next annual submission.

33. France has not identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol and CRF table NIR-3 has not been provided. The ERT recommends that France include these activities in the key category analysis in its next annual submission, following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory as provided in chapter 5.4.4 of the IPCC good practice guidance for LULUCF.

#### *Uncertainties*

34. France has provided a tier 1 uncertainty analysis for 38 categories and for the inventory as a whole (including the LULUCF sector). The overall uncertainty estimated for 2008 is 18.9 per cent if the LULUCF sector is excluded from the analysis and 23.2 per cent if this sector is included. The uncertainty in the trend was estimated at 2.2 per cent if the LULUCF sector is not included in the analysis and 4.6 per cent if the LULUCF sector is

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<sup>5</sup> The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance for LULUCF. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

<sup>6</sup> FCCC/ARR/2009/FRA, paragraph 28.

<sup>7</sup> FCCC/ARR/2009/FRA, paragraph 29.

included. France did not provide a tier 2 uncertainty analysis and did not inform the ERT that it is planning to do so.

35. The ERT noted that the uncertainties are provided at a high level of aggregation of categories and, consequently, the same uncertainty values for activity data (AD) and emission factors (EF) are applied to all underlying subcategories, such as CH<sub>4</sub> from enteric fermentation; fugitive emissions from oil and natural gas; transport; mineral products; chemical industry; and consumption of halocarbons and SF<sub>6</sub>. During the review, France indicated that the quality and accuracy of the AD and EFs used to calculate the estimates vary across the (sub)categories. The ERT believes this to mean that the uncertainty values are different for each subcategory. The ERT notes that (sub)categories with different data quality and based on different methodological tiers should be treated separately in the uncertainty analysis. Besides, France has not provided specific information on uncertainty values related to EFs and AD for individual categories. Further, the ERT noted that the same uncertainties have been reported since 2006 and have not been updated in line with methodological improvements. Therefore, the ERT believes that the uncertainty analysis does not adequately reflect the methodologies and data quality in the different categories and cannot be used to prioritize inventory improvements. The ERT recommends that France improve these issues affecting the uncertainty analysis for the next annual submission. The ERT reiterates the recommendations from previous review reports<sup>8</sup> that France improve the reporting of the uncertainty analysis in its next annual submission with improved and more detailed information on how the uncertainty values were established.

36. The ERT also encourages France to perform a tier 2 uncertainty analysis and set a clear deadline for its implementation in the inventory improvement plan. France should make use of the large amount of plant-specific data in order to derive information on uncertainties and the information necessary for a tier 2 uncertainty analysis.

#### *Recalculations and time-series consistency*

37. Recalculations have been performed and generally reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations in the period 1990–2007 reported by France in the inventory submitted on 12 April 2010 have been undertaken to take into account: updated AD in the energy sector; methodological improvements recommended by previous review reports (e.g. for fugitive emissions from solid fuels); changes in allocations to categories (e.g. between mineral products and iron and steel); the correction of errors (e.g. iron and steel production); and the estimation of additional categories (e.g. CH<sub>4</sub> emissions from industrial wastewater handling and from sludge from wastewater handling). In accordance with the submission of 12 April 2010, the recalculations led to an increase in estimated emissions in 1990 of 0.11 per cent and a decrease in 2007 of 0.17 per cent for total GHG emissions excluding LULUCF. For total GHG emissions including LULUCF, the emissions in 1990 increased by 1.13 per cent and in 2007 by 0.45 per cent.

38. France has provided an overview of the recalculations in a table in chapter 10 of the NIR (page 155). However, the table only provides references to sectoral chapters. The ERT found that this list as well as the explanations in the sectoral chapters are incomplete, as references to the recalculations of CO<sub>2</sub> emissions from transport and of fugitive emissions from oil and natural gas are not included in the NIR table, but recalculations are provided in CRF table 8(a). The ERT also considers that some of the explanations provided in the sectoral chapters include only information on the changes made and do not explain the reasons for the recalculations; for example, for the manufacture of solid fuels and other energy industries, the NIR states that “A small adjustment of CO<sub>2</sub> emissions for 2007 has

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<sup>8</sup> FCCC/ARR/2009/FRA, paragraph 32.

been implemented”; for fugitive emissions from solid fuels the NIR explains that “The estimation method for CH<sub>4</sub> from coal mining has been revised”; and for consumption of halocarbons and SF<sub>6</sub> in refrigeration and air-conditioning equipment the text states that “L’Ecole Nationale des Mines de Paris has revised its annual inventory”. In addition, CRF table 8(b) is empty. The ERT recommends that France summarize the reasons for the recalculations, at least for the most important changes, in chapter 10 of the NIR. The Party is also encouraged to improve the explanations of the recalculations in the sectoral chapters, indicating the reasons for the recalculations, the sources of new information included, the types of errors corrected or the exact methodological revisions that took place. Further, the ERT reiterates previous recommendations<sup>9</sup> that France complete CRF table 8(b) which would enable the ERT to assess whether all recalculations performed have been adequately explained.

#### *Verification and quality assurance/quality control approaches*

39. France has elaborated and implemented a QA/QC plan in accordance with the IPCC good practice guidance. This includes general QC procedures (tier 1) as well as some source/sink category-specific procedures (tier 2) for key categories and also for those categories in which significant revisions of methodologies or data revisions have occurred. The French QA/QC approach includes the following elements:

(a) GCIIE meets three times a year to discuss any issues related to the ongoing and planned inventory-related activities, including proposed improvements to methods. An annual action plan for inventory improvement is also presented to GCIIE for endorsement;

(b) CITEPA has implemented a quality management system which is certified under International Organization for Standardization (ISO) standard 9001 (version 2000);

(c) CITEPA has developed an electronic system for documenting the QC checks performed by the inventory compilers that is linked with the inventory improvement plan. This provided good evidence to the ERT that the checks described in the QA/QC plan are systematically implemented.

40. The recalculations, as well as previous review stages, identified a number of errors. The ERT recommends that France further enhance the QC system by integrating more automatic checks to identify issues similar to the checks in the earlier stages of the review and by implementing more tier 2 QC checks and providing an improved description of the checks already performed.

41. The ERT considers that France could improve the reporting of verification and QC measures. The NIR describes the QC procedures in a standardized way and mostly does not refer to any tier 2 QC checks, although some of these checks were in fact implemented. The information in the sectoral chapters is largely repetitive, where the Party simply states that general QC procedures have been applied. The ERT recommends that the Party improve the description of the checks already performed, and that the sections in the NIR related to QC should address specific QC procedures for the respective categories. In response to the draft review report, France informed the ERT that improvements related to these issues will be included in the 2011 annual submission.

#### *Transparency*

42. The ERT considers that the information provided in the NIR, including the information contained in annex 3 to the NIR (the OMINEA report), does not appropriately reflect the high quality of the French inventory and is frequently not sufficiently detailed or does not provide specific information to enable the review team to assess whether the

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<sup>9</sup> FCCC/ARR/2009/FRA, paragraph 34.

inventory is in line with IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The ERT recommends that France improve the transparency of its reporting by improving, inter alia:

(a) The description of data sources, including information on data, references, and on how the data were compiled (e.g. plant-specific or survey). The inclusion of weblinks to data sources that are available online would also improve transparency;

(b) The description of the choice of methods, by providing a detailed description of methods when they depart from the methodologies proposed in the Revised 1996 IPCC Guidelines, the IPCC good practice guidance or the IPCC good practice guidance for LULUCF and a clear indication of the IPCC methodological tiers. Charts and graphs, as provided during the review, are very useful in this regard and should be integrated in the NIR;

(c) The description of EFs and how they were derived, including references, assumptions and calculations. This should also include explanations for the use of the EFs and parameters, and justification as to why they are appropriate for the national circumstances (including when they are IPCC defaults);

(d) The explanation of the reasons for trends and for the significant inter-annual variations in emissions and removals for individual categories.

43. In response to the draft annual review report, France informed the ERT that the methodological descriptions will be improved in the 2011 inventory submission.

44. Previous review reports have addressed concerns regarding the balance of information provided between the main body of the NIR and the OMINEA report.<sup>10</sup> In the 2010 submission, France has improved this balance by providing more information in the NIR and by including specific references to sections in annex 3 to the NIR. The ERT recommends that the Party continue its efforts and further expand these references. The ERT also considers that section A of annex 3, containing information on the national system, includes useful information that should be reported in the relevant sections of the main part of the NIR (e.g. sections on QA/QC and uncertainty analysis, when the information is unrelated to the estimation of other pollutants apart from GHGs). The ERT recommends that France continue to assess the distribution of information between the OMINEA report and the main part of the NIR.

#### Inventory management

45. France has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information is maintained and updated by CITEPA.

46. CITEPA keeps record of all data, methods and literature used, backs up the archived information on a daily basis, and archives the final set of all documentation used for each annual inventory submission on permanent media. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification, and planned inventory improvements. During the review, the ERT was quickly provided with the requested additional archived information, including both electronically stored information and hard copies of documents.

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<sup>10</sup> FCCC/ARR/2008/FRA, paragraphs 3, 13 and 14; FCCC/ARR/2009/FRA, paragraphs 20 and 37.

### 3. Follow-up to previous reviews

47. France has systematically addressed and implemented recommendations from previous review reports, the most important being: completed estimates for missing categories; and the inclusion of information from the OMINEA report in the NIR.

48. France has also improved its reporting on the follow-up from previous reviews, by including table 87 in the NIR in which it provides a comprehensive list of recommendations from previous review reports, providing information on whether and how they were addressed, and references to the specific NIR sections where more information can be found. The ERT commends France for this addition, which improves transparency in the follow-up to the recommendations from previous review reports. However, the ERT notes that not all recommendations in previous review reports have yet been addressed, in particular:

- (a) The preparation of a tier 2 uncertainty analysis;
- (b) The application of a tier 2 key category analysis (see para. 32 above);
- (c) The completion of the CRF tables, by including tables 7, 8(b) and NIR-3;
- (d) The full availability of publicly available information related to the national registry;
- (e) The elaboration of a detailed reference approach, consistent for the whole time series;
- (f) The distinction of sales of marine bunker fuels for individual territories after 2000.

### 4. Areas for further improvement

#### Identified by the Party

49. The 2010 NIR identifies several areas for improvement, including:

- (a) The improvement of the accuracy of emission estimates, in particular those from the key categories. In that regard, the Party is planning to improve the system to report emissions under the European Union emissions trading scheme (EU ETS);
- (b) The improvement of the uncertainty analysis;
- (c) The reinforcement of actions to ensure a better QA/QC system.

#### Identified by the expert review team

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

- (a) The enhancement of general transparency for all sectors, in particular where country-specific methods, EFs and parameters are used, by providing more detailed explanations of the trends, and by continuing the efforts to better balance the share of information between the main part of the NIR and the OMINEA report (see para. 42 above);
- (b) The application of a tier 2 key category analysis, and the inclusion of the KP-LULUCF activities under the key category analysis (see paras. 32–33 above);
- (c) The restructuring of the plan for the uncertainty analysis, by adjusting the level of aggregation of categories and subcategories, so that uncertainty values represent the real accuracy of the methodologies and data (see para. 35 above);

- (d) The improvement of the reporting of recalculations, with clearer explanations of the reasons for the recalculations for individual categories (see para. 38 above);
- (e) The enhancement of the QA/QC plan, by integrating more automatic checks and tier 2 QC checks;
- (f) Increasing the timeliness of the availability and approval of the detailed energy balance (see para. 57 below);
- (g) Increasing the consistency of estimates for related categories in the agriculture sector (see para. 97 below);
- (h) The collection of monitored data for CH<sub>4</sub> recovery from all landfills (see para. 133 below);
- (i) The improvement of the cooperation with data providers for the LULUCF sector, and ensuring a consistent representation of land use over the whole time series (see para. 30 above).

## **B. Energy**

### **1. Sector overview**

51. The energy sector is the main sector in the GHG inventory of France. In 2008, emissions from the energy sector amounted to 376,576.25 Gg CO<sub>2</sub> eq, or 71.3 per cent of total GHG emissions. Since 1990, emissions have decreased by 1.6 per cent. The key drivers for the fall in emissions are the reductions in emissions from manufacturing industries and construction by 12,248.90 Gg CO<sub>2</sub> eq (a 14.2 per cent decrease from 1990 to 2008), emissions from fugitive emissions from solid fuels by 3,972.39 Gg CO<sub>2</sub> eq (-66.4 per cent), emissions from energy industries by 3,147.59 Gg CO<sub>2</sub> eq (-4.8 per cent), and fugitive emissions from oil and natural gas by 1,151.47 Gg CO<sub>2</sub> eq (-19.2 per cent). These decreases were partially compensated by an increase in emissions from transport of 12,007.42 Gg CO<sub>2</sub> eq (10.1 per cent) and an increase of 2,530.38 Gg CO<sub>2</sub> eq in emissions from other sectors. Within the sector, 34.8 per cent of the emissions were from transport, followed by 27.2 per cent from other sectors, 19.7 per cent from manufacturing industries and construction and 16.7 per cent from energy industries. Fugitive emissions from oil and natural gas accounted for 1.6 per cent and fugitive emissions from solid fuels accounted for 0.03 per cent. The category other (energy) is reported as "NO" in France.

52. The energy sector reporting is complete. The CRF includes emission estimates for all categories, gases and fuel use from the energy sector, as recommended by the Revised 1996 IPCC Guidelines. Emissions from the energy sector have been reported for all years of the inventory time series and cover all geographical locations.

53. France uses general and category-specific QC procedures to ensure the quality of the estimates in the energy sector. Nevertheless, the ERT detected several errors in the reporting (see para. 69 below for further details). The ERT considers that these issues could have been detected earlier by the Party by performing verification checks on the trends of the implied emission factors (IEFs). The ERT recommends that France improve its QC checks by including an analysis of the IEFs for all gases.

54. The description of the energy sector is generally transparent, but the descriptions of individual categories often lack explanations about country-specific circumstances, trends and inter-annual variations (e.g. justification for the sharp decreases in the emissions trend due to plant closure, or variations in the IEF due to changes in the energy mix). The methodological descriptions and the choice of EFs could be improved by providing, in the NIR, more details on the assumptions made and the parameters and sources used, especially

when these values are derived from research studies or from the *EMEP/EEA Air Pollutant Emission Inventory Guidebook* (European Environment Agency (EEA), 2009). The ERT reiterates the recommendations from previous review reports that France increase the transparency of the energy sector by providing more detailed information on country-specific issues for individual categories/subcategories and by improving the descriptions of EF and IEF trends.

55. The ERT noted that the recalculations reported by France for the time series 1990–2007 have been undertaken in the energy sector to take into account: improvements in AD due to updated statistical information; the correction of errors; reallocations; and methodological improvements. For example, in public electricity and heat production, corrections to AD and to the methodology used to estimate emissions from waste incineration with energy recovery (adjusted carbon contents) resulted in a decrease in the CO<sub>2</sub> emissions of 715.12 Gg in 2007 and 690.83 Gg in 1990. As another example, emissions from limestone use, reported previously as energy emissions from iron and steel production (under manufacturing industries and construction) were reallocated to iron and steel production (under industrial processes, metal production). In the energy sector, the effect of all the recalculations in 2007 was a decrease in total GHG emissions of 3,556.02 Gg CO<sub>2</sub> eq or 0.9 per cent of total GHG emissions.

## 2. Reference and sectoral approaches

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

56. CO<sub>2</sub> emissions from fuel combustion were calculated using the reference approach and the sectoral approach. For 2008, CO<sub>2</sub> emissions from the sectoral approach were 1.0 per cent higher than the emissions from the reference approach. Explanations for the differences and fluctuations are given in the NIR, but the ERT considers that transparency could be increased through the provision of further detail on the parameters, such as the net calorific values (NCVs), carbon content and carbon stored, used to estimate the emissions from the reference approach, as well as more detailed explanations of the differences between the two approaches for each fuel type.

57. For 2008, France has not reported detailed data by fuel type in the reference approach; in other words, the total consumption of petroleum products is reported under “other oil” and for solid fuels, the total consumption is reported as “coking coal”, while all other fuel types are reported as “NO”. In the NIR, the Party explains that data from the energy balance were not available at the time of the preparation of the inventory. However, the ERT learned during the review that the statistical agency SOeS had already compiled a validated energy balance at the time of the inventory compilation, but it could not be validated in time by MEEDDM. In line with the recommendations from previous review reports,<sup>11</sup> the ERT recommends that France make the necessary efforts and institutional arrangements to obtain the detailed data in time for the preparation of the annual inventory submission.

### International bunker fuels

58. During the review, the ERT found that France had allocated fuel consumption emissions to domestic and international navigation based on historical data dating from 1993 and only covering movements in the Mediterranean Sea. The ERT recommends that the Party make use of the recent collected underlying data in order to improve the estimate of the split between international and civil navigation (see para. 67 below for further details).

<sup>11</sup> FCCC/ARR/2009/FRA, paragraph 46.

### Feedstocks and non-energy use of fuels

59. The reporting of feedstocks and non-energy use of fuels has not improved since the last submission. The 2010 submission includes estimates of the quantities of feedstocks and non-energy use of fuels in CRF table 1.A(d). This table shows information on the estimates of carbon stored in non-energy use, but does not include information on the associated CO<sub>2</sub> emissions and where they were allocated. France clarified that these emissions are allocated to the industrial processes sector based on the percentage of fossil fuel used as a material input to a production process by industry type. However, the AD and methodologies used for their estimation are neither adequately nor transparently described in the NIR. The ERT reiterates the recommendation from the previous review report<sup>12</sup> that France clearly describe how feedstock values are estimated in the energy chapter of its next annual submission.

### **3. Key categories**

#### Stationary combustion: liquid, solid and other fuels – CO<sub>2</sub>

60. For the electricity and heat production category, the CO<sub>2</sub> IEF for other fuels increased by 18.9 per cent between 1990 (84.74 t/TJ) and 2008 (100.74 t/TJ). The ERT found that the NIR does not indicate which fuel types are included under this fuel type, and no discussion of the IEF trend is provided in the NIR. During the review, France explained that the category “other fuels” mainly corresponds to waste consumed by incineration plants with energy recovery, and that the changes in the CO<sub>2</sub> IEF are due to changes in the fossil share of the fuel. The ERT recommends that France include more detailed information on the fuels consumed under this fuel category for the next annual submission, including information on: the composition of the waste incinerated and its evolution over time; the biogenic ratio; and the carbon content per waste type.

61. France reports all fuels (such as gasoil, natural gas, coke oven gas, and blast furnace gas) consumed in coke ovens in iron and steel production (in the category manufacturing of solid fuels and other energy industries) under the fuel type “other fuels”. This procedure is explained by historical reasons. The ERT notes that this reporting is not in line with the Revised 1996 IPCC Guidelines, and recommends that France reallocate the AD and emissions to the correct fuel categories for the next annual submission.

62. The method to estimate CO<sub>2</sub> emissions from combustion activities in iron and steel for all fuels uses a combination of fuel consumption data and carbon mass-balance data. However, the methodology is not transparently described in the NIR or in the OMINEA report (annex 3 to the NIR). During the review, France provided some detailed documentation and graphical information depicting energy and input material flows, which the ERT found to be very helpful. The ERT recommends that France provide more detail on the methodology used in the next annual submission, by including the documentation presented to the ERT during the review. The ERT also encourages France to implement a supplementary category-specific QC check: the performance of a global carbon mass balance for the entire category.

63. In 2008, the Party’s CO<sub>2</sub> IEF values for liquid fuels (83.80 t/TJ) in the iron and steel category were among the highest for reporting Parties (1.09– 85.83 t/TJ), and the IEF for solid fuels (139.90 t/TJ) was higher than the upper limit of the IPCC default range (94.60– 106.70 t/TJ). In addition, the overall CO<sub>2</sub> IEF trends of both fuel categories were unstable over the time series (for example, the IEF for liquid fuels grows by 24.5 per cent between 1990 and 2006 (102.04 t/TJ), but thereafter decreases by 17.3 per cent to 2007 (84.04 t/TJ) and by 0.3 per cent to 2008 (83.80 t/TJ). During the review, France explained that this is

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<sup>12</sup> FCCC/ARR/2009/FRA, paragraph 50.

mainly due to the inclusion of different fuels in this fuel category, and that fluctuations in the IEF are due to yearly variations in the energy mix. The ERT encourages France to include detailed explanations for the variations in the energy mix and to explain the reasons for the CO<sub>2</sub> IEF fluctuations in the next annual submission.

64. Due to confidentiality reasons, France reports emissions from tobacco processing under the category other manufacturing industries, but the ERT notes that this reporting procedure is not in line with the Revised 1996 IPCC Guidelines and the UNFCCC reporting guidelines. The ERT recommends that France reallocate the emissions from tobacco processing to the category food processing, beverages and tobacco.

Civil aviation: aviation gasoline and jet kerosene – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O<sup>13</sup>

65. France reports fuel consumption and emissions from aviation gasoline as included elsewhere (“IE”) and aggregated with jet kerosene emissions. For transparency reasons, the ERT reiterates the recommendations from previous review reports<sup>14</sup> that the Party report the emissions from the two fuels separately in the next annual submission.

Road transportation: diesel oil and gasoline – CO<sub>2</sub>

66. France derives its EFs from the COPERT IV model<sup>15</sup> based on the default carbon/hydrogen (C/H) ratios considered by this model. The 2008 CO<sub>2</sub> IEF for diesel oil is 74.70 t/TJ, which has been identified as significantly different from those of other reporting Parties and is larger than the IPCC default value for Europe (74.00 t/TJ). For motor gasoline, the CO<sub>2</sub> IEF is 72.35 t/TJ, which is also higher than the IPCC default value for Europe (69.30 t/TJ). No explanation is given in the NIR as to why France assumes that the default C/H ratio from the COPERT model is applicable to national circumstances. The ERT recommends that France develop country-specific EFs for diesel oil and motor gasoline and report transparently thereon in the next annual submission.

Navigation: liquid fuels – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O<sup>16</sup>

67. France reports emissions from fluvial and domestic maritime navigation under this category. Four per cent of the fuel consumption of international maritime bunkers is allocated to this category. However, the split between domestic and international fuel consumption for maritime bunkers is based on historical data from ship movements in the Mediterranean Sea only (CITEPA, January 1993<sup>17</sup>). During the review, the ERT was informed of preliminary results from a more recent study on ship movements, this time covering the entire French coastline and based on data of individual ship movements. Later, in response to the draft annual review report, the Party informed the ERT that the study had been completed and a revised percentage of 6.2 per cent for domestic coastal traffic will be used for the 2011 annual submission. The ERT commends the efforts made by France, and recommends that the Party revise the split between domestic and international maritime bunkers using the final results of this new study and transparently report thereon in the next NIR.

<sup>13</sup> Not all emissions related to all gases under this category are key categories, particularly CH<sub>4</sub> and N<sub>2</sub>O emissions. However, since the calculation procedures for and issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

<sup>14</sup> FCCC/ARR/2009/FRA, paragraph 57.

<sup>15</sup> Information on the model is available at <<http://www.emisia.com/copert/>>.

<sup>16</sup> Not all emissions related to all gases under this category are key categories, particularly CH<sub>4</sub> and N<sub>2</sub>O emissions. However, since the calculation procedures for and issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

<sup>17</sup> Dang QC. 1993. *Tentative d'estimation des émissions de polluants atmosphériques dues au trafic maritime en Méditerranée Occidentale*.

Coal mining and handling: CH<sub>4</sub>

68. France reports emissions from mines that are already closed under the category solid fuel transformation. The ERT reiterates the recommendations from previous review reports<sup>18</sup> that France reallocate the emissions from closed mines under other non-specified (fugitive emissions from solid fuels).

**4. Non-key categories**Stationary combustion: gaseous fuels – CO<sub>2</sub>

69. The ERT found that the overall trend of the CO<sub>2</sub> IEF for the use of gaseous fuels in petroleum refining is decreasing and the 2008 value (55.24 t/TJ) is 3.1 per cent lower than the 1990 value (57.00 t/TJ), but no explanation is provided in the NIR. In addition, the 2008 CO<sub>2</sub> IEF value for France (55.24 t/TJ) is lower than the IPCC default value (56.10 t/TJ). During the earlier stages of the review, France commented on this issue, indicating that for the years 2000 and 2004, part of the AD (about 184 TJ in 2000 and 355 TJ in 2004) were not reported, but related emissions were. During the review, the ERT recommended that France correct the errors relating to AD in the next annual submission and adapt the QC procedures to include an IEF trend analysis, in order to ensure that possible problems/unusual values are detected, explained and/or corrected on time. In response to the draft annual review report, France informed the ERT that it had reinforced the existing procedures to ensure better QC procedures for the IEF trends.

Other transportation: natural gas – CO<sub>2</sub> and CH<sub>4</sub>

70. Although AD and emissions for pipeline compressors are reported in the CRF tables, a description of this subcategory is missing in the NIR. The ERT recommends that France include a detailed description of this subcategory in the next annual submission.

71. The CH<sub>4</sub> IEF increased by 234.4 per cent between 2006 (7.77 kg/TJ) and 2008 (26.00 kg/TJ). Before this period, the CH<sub>4</sub> IEF was constant at 3.00 kg/TJ. During the review, France explained that this increase was due to a methodological change in the latest years, where plant-specific data were used instead of IPCC default values. The ERT recommends that France collect the necessary data to re-evaluate the emissions from 1990–2007 in order to ensure time-series consistency, in accordance with the methodologies in the IPCC good practice guidance.

**5. Areas for further improvement**Identified by the Party

72. No further improvements are identified by the Party in the NIR for this sector.

Identified by the expert review team

73. The ERT recommends that France improve the inventory by using more updated data on the share of national and international use of bunker fuels in navigation. The paragraphs above list several areas where the ERT recommended improvements, the most important of which are: the improvement of transparency by providing explanations of trends, country-specific methods, EFs and parameters; the improvement of QC procedures by including a trend analysis and a carbon balance; and increasing the timeliness of the approval of the detailed energy balance.

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<sup>18</sup> FCCC/ARR/2009/FRA, paragraph 61.

## C. Industrial processes and solvent and other product use

### 1. Sector overview

74. In 2008, emissions from the industrial processes sector amounted to 40,727.98 Gg CO<sub>2</sub> eq, or 7.7 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 1,274.12 Gg CO<sub>2</sub> eq, or 0.2 per cent of total GHG emissions excluding LULUCF. Since the base year, emissions have decreased by 30.2 per cent in the industrial processes sector, and decreased by 38.3 per cent in the solvent and other product use sector. The key driver for the fall in emissions in the industrial processes sector is the chemical industry, where emissions of CO<sub>2</sub> from ammonia production, N<sub>2</sub>O emissions from nitric acid production, N<sub>2</sub>O emissions from adipic acid production and N<sub>2</sub>O emissions from glyoxylic acid production decreased substantially from 1990 to 2008. Overall emissions from the chemical industry have decreased by 21,382.18 Gg CO<sub>2</sub> eq since the base year (–75.5 per cent). Another category where substantial reductions of emissions have occurred is PFC emissions from aluminium production and SF<sub>6</sub> emissions from the production of halocarbons and SF<sub>6</sub> (emissions for this category have decreased by 4,157.88 Gg CO<sub>2</sub> eq or 88.6 per cent since the base year). Between 1990 and 2008, emissions from mineral production decreased by 2,886.48 Gg CO<sub>2</sub> eq (–17.6 per cent), and emissions from metal production decreased by 3,402.96 Gg CO<sub>2</sub> eq (–45.2 per cent). On the other hand, in the same period, emissions from the consumption of halocarbons and SF<sub>6</sub> increased by 14,176.43 Gg CO<sub>2</sub> eq or 957.6 per cent since the base year. Within the industrial processes sector, 38.4 per cent of the emissions were from the consumption of halocarbons and SF<sub>6</sub>, followed by 33.1 per cent from mineral products, 17.0 per cent from the chemical industry, 10.1 per cent from metal production and 3.1 per cent from the production of halocarbons and SF<sub>6</sub>. Direct GHG emissions from other production were reported as “NA” and other (industrial processes) as “NO”.

75. France has improved the completeness of the inventory since its last submission by reporting: CO<sub>2</sub> emissions from ferroalloys production; CO<sub>2</sub> emissions from ethylene, propylene and titanium tetrachloride production (reported under other (chemical industry)); CH<sub>4</sub> emissions from ethylene, propylene, styrene and dichloroethylene production; and N<sub>2</sub>O emissions from nitrous oxide and uranium tetrafluoride production (both reported under other (chemical industry)). The ERT commends the Party for these improvements in completeness, which are in line with the recommendations made in the previous review report.<sup>19</sup>

76. For all industrial processes categories, France uses expert judgement to determine the uncertainty values. The ERT notes that France uses tier 2 and tier 3 methods to estimate process emissions from most industrial plants. During the review, the ERT also learned that the Party has a national database containing information on all annual emissions, and that this database complies with national and European regulations and is reviewed and verified by an external certified agency. The ERT considers that France could improve the uncertainty estimates through the statistical analysis of the information in this centralized database, thereby replacing the current use of expert judgement.

77. France has implemented sectoral QC procedures as contained in the Plan de Surveillance, a plant monitoring plan, and in auditing reports. However, these category-specific QC activities are not described in the NIR. During the review, French experts explained in detail the actual QC procedures for the industrial processes sector. From that information, the ERT concluded that the French QC system is of high quality, and recommends that the Party improve the reporting in the NIR by providing information on these sectoral and category QC procedures.

<sup>19</sup> FCCC/ARR/2009/FRA, paragraph 63.

78. France did not report in the NIR on recycling systems or the abatement technology used that could be relevant to GHG emissions. The descriptions of the methodologies used for the preparation of emission estimates also lack sufficient detail. During the review, France provided comprehensive information related to the processes and technology used by different plants and to the methodologies used to estimate emissions. To improve transparency, the ERT recommends that the Party report more detailed information related to technological processes, abatement technologies or recycling systems for the relevant categories in its next annual submission.

79. The ERT found that many references cited in the NIR are incomplete (e.g. the publication year or date is missing). Further, the ERT noted that many references were not updated in the current NIR and are the same as in previous submissions. The ERT recommends that France update the references and report the publication dates of all cited reports and documents.

80. In CRF table summary 3, France refers to cases where plant specific (“PS”) and country-specific (“CS”) EFs are used, whereas the NIR, for the same plants, refers to the use of default EFs. The ERT understood that the notation keys for EFs used in CRF table summary 3 represent the current situation, and recommends that France resolve the inconsistency of the categorization of EFs between the CRF tables and the NIR in its next annual submission.

81. Following the recommendation of the previous review report, France has reported potential emissions of halocarbons and SF<sub>6</sub>. The ERT acknowledges the plans of ADEME to improve data collection and the emission estimates of actual emissions for halocarbons and SF<sub>6</sub>, which will improve the quality of reporting in future annual submissions.

## 2. Key categories

### Cement production – CO<sub>2</sub>

82. For 2008, France has used a new methodology to estimate emissions from cement production based on accurate data on the carbonate content in raw material. This improvement in accuracy resulted from new national regulations on reporting. Accordingly, the IEF for 2008 (0.526 t/t clinker) is 1.6 per cent higher than the IEF for 2007 (0.517 t/t clinker). The ERT found that France did not recalculate emissions for previous years and three different periods are visible: from 1990 to 2003 the IEF is 0.525 t/t clinker; between 2004 and 2007 the IEF decreases from 0.520 to 0.517 t/t clinker; and for 2008, the IEF is higher than in the three previous years and is based on a new methodology. The ERT notes that the time series is not consistent or in line with the IPCC good practice guidance, which requires time-series consistency. The ERT recommends that France recalculate the emissions for the entire time series for the next annual submission.

83. Out of a total of 31 cement plants in operation in France, three were dedicated to the production of alumina cement in 2008. Following the recommendations from the previous review report,<sup>20</sup> France has improved the reporting on this category by providing, in the NIR, specific EFs for the two types of cement produced in France. During the review, the national experts provided information on the share of alumina cement production, which is around 3 per cent of the total clinker production in 2008. The ERT commends the Party for the improvements in reporting and recommends that France continue its efforts to improve the transparency of reporting by including the additional information provided during the review in the NIR of its next annual submission.

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<sup>20</sup> FCCC/ARR/2009/FRA, paragraph 67.

84. France reported in the NIR that only two cement plants are taking cement kiln dust (CKD) into account in their emission estimates. During the review, French experts clarified the situation on the accounting of CKD to the ERT: 15 plants account for CKD, and 16 modern plants do not account for CKD as they do not have a bypass dust system but are equipped with efficient dust collection and recycling systems. The ERT recommends that France report this information on technologies and linkages to CKD consideration in the next annual submission.

#### Nitric acid – N<sub>2</sub>O

85. There were 10 nitric acid plants remaining in operation in France in 2008. During the review, the ERT was informed that three of these plants, contributing up to 30 per cent of total nitric acid production, are equipped with abatement systems, but these systems are not described in the NIR. After 2002, emissions were estimated from continuous measurements in seven industrial plants, annual measurements in one plant, and using a general country-specific EF multiplied by AD for the remaining two plants. The evolution of the aggregated IEF for all plants is consistently presented in table 43 in the NIR and in the CRF tables, showing that the IEF decreased between 1990 (6.62 kg/t HNO<sub>3</sub> 100%) and 2008 (3.55 kg/t HNO<sub>3</sub> 100%). The ERT considers that France is not reporting information on how it calculates the country-specific EFs and the trend in a transparent manner. The ERT recommends that France report on the process technology used for each plant and the emissions aggregated by the two groups of plants, with and without N<sub>2</sub>O destruction technology, in order to increase transparency in its next annual submission. The ERT also reiterates the recommendations from the previous review report<sup>21</sup> that France report the production share of the seven plants where continuous measurements are made separately and indicate their share in the total production in France.

#### Ozone-depleting substances (ODS) substitutes – HFCs, PFCs and SF<sub>6</sub>

86. Emissions of fluoride gases are estimated each year by the Ecole des Mines de Paris based on regular surveys and using the RIEP model, which was developed for this purpose. The model calculates emissions using data inputs collected from sales statistics in the chemical industry and considering the national demand for F-gases for appliances. During the review, the French experts provided further information about the validation of the model, which is performed regularly based on the comparison between sales of refrigerant gases and refrigerant demand, as derived by the RIEP model. The cross-check of sales and demand shows that the model results are consistent.

87. The ERT noted that the NIR does not provide a reference to recent descriptions of the RIEP model or detailed information on the model input data and parameters used. The descriptions of the model referenced by France are 10 years old, and France explained during the review that it has made partial updates to it (e.g. recent developments of appliances using fluoride gases were integrated). Information on the model is not publicly available and no evidence of peer reviews of the model and its results were provided to the ERT. Therefore, the ERT considers that clear information on the methodologies and assumptions, as well as the QA/QC procedures, conducted by the Ecole des Mines de Paris remain unclear. The ERT recommends that France improve the transparency in the NIR by providing more recent information on the sources of AD, EFs and other parameters used, and an updated model description with information on assumptions, data, QA/QC checks, model validation, and peer reviews.

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<sup>21</sup> FCCC/ARR/2009/FRA, paragraph 72.

### 3. Non-key categories

#### Ferroalloys production – CO<sub>2</sub>

88. France has estimated emissions from ferroalloys production in line with the recommendations made in the 2009 review report,<sup>22</sup> by using plant-specific EFs (table 53 in the NIR). However, during the review, the ERT noted that France's emissions estimate for 2008 is calculated from AD of 55.11 kt ferroalloys consumed, whereas the United States Geological Survey (USGS) reports a national annual production of 340 kt for 2008 and the Eurostat PRODCOM database<sup>23</sup> indicates a ferroalloys production of 271 kt for 2008. France states in the NIR that the survey of plants producing ferroalloys needs to be completed and that further investigations are ongoing to assess total emissions from ferroalloys production. The ERT concludes that the accuracy of emission estimates from ferroalloys production can be further improved by the Party. The ERT strongly recommends that France improve the completeness of emission estimates from this category in its next annual submission.

#### Other (chemical industry) – N<sub>2</sub>O and CH<sub>4</sub>

89. Emissions of N<sub>2</sub>O from N<sub>2</sub>O production, uranium tetrafluoride production, titanium tetrachloride, and other chemical production (such as paratertiobutybenzoic acid (4-methylsulfonylnitrobenzoic)) are reported in the CRF tables under other (chemical industry), but the NIR does not contain explanations of the methodologies used to estimate these emissions, or information on AD or EFs. The ERT recommends that France include descriptions of the methods, AD and EFs used to estimate these emission sources in the next annual submission.

### 4. Areas for further improvement

#### Identified by the Party

90. No further improvements are identified by the Party in the NIR for this sector.

#### Identified by the expert review team

91. The paragraphs above list several areas where the ERT recommended improvements, the most important of which are: the general increase in transparency; the use of plant-specific data in the uncertainty analysis; and the assurance of consistency in the time series (e.g. cement production).

## D. Agriculture

### 1. Sector overview

92. In 2008, emissions from the agricultural sector amounted to 98,066.99 Gg CO<sub>2</sub> eq, or 18.6 per cent of total national GHG emissions. Since the base year, emissions have decreased by 8.9 per cent. The key drivers for the fall in emissions between 1990 and 2008 are the decrease in N<sub>2</sub>O emissions from agricultural soils by 6,651.11 Gg CO<sub>2</sub> eq (an 11.9 per cent decrease between 1990 and 2008), and CH<sub>4</sub> emissions from enteric fermentation, which decreased by 2,404.21 Gg CO<sub>2</sub> eq. Overall, CH<sub>4</sub> emissions decreased by 4.6 per cent and N<sub>2</sub>O emissions decreased by 11.9 per cent in the period 1990–2008. The reduction in

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<sup>22</sup> FCCC/ARR/2009/FRA, paragraph 78.

<sup>23</sup> Eurostat. 2011. *Statistics on the Production of Manufactured Goods Sold, Volume 2008*. 3 March 2011, Code 24101290.

emissions is mainly due to lower dairy and sheep populations, lower crop production and the reduced consumption of synthetic nitrogen (N) fertilizers. Within the sector, 50.3 per cent of the emissions were from agricultural soils, followed by 29.1 per cent from enteric fermentation, 20.5 per cent from manure management and 0.1 per cent from rice cultivation. Emissions of N<sub>2</sub>O accounted for 56.4 per cent and CH<sub>4</sub> emissions accounted for 43.6 per cent of total emissions.

93. France's inventory is complete with regard to the reporting of categories and gases and no categories are reported as "NE". Emissions from prescribed burning of savannas, field burning of agricultural residues and other (agriculture) are reported as "NO".

94. The ERT considers that there are some transparency issues with regard to the documentation of inventory methodologies and AD sources. The ERT recommends that France provide additional material on inventory methods in order to improve transparency, including detailed descriptions of the country-specific methods and calculation of country-specific EFs and parameters (see paras. 95, 98 and 99 below). During the review, France presented an improvement plan for the agriculture sector. However, this plan is not provided in the NIR. The ERT encourages France to include information on the planned inventory improvements for the agriculture sector in its next annual submission.

## 2. Key categories

### Enteric fermentation – CH<sub>4</sub>

95. France uses a country-specific method to derive EFs to estimate CH<sub>4</sub> emissions from enteric fermentation that diverges from both tier 2 methodologies presented in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance for deriving the enteric CH<sub>4</sub> EFs for dairy and non-dairy cattle, and sheep. This method was developed by the Institut National de la Recherche Agronomique (INRA) and is documented in two publications (INRA, 2008; Vermorel et al., 2008).<sup>24</sup> The method uses recommended quantities of animal fodder, developed by INRA, and a methane conversion factor (Y<sub>m</sub>). A difference compared to the default IPCC methodologies is that Y<sub>m</sub> applies to metabolizable energy, whereas in both the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, the methane conversion factor (Y<sub>m</sub>) is multiplied by the gross energy intake. Further unpublished information was provided to the ERT during the review containing additional detail on the underlying methodology and the development of the tables with recommended quantities of animal fodder. The ERT believes that the transparency of reporting in the NIR is insufficient and recommends that the Party improve it in the next annual submission by providing more detailed information on the methodology used to derive the CH<sub>4</sub> emission estimates. In response to the draft annual review report, France informed the ERT that an improved description of the methodology to derive the CH<sub>4</sub> EFs will be provided in the 2012 annual submission.

96. France did not compare the results of the country-specific method with those from the use of one of the IPCC default methodologies, and did not provide transparent evidence that its method is more accurate to estimate emissions. The ERT recommends that France re-evaluate the country-specific approach used by comparing the EFs derived by the two methods (the country-specific method and the IPCC good practice guidance), in its next annual submission.

<sup>24</sup> A description of the methodology is available in the following publications: INRA. 2008. *Projections d'émissions/absorptions de gaz à effet de serre dans les secteurs forêt et agriculture aux horizons 2010 et 2020. Rapport Final*. pp. 129–192; Vermorel M, Jouany JP, Eugène M, Sauvant D, Noblet J, and JY Dourmad. 2008. *Evaluation quantitative des émissions de méthane entérique par les animaux d'élevage en 2007 en France*. INRA.

Manure management – CH<sub>4</sub>

97. France uses default values for volatile solids (VS) from the Revised 1996 IPCC Guidelines to derive the CH<sub>4</sub> EFs for dairy and non-dairy cattle, and sheep. The ERT considers that, in accordance with the IPCC good practice guidance and considering that France has developed national values for feed intake, the EFs could be estimated from feed-intake values. Responding to the ERT during the review, the Party informed the ERT that INRA is working on the development of a methodology to estimate emissions of CH<sub>4</sub> from manure management and a scientific publication is expected within the next few years. The ERT recommends that France use country-specific VS values consistent with the estimates of feed energy intake for enteric fermentation, taking into account possible changes in VS over time (e.g. due to changes in milk yield and feeding practices) in future annual submissions.

Manure management – N<sub>2</sub>O

98. The ERT considers that the transparency of reporting in the NIR for this category is insufficient, in particular with regard to: the number of subclasses of livestock used in the emission estimates; and the manure N excretion rates (N<sub>ex</sub>) used for each livestock category or subcategory. In response to a question raised by the ERT during the review, the Party explained that it applies the default IPCC method to estimate N<sub>2</sub>O emissions from manure management along with the default EFs from the Revised 1996 IPCC Guidelines adjusted by the default adjustment factors provided in the IPCC good practice guidance taking into consideration the age classes. During the review, France also provided the ERT with the list of animal subclasses that were used and the N<sub>ex</sub> for each subclass. The ERT recommends that France provide this information in the NIR in order to improve the transparency of the documentation in its next annual submission.

Agricultural soils – N<sub>2</sub>O

99. The ERT noted that France has reported only that emissions of N<sub>2</sub>O from agricultural soils are estimated using the IPCC methods, but the actual EFs used are not provided, nor are the AD for individual sources of N to soil. The ERT notes that some of these sources of N cannot be estimated from other data in the CRF tables (e.g. N input to soil as crop residues), and must be reported for the sake of transparency. The ERT recommends that France provide summary information on the inventory methods, equations, parameters and EFs used in order to improve the transparency of the documentation, and that the Party provide more information on AD in its next annual submission.

100. France reports N<sub>2</sub>O emissions from the use of sewage sludge and compost spreading under the category other direct emissions, but does not provide a description of inventory methodologies or information data sources in the NIR. The ERT recommends that France provide this information in its next annual submission.

**3. Areas for further improvement**Identified by the Party

101. No further improvements are identified by the Party in the NIR for this sector.

Identified by the expert review team

102. According to the ERT, the major areas for improvement are estimates of CH<sub>4</sub> and N<sub>2</sub>O emissions from manure management. The ERT recommends that France improve the methodologies used for these categories so that the data used (e.g. VS and N<sub>ex</sub>) are

consistent with the assumptions and underlying data used to estimate CH<sub>4</sub> emissions from enteric fermentation. The ERT also recommends that the Party improve the transparency of its reporting by providing additional information on country-specific models, EFs, parameters and assumptions.

## **E. Land use, land-use change and forestry**

### **1. Sector overview**

103. In 2008, net removals from the LULUCF sector amounted to 67,558.26 Gg CO<sub>2</sub> eq. Since the base year, net removals have increased by 102.7 per cent from net removals of 33,321.41 Gg CO<sub>2</sub> eq in 1990. The key driver for the rise in removals was the expansion in the area of total forest land, an increase of 3.7 per cent, or 831.59 kha, between 1990 (22,656.44 kha) and 2008 (23,488.03 kha), and the increase in removals per unit area of forest land remaining forest land, from 2.13 to 3.19 t CO<sub>2</sub>/ha from 1990 to 2008, an increase of 49.9 per cent. Overall, the increase in net removals in the sector reflects the increase in net removals from total forest land of 32,519.13 Gg CO<sub>2</sub> eq (66.2 per cent since the base year) and the decrease in emissions from total cropland by 45.1 per cent (15,385.95 Gg CO<sub>2</sub> eq). This effect was partly balanced by a reduction in net removals from total grassland of 11,493 Gg CO<sub>2</sub> eq (-50.3 per cent).

104. Within the sector, net removals of 69,429.58 Gg CO<sub>2</sub> eq were reported from forest land remaining forest land, followed by 14,061.48 Gg CO<sub>2</sub> eq from land converted to forest land, and 11,501.31 Gg CO<sub>2</sub> eq from land converted to grassland. On the other hand, net emissions of 16,062.22 Gg CO<sub>2</sub> eq were reported from land converted to cropland, followed by 4,609.93 Gg CO<sub>2</sub> eq from land converted to settlements, 1,241.21 Gg CO<sub>2</sub> eq of CH<sub>4</sub> and N<sub>2</sub>O emissions from biomass burning, and 329.97 Gg CO<sub>2</sub> eq from land converted to other land. N<sub>2</sub>O emissions from disturbance associated with land-use conversion to cropland accounted for 1,411.69 Gg CO<sub>2</sub> eq (4.55 Gg N<sub>2</sub>O), CO<sub>2</sub> emissions from agricultural lime application on cropland accounted for 983.56 Gg CO<sub>2</sub> eq and CO<sub>2</sub> net emissions from land converted to wetlands accounted for 405.24 Gg CO<sub>2</sub> eq.

105. The following categories were reported as “NO”: emissions/removals of CO<sub>2</sub> from cropland remaining cropland, grassland remaining grassland and wetlands remaining wetlands; N<sub>2</sub>O direct emissions from N fertilization of forest land and other; CH<sub>4</sub> and N<sub>2</sub>O emissions from drainage of forest soils and wetlands; CO<sub>2</sub> emissions from lime application on grassland; and CH<sub>4</sub> and N<sub>2</sub>O emissions from wildfires in cropland, grassland and wetlands.

106. France has also not reported (reported as “0”) changes in carbon pools for some categories, such as: mineral soils for wetlands and other land converted to forest land; mineral soils for wetlands, settlements and other land converted to cropland or grassland; and mineral soils for grassland converted to grassland. France has not provided explanations as to why it has not included estimates for these pools. The ERT recommends that France include, in the next annual submission, to the extent possible, estimates of carbon stock changes (CSC) for all pools or report them using the appropriate notation keys and providing justification as to why they have not been reported.

107. France has reported as “0” the CSC in some pools, across different categories, that are assumed to be unchanging or do not occur in the country, such as: organic soils for forest land remaining forest land and land converted to forest land; mineral soils and organic soils for cropland remaining cropland; organic soils for land converted to cropland; mineral and organic soils for grassland remaining grassland; and organic soils for land converted to grassland. The ERT notes that the use of “0” is not in accordance with the UNFCCC reporting guidelines, except to report the CSC in living biomass when gains

equal losses. The ERT recommends that France report the changes in these pools using the appropriate notation key (“NO”) for the next annual submission.

108. France has reported the CSC in some pools as “NO” even when it appears that these may not have been estimated due to a lack of information, including: gains in living biomass in forest land converted to cropland or grassland; gains and losses in living biomass in wetlands, settlements and other land converted to cropland or grassland, cropland converted to grassland and vice versa; losses in living biomass in grassland, wetlands, settlements and other land converted to forest land; and soils in all land converted to settlements except tropical forest to settlements. The ERT recommends that France include in its next annual submission, to the extent possible, estimates for changes in all the pools currently reported as “NO” or provide documentation to justify that they do not occur. Otherwise, the ERT recommends that France report these cases as “NE”.

109. For mainland France, the Party collects annual monitoring data on land cover/use from the Teruti (before 2004) and Teruti-LUCAS (after 2004) systems, which can be classified as a tier 2 approach in accordance with the IPCC good practice guidance for LULUCF. However, the methodology for sampling was changed in 2005, when the Party moved from the Teruti to the Teruti-LUCAS system, and the ERT considers that this is causing an inconsistency in the time series.

110. During the review, France provided additional information on how time-series consistency issues have been addressed in land area representation. The ERT is satisfied with the general approach followed by France, but believes that there are still some unresolved issues concerning the representation of the land area, in particular: fluctuations in the total national land area as collected from the CRF tables (635,786.2 km<sup>2</sup> in 1990, 636,045.2 km<sup>2</sup> in 2000 and 635,925.8 km<sup>2</sup> in 2008); the inconsistency between the national land area reported in the CRF tables for 2008 (635,786.2 km<sup>2</sup>) and in the NIR (632,834 km<sup>2</sup>); and the share of the land area allocated to lands converted to cropland and grassland, which is unrealistically high. These issues were raised in the previous review report.<sup>25</sup>

111. The Party explained during the review that the apparent overestimation of the area of converted land may be due to errors associated with the extrapolation method used to estimate land-use areas in the early years of the time series. The ERT recommends that France revise the procedure used for the representation of land use and land-use change for the entire time series and develop a consistent land area representation by including a complete set of land-use change matrices since 1971 in the next annual submission.

112. The ERT considers that the LULUCF sector is not reported in a fully transparent manner. The OMINEA report (annex 3 to the NIR) provides detailed information on the sources of the various methods used. However, no explanations are provided on how these methods were applied for several categories (e.g. selected values for carbon losses due to biomass burning; the method used to estimate areas of land under different land uses) as well as the basis supporting several of the assumptions made. The NIR does not provide information on relevant AD (e.g. wood harvest or areas affected by forest fire) and on the EFs used in the estimates. The ERT recommends that France take measures to improve the transparency of reporting in the next and future annual submissions. In particular, the ERT recommends that some of the information provided during the review on the land-use survey system (Teruti-LUCAS) and the NFI be included in the NIR, in order to improve transparency. In addition, a description of the existing QA/QC plan for the LULUCF sector should be included in the NIR.

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<sup>25</sup> FCCC/ARR/2009/FRA, paragraph 94.

## 2. Key categories

### Forest land remaining forest land – CO<sub>2</sub> and CH<sub>4</sub>

113. France uses the default assumption that all carbon in biomass harvested is emitted in the same year. However, France reports emissions from forest land affected by the 1999 storm event using a different approach: it considers compensation by the wood industry in the first few years after the storm (2000 and 2001) for the consideration of additional wood available from windfalls, followed by reduced harvest removals in the later years (2002–2006). At the same time, it considers emissions from the gradual decomposition of the windfalls from the storm over the period 2001–2020 following an exponential decay model. This gradual loss of carbon from the dead organic matter (DOM) pool accounts for most of the emissions from the storm over the entire period.

114. France has followed this approach to better reflect the actual profile of emissions resulting from the 1999 storm and to avoid reporting extraordinarily high emissions in the years immediately following the storm. France explained during the review that this approach does not affect the total emissions resulting from the storm. However, the ERT notes that the CSC resulting from the 1999 storm were not correctly apportioned to the different carbon pools in the CRF tables (e.g. emissions from DOM do not show any increase in the years after the storm), which makes it difficult to assess whether the emissions from the 1999 storm are accurately estimated. The ERT recommends that France revise the way it reports the CSC in the different carbon pools for the years following exceptional events such as storms in order to improve the transparency of emission estimates in its next annual submission.

115. France makes use of energy consumption statistics to estimate the biomass losses from fuelwood removals from forest land. During the review, France explained that 30 per cent of the volume of non-merchantable parts of the commercial timber harvest is subtracted from the total volume of fuelwood from forest land obtained from energy consumption statistics to avoid the double-counting of biomass removals, and that this figure is based on expert judgement. However, neither a reference to this figure nor its basis were provided in the NIR. The ERT recommends that France provide more information on the basis of this expert judgement as well as supporting documentation in the NIR in its next annual submission.

116. The biomass pool has been considered to be unchanging for tropical forests in the overseas territories of Guyana, Guadeloupe, Martinique and Reunion based on the assumption that biomass growth equals removals. During the review, France clarified that this assumption is based on expert judgement, but did not provide its basis. The ERT recommends that France either revise the estimates with data on actual biomass growth and removals or provide sufficient justification for this assumption including supporting documentation in the NIR in its next annual submission.

117. According to the NIR (the OMINEA report), France reports CH<sub>4</sub> removals in forest land remaining forest land using an EF of 2.4 kg/ha which is the same as the EF for undisturbed forests. This issue was also identified in the previous review report.<sup>26</sup> The ERT reiterates the recommendations in the previous review report that France reallocate the estimates of CH<sub>4</sub> removals to the category other (LULUCF) and report relevant information in the NIR in future annual submissions.

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<sup>26</sup> FCCC/ARR/2009/FRA, paragraph 96.

Land converted to forest land – CO<sub>2</sub>

118. The ERT noted that France did not report the totality of CSC in the DOM pool for the land converted to forest land in mainland France. This issue was identified by the ERT from the CRF tables reporting data on activities under Article 3, paragraph 3, of the Kyoto Protocol where the deadwood pool is reported as “NO” for areas under afforestation and reforestation. During the review, France confirmed that this was indeed the case and explained that this was done due to the lack of data on the deadwood pool for mainland France. In the course of the review, France, following recommendations by the ERT, submitted revised estimates of CSC in the deadwood pool (reported under DOM) using information from a scientific study, which the ERT considers to be in line with the IPCC good practice guidance for LULUCF.

Land converted to cropland – N<sub>2</sub>O

119. The areas reported as land converted to cropland in CRF tables 5.B (4,1640.60 kha) and 5(III) (3,639.63 kha) are not the same. This issue was identified in the previous review report.<sup>27</sup> The ERT reiterates the recommendation that France resolve this inconsistency in the next annual submission.

Land converted to grassland – CO<sub>2</sub>

120. The proportion of land converted to grassland to total grassland area is unusually high, although it shows a falling trend over the whole time series: 70.3 per cent in 1990 and 41.3 per cent in 2008. The Party explained that this may be the result of errors in the procedure used for the representation of land use, due to the difficulties in distinguishing areas that are under grassland from those under cropland, and due to the fact that the estimates for earlier years in the time series are made by extrapolation. The ERT recommends that France revise the procedures for the identification of land use in the whole time series for the next annual submission.

Land converted to settlements – CO<sub>2</sub>

121. There is a minor inconsistency between the NIR and CRF table 5.E in the total area reported as settlements in 2008: CRF table 5.E reports an area of 4,945.33 kha while the NIR (page 137) reports an area of 5.2 Mha. The ERT recommends that France resolve this inconsistency in its next annual submission.

**3. Non-key categories**Cropland remaining cropland – CO<sub>2</sub>

122. France uses a constant value for the organic carbon content in agricultural soils under an equilibrium of 40 t C/ha (OMINEA report, section B.3.3.2) to estimate the soil CSC of mineral soils for cropland without making suitable adjustments for the management practices that could affect soil carbon stock levels. As explained in the NIR, such disaggregation has not been done due to the lack of information regarding management practices. The ERT recommends that France collect information regarding management practices on cropland as part of its Teruti-LUCAS land-area survey system and report the soil CSC in mineral soils taking account of management practices in its next annual inventory submission.

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<sup>27</sup> FCCC/ARR/2009/FRA, paragraph 102.

Biomass burning – CO<sub>2</sub>

123. France has not reported CO<sub>2</sub> emissions from wildfires from forest land remaining forest land because it assumes that these emissions are included in the biomass growth factors used. During the review, the material provided by France made it clear that these emissions are in fact not included in the growth factors used. France provided information on the area, volume of biomass burned, which allows a thorough review of the emission estimates. In the course of the review, France submitted revised estimates of emissions from biomass burning due to wildfires in forest land remaining forest land using the area annually burned as provided by the Ministry of Agriculture. The Party reported additional emissions of 158.23 Gg CO<sub>2</sub> eq in 2008 from wildfires in 6,006.00 ha of forest land remaining forest land, and the ERT concludes that the emission estimates are now in accordance with the IPCC good practice guidance for LULUCF.

**4. Areas for further improvement**Identified by the Party

124. No further improvements are identified by the Party in the NIR for this sector.

Identified by the expert review team

125. The ERT recommends that France implement the following improvements for future annual submissions:

(a) The improvement of the transparency of reporting, including: the proper use of notation keys; clear documentation of AD, EFs, methods and assumptions in the NIR; and transparent information on the Teruti-LUCAS system, the NFI, sector-specific QC and institutional responsibilities;

(b) Ensuring a more consistent representation of land use over the whole time series, including the knowledge of management practices in cropland and grassland to enable the estimation of CSC in these land-use categories;

(c) The improvement of the knowledge on carbon stocks and their changes as well as GHG emissions in overseas tropical territories;

(d) The development of more accurate estimates of non-biomass carbon pools in forest land;

(e) Increasing the completeness of reporting by providing estimates for pools not estimated or not reported.

**F. Waste****1. Sector overview**

126. In 2008, emissions from the waste sector amounted to 11,444.38 Gg CO<sub>2</sub> eq, or 2.2 per cent of total GHG emissions. Since the base year, emissions have decreased by 9.3 per cent. The key drivers for the fall in emissions are the decrease in CH<sub>4</sub> emissions from solid waste disposal (emissions have decreased by 1,364.13 Gg CO<sub>2</sub> eq or 56.9 per cent since the base year), which was due to the reduced deposition of waste in landfills and increased CH<sub>4</sub> recovery, and the decrease in CO<sub>2</sub> emissions from waste incineration without energy recovery (a decrease of 422.29 Gg CO<sub>2</sub> eq or 17.6 per cent since the base year). The decrease in emissions was partially countered by an increase in CH<sub>4</sub> emissions from wastewater treatment (an increase of 242.57 Gg CO<sub>2</sub> eq or 10.1 per cent since the base year), which was caused by the growing number of people connected to septic systems, and

by the increase of 369.64 Gg CO<sub>2</sub> eq of CH<sub>4</sub> emissions from composting and biogas production (reported under the category other (waste)). Within the sector, 60.0 per cent of the emissions were from solid waste disposal, followed by 19.8 per cent from wastewater treatment, 16.1 per cent from waste incineration, and 4.2 per cent from composting and biogas production. The category GHG emissions from waste incineration includes only emissions without energy recovery, while emissions from waste incinerated with energy recovery are reported in the energy sector in accordance with the Revised 1996 IPCC Guidelines.

127. The ERT commends France for the many improvements made to the completeness and to the transparency of its 2010 submission (e.g. France has integrated relevant information from the OMINEA report in the main part of the NIR relating to the description of the methodology used for solid waste disposal on land), and for having implemented many of the recommendations of previous review reports. However, the ERT recommends that France provide more detailed and documented information on the methodologies, AD and EFs used in the waste sector, and more explanations on the national circumstances relating to the waste sector in the NIR, in its next annual submission.

## 2. Key categories

### Solid waste disposal on land – CH<sub>4</sub>

128. France uses a tier 2 methodology to estimate CH<sub>4</sub> emissions from solid waste disposal sites (SWDS). National statistics and survey data were used along with country-specific EFs. A total of 95 per cent of the waste landfilled in France is disposed in landfills equipped with biogas recovery systems.

129. In the original submission of 12 April 2010, France used a recovery efficiency of 80 per cent to estimate emissions from this category. The ERT found that this value is based on expert judgement, and the ERT notes that the IPCC good practice guidance (page 5.10) states that the default methane recovery value is zero, and that it should only be changed “when references documenting the amount of methane recovery are available”. The same IPCC document also states that “reporting based on metering of all gas recovered for energy utilization and flaring is consistent with good practice” and “the use of undocumented estimates of landfill gas recovery potential is not appropriate, as such estimates tend to overestimate the amount of recovery”. The ERT pointed out to the Party, during the review, that the fraction of CH<sub>4</sub> recovery in total CH<sub>4</sub> emissions generated, calculated from data in the CRF tables (69.0 per cent in 2008), is one of the highest fractions among reporting Parties and higher than any CH<sub>4</sub> recovery fraction reported by countries that use monitored data for landfill gas recovery.

130. Further, during the review, France informed the ERT that monitored data of landfill gas recovered are currently not available, and provided the ERT with information on research studies (Diot et al., 2001; Morcet et al., 2003) containing the results from measurements conducted on three closed landfill sites, where about 90 per cent of the biogas produced was recovered. The ERT notes that these measurements were undertaken on closed landfills with highly effective cover materials and the experiments may not reflect average conditions of general operational landfill sites.

131. Responding to a request from the ERT, France submitted revised estimates of CH<sub>4</sub> emissions and recovery from managed solid waste disposal on land on 22 October 2010. The Party revised the recovery efficiency in 2008 downwards, from 80 per cent to 70 per cent (a weighted average of 64 per cent in landfills managed by public authorities and 80 per cent in those managed by private companies). The new values are based on expert judgement and assumptions and a limited number of reference documents (ADEME, 2003; Hébé and Gaucher, 2010; Sylvain and Morcet, 2002) and limited analysis of the situation in

other countries (e.g. Ireland and the United Kingdom of Great Britain and Northern Ireland). Overall, the revised fraction of CH<sub>4</sub> recovery in total CH<sub>4</sub> emissions generated, calculated from data in the CRF tables, was revised downwards to 61.9 per cent.

132. Having analysed the revised estimates provided by France, the ERT concluded that the documentation provided is insufficient to support the high recovery of CH<sub>4</sub>, taking into consideration that the assumptions are largely based on a single study (Sylvain and Morcet, 2002), whereby the results from a limited number of landfills were extrapolated to all French landfills, as well as several other issues (see para. 153 below for further details). Given the large number of assumptions for which expert estimates were used in extrapolating the measured parameters to the period of a year and to all French landfills, and the fact that the full operation of gas recovery systems throughout the year was assumed, the ERT believes that the method is not in line with the IPCC good practice guidance. Therefore, the amount of CH<sub>4</sub> recovered is considered to be overestimated and the ERT calculated an adjustment for the category CH<sub>4</sub> emissions from managed solid waste disposal on land (see chapter II.G below for further details).

133. The ERT recommends that France start to gather measured data on landfill gas captured in French landfills, and report them in the next annual submission. In particular, the ERT recommends that the Party collect data on: actual amounts of landfilled gas captured for all landfills; the CH<sub>4</sub> content of the landfill gas captured; the amount of landfill gas used for energy purposes and the amounts flared; and the electricity generated and used for own purposes or sold (the latter elements can be used to cross-check with the French energy balance). Data collection should cover not only operating landfills, but also potentially closed landfills with ongoing landfill gas recovery in order to gather data on complete amounts of gas recovery. During the course of the review, France informed the ERT that the national system, through the actions of the GCIIE group, had already defined a plan to collect information in the form of a questionnaire aimed at private and public landfills, and to calculate estimates in time for the Party's 2012 submission. The Party also informed the ERT that the use of data from the questionnaire is temporary and that it plans to implement mandatory procedures to collect information through the GEREPE system. The ERT recommends that France follow the plan and report on the state of its implementation in the next annual submission.

#### Waste incineration – CO<sub>2</sub>

134. France estimates CO<sub>2</sub> emissions from waste incineration for several fractions of wastes using either tier 1 or tier 2 methodologies depending on the waste category. The EFs are country-specific or from the *EMEP/EEA Air Pollutant Emission Inventory Guidebook* (EEA, 2009), as described in the OMINEA report. The ERT considers that the use of these methods is appropriate.

135. During the review, France provided new figures to correct the discrepancies between the AD of industrial waste incinerated in 1990 provided in the 2009 and 2010 NIRs. The ERT considers this inaccuracy to be the result of a failure to carry out adequate QC checks and recommends that France correct these figures in the next submission and improve its QC checks for the waste sector.

### **3. Non-key categories**

#### Wastewater treatment – CH<sub>4</sub> and N<sub>2</sub>O

136. France uses a tier 2 methodology combined with country-specific parameters to estimate CH<sub>4</sub> emissions from wastewater handling. The ERT commends France for the improvements in completeness: the Party is now providing estimates of CH<sub>4</sub> emissions from sludge (industrial, domestic and commercial wastewater), and N<sub>2</sub>O emissions from

domestic wastewater. Following the recommendations of the previous review report,<sup>28</sup> France has also reported data on biochemical oxygen demand and maximum CH<sub>4</sub> producing capacity.

137. Following the recommendations of the previous review report, France is now providing per capita protein consumption and the N fraction in CRF table 6.B. However, the AD and formulae used to estimate the N<sub>2</sub>O EF for industrial wastewater are not provided in the NIR. The ERT recommends that France provide this information in the next annual submission.

#### Waste incineration – N<sub>2</sub>O

138. Following the recommendations of the previous review report,<sup>29</sup> France is now providing references for the N<sub>2</sub>O EFs of some subcategories (e.g. household waste, sludge, hospital waste). The ERT recommends that France continue to enhance the reporting for this category in future annual submissions by providing references for all categories.

#### Other (waste) – CH<sub>4</sub> and N<sub>2</sub>O

139. During the review, France provided AD for composting and for biogas production. References to information sources of AD are provided in annex 3 to the NIR, but the time series for each category were not provided in the NIR. The ERT recommends that France report the AD and EFs used for these rapidly evolving subcategories separately in the main body of the NIR in its next annual submission.

### **4. Areas for further improvement**

#### Identified by the Party

140. The following improvements were proposed by France in the written answers to the questions raised by the ERT during the review:

- (a) The provisions or update of references related to AD, EFs and equation parameters, in the next annual submission;
- (b) The improvement of checks to verify that the units of AD and EFs used in the NIR will be the same as those in the CRF tables;
- (c) The provision of more detailed explanations on uncertainties.

#### Identified by the expert review team

141. The ERT identified the following improvements for the future:

The collection of monitored data for CH<sub>4</sub> recovery from all landfills as required by the IPCC good practice guidance for the next annual submission.

## **G. Adjustments**

142. The ERT identified and applied an adjustment in the waste sector for 2008. In accordance with the Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (decision 20/CMP.1), an adjustment to the waste sector was prepared by the ERT in consultation with France. Also, in accordance with the

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<sup>28</sup> FCCC/ARR/2009/FRA, paragraph 114.

<sup>29</sup> FCCC/ARR/2009/FRA, paragraph 119.

“Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1), the ERT officially notified France of the calculated adjustment.

143. The underestimation leading to the adjustment in the waste sector in 2008 includes: CH<sub>4</sub> emissions from managed solid waste disposal on land.

144. The adjusted estimate for GHG emissions from the waste sector in 2008 amounts to 19,540.86 Gg CO<sub>2</sub> eq, compared with 11,444.38 Gg CO<sub>2</sub> eq originally reported by France in its 2010 annual submission. The calculation of the adjustment leads to an increase in estimated total Annex A GHG emissions of 1.5 per cent (8,096.47 Gg CO<sub>2</sub> eq), from 528,089.71 Gg CO<sub>2</sub> eq as reported by France to 536,186.18 Gg CO<sub>2</sub> eq as calculated by the ERT.

145. In its response to the draft annual review report, France notified the secretariat of its intention to accept the calculated adjustment.

146. The ERT notes that France may submit a revised estimate for a part of its inventory to which an adjustment was applied, in conjunction with its next inventory, or at the latest with the inventory for the year 2012. The revised estimate will be part of the Article 8 review and, if accepted by the ERT, the revised estimate will replace the adjustment.

## 1. Solid waste disposal on land – CH<sub>4</sub>

### The original estimate

147. In its original submission of 12 April 2010, France submitted, for 2008, an estimate of 220.93 Gg CH<sub>4</sub> emissions from managed solid waste disposal on land and CH<sub>4</sub> recovery of 491.78 Gg for the same category.

### The underlying problem

148. In its original submission of 12 April 2010, France used a recovery efficiency of 80 per cent to estimate emissions from this category. The ERT found that this value was based on expert judgement which the Party could not satisfactorily justify. The fraction of CH<sub>4</sub> recovery in total CH<sub>4</sub> emissions generated, calculated from data in the CRF tables, is 69.0 per cent in France. The ERT pointed out to the Party, during the review, that the fraction of CH<sub>4</sub> recovery in total CH<sub>4</sub> emissions generated, calculated from data in the CRF tables (69.0 per cent in 2008), is one of the highest fractions among reporting Parties and higher than any CH<sub>4</sub> recovery fraction reported by countries that use monitored data for landfill gas recovery. There is only one Party reporting a higher fraction in 2008, the United Kingdom, which reported 72.7 per cent, and the average fraction across all Parties that report CH<sub>4</sub> recovery is 30.4 per cent.

149. The ERT notes that the IPCC good practice guidance (page 5.10) states that the default methane recovery is zero, and that it should only be changed “when references documenting the amount of methane recovery are available”. The same IPCC document also states that “reporting based on metering of all gas recovered for energy utilization and flaring is consistent with good practice” and that “the use of undocumented estimates of landfill gas recovery potential is not appropriate, as such estimates tend to overestimate the amount of recovery”. The IPCC good practice guidance also requires references documenting the amount of CH<sub>4</sub> recovery. The *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) further specify that reporting based on metering of CH<sub>4</sub> recovered should include the monitoring of the produced amount of electricity from the landfill gas and that estimating the amount of CH<sub>4</sub> recovered using more indirect methods should be done with great care, using substantiated assumptions.

150. According to information provided by the Party, the estimate of CH<sub>4</sub> recovery provided by France in its original submission was not based on the metering of all gas recovered for energy utilization and flaring. It was based on a country-specific method using an assumed average recovery efficiency of 80 per cent for all landfills with recovery systems over the lifetime of the landfills. The data sources and the underlying assumptions used for the estimate of CH<sub>4</sub> recovery were not transparently explained in the NIR or in the additional information received from the Party during and after the review week.

#### The recommendation to the Party

151. In the list of potential problems and further questions, the ERT requested that France start to gather measured data for the landfill gas captured in French landfills in order to comply with the requirements of the IPCC good practice guidance. Until such measured data are available, the ERT recommended that France use a fraction of CH<sub>4</sub> recovery reported by one or several countries that use measured data from landfills and that have comparable conditions to France with regard to: landfill management practices; the implementation of landfill gas recovery; and the types of waste disposed to landfills. It was also recommended that France analyse the inventory reports of neighbouring countries to identify appropriate countries and deduct the fraction of CH<sub>4</sub> recovery.

#### The rationale for adjustment

152. In its response to the list of potential problems and further questions raised by the ERT, France submitted revised estimates of CH<sub>4</sub> emissions and recovery from managed solid waste disposal on land on 22 October 2010. The Party revised the recovery efficiency in 2008 downwards, from 80 per cent to 70 per cent (reflecting a weighted average of 64 per cent in landfills managed by public authorities and 80 per cent in those managed by private companies). The new values are based on expert judgement and assumptions, a limited number of reference documents (Diot et al., 2001; Morcet et al., 2003; ADEME, 2003; Hébé and Gaucher, 2010; Sylvain and Morcet, 2002), and a limited analysis of the situation in other countries (Ireland and the United Kingdom). Overall, the revised fraction of CH<sub>4</sub> recovery in total CH<sub>4</sub> emissions generated, calculated from data in the CRF tables, was revised downwards to 61.9 per cent. Most assumptions used in the revision of the estimates were derived from a key study with measurement data (Sylvain and Morcet, 2002). The study, using 2002 data, is based on measurements in three landfills during two two-week periods in winter (December) and summer (September) using a mass-balance method. For one landfill, the measurement period was only one week.

153. The values from these measurements were extrapolated to all landfills with CH<sub>4</sub> recovery systems. The representativeness of the measurements from three landfills to all landfills with recovery systems, and the justification for the application of results from a small sample to the overall French system of landfills, was not demonstrated. The ERT identified the following additional problems with the assumptions made:

(a) France assumed that one fifth of each landfill area is under exploitation, that one fifth of each landfill has an intermediate cover and that three fifths of the area is closed with permanent cover. No reference sources were provided for these key assumptions. The ERT notes that the recovery efficiency in closed landfills has to be differentiated from landfills in operation. The latter may have no coverage or some preliminary coverage and have lower recovery efficiencies than closed landfills;

(b) France assumes better cover materials and faster coverage for landfills operated by private companies compared to landfills operated by public authorities. The estimates used are based on expert judgement from private landfill operators and are not based on statistical data. The ERT notes that the recovery efficiency depends on the cover materials and when the disposed waste is covered;

(c) For landfills under exploitation, the study by Sylvain and Morcet (2002) provides very few results with regard to the recovery efficiency. For the summer measurements, the mass-balance method did not show consistent results. This inconsistency was explained by the fact that the gas collection systems did not work properly and the results were consequently not used in the estimation. As the recovery systems did not work properly on two separate occasions during the collection of the measurements, the ERT notes that such interruptions in the operation may be typical in summer periods. In the estimation, the fact that the CH<sub>4</sub> recovery systems may not be fully operational during the entire year was not taken into account. The same study showed that, during the measurements taken in September, the clay recovery systems did not work properly because the clay cover had many cracks due to the dry weather conditions, which led to the increased emission of CH<sub>4</sub> into the atmosphere: oxygen (O<sub>2</sub>) was sucked through the cracks into the recovery system and the system was shut down due to the unfavourable conditions. Such conditions may prevail during longer periods in the summer, which would reduce the recovery rate compared to the assumptions used;

(d) Estimates by France assume a high recovery efficiency of 90 per cent for landfills using a “waterproof covering” which was represented by a geomembrane cover in the study provided. However, in the study (Sylvain and Morcet, 2002) a single landfill with such cover materials showed a recovery efficiency of only 84 per cent and with an inconsistent mass-balance. The ERT considers that no scientific evidence for the high recovery efficiency was presented;

(e) The study by Sylvain and Morcet (2002) concludes that the recovery efficiency is strongly dependent on the moisture content of the soil and the temperature. However, single measurements only provide snapshots due to spatial and temporal variation. No evidence was provided to demonstrate that the measured parameters are applicable over the course of an entire year. According to other authors (Oonk and Boom, 1995) a period of about three weeks is required to obtain consistent average emissions with the mass-balance method used, whereas in the study, measurements were taken over two-week or one-week periods only. Thus, the measurement periods in the Sylvain and Morcet study may not be representative;

(f) No data have been presented on the heat and electricity produced, or on the amounts flared. However, the Party assumed that 100 per cent of the CH<sub>4</sub> captured is used for energy purposes and flared and that no gas is vented. No documentation was provided to support these assumptions;

(g) For 2008, it was assumed that 95 per cent of the waste disposed in managed SWDS have recovery systems. This assumption is not clearly substantiated in the amount of waste disposed in managed landfills with recovery systems and in landfills without recovery systems.

154. Given the large number of assumptions for which expert estimates were used in extrapolating the measured parameters to the period of a year and to all French landfills, and the fact that the full operation of gas recovery systems throughout the year was assumed, the ERT considers that the method used by France to estimate CH<sub>4</sub> recovery is not in line with the IPCC good practice guidance. Therefore, the ERT considers that the revised parameter provided during the review on the amount of CH<sub>4</sub> recovered in managed solid waste disposal on land is overestimated and that estimates of CH<sub>4</sub> emissions from the same category are underestimated.

#### The assumptions, data and methodology used to calculate the adjustment

155. In accordance with decision 20/CMP.1, the adjustment was calculated at the level at which the problem was identified, that is, the recovery efficiency at landfill sites.

156. In accordance with table 1 of the Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (annex to decision 20/CMP.1), the ERT calculated the adjustment using the IPCC default method from the IPCC good practice guidance and recommended international data sources.

157. France reported an original value of 80 per cent for the recovery efficiency at landfill sites, which was revised to 70 per cent in later submissions during the review. Thus, the percentage emitted is 30 per cent. At the same time, the fraction of CH<sub>4</sub> recovery in total CH<sub>4</sub> emissions generated, calculated from data in the CRF tables, was revised from 69.0 per cent in the original submission to 61.9 per cent in the revised estimates. This corresponds to a 38.1 per cent fraction of emissions.

158. According to the IPCC good practice guidance, the default for CH<sub>4</sub> recovery is zero recovery. However, the ERT considers that the use of this default would result in an overestimation of emissions and would not recognize the mitigation efforts in the waste sector, given the widespread use of CH<sub>4</sub> recovery systems in France. The ERT notes that the 2006 IPCC Guidelines, representing the most recent compilation of scientific evidence, provide a revised default recovery efficiency of 20 per cent when CH<sub>4</sub> recovery is estimated on the basis of the number of SWDS with landfill recovery. The ERT considers that this last assumption is closer to the situation in France. The ERT decided to calculate the adjustment using 20 per cent as the efficiency of recovery, or 80 per cent of emissions.

The adjusted estimate

159. Table 4 below describes the steps for the calculation of the adjustment.

Table 4

**Description of the adjustment(s) calculation for Annex A sources**

<i>Parameter/estimate</i>	<i>Value</i>	<i>Unit</i>	<i>Source</i>
Category: CH <sub>4</sub> from managed solid waste disposal on land			
Party's estimate of: CH <sub>4</sub> recovery	441.20	Gg CH <sub>4</sub>	CRF table 6.A.C
Input parameter used by Party: recovery efficiency	70.0	%	France reported 80 per cent in the NIR (page B.2.4.1 COM/2). During the review, France revised the value to 70 per cent
Party's emissions estimate from managed solid waste disposal on land	271.56	Gg CH <sub>4</sub>	CRF table 6.A.C
Input data/parameter for calculation of adjustment	20.0	%	2006 IPCC Guidelines, volume 5 – Waste, chapter 3 – Solid Waste Disposal, page 3.19
Calculated estimate for CH <sub>4</sub> recovery	126.06	Gg CH <sub>4</sub>	Calculation by the ERT
Calculated estimate for CH <sub>4</sub> emissions from managed solid waste disposal on land	586.71	Gg CH <sub>4</sub>	Calculation by the ERT
Conservativeness factor	1.12		Table 2, appendix III of the annex to decision 20/CMP.1
Adjusted conservative estimate for CH <sub>4</sub> emissions from managed solid waste disposal on land	657.11	Gg CH <sub>4</sub>	Calculation by the ERT
Total aggregated GHG emissions (excluding LULUCF) as reported	528 089.71		CRF table summary2

by the Party			
Total aggregated GHG emissions (excluding LULUCF) after application of the adjustment	536 186.18		Calculation by the ERT
Difference between original and adjusted total aggregated GHG emissions	8 096.47	Gg CO <sub>2</sub> eq	Calculation by the ERT
	1.5	%	

#### Conservativeness of the ERT's calculation of the adjustment

160. In line with paragraph 5 of decision 20/CMP.1, conservativeness was ensured by applying the conservativeness factor of 1.12 (for emission estimates of CH<sub>4</sub> from managed solid waste disposal on land) from table 2 of appendix III to the Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (annex to decision 20/CMP.1). The ERT therefore considers that the resulting adjusted values are conservative.

## **H. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol**

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

#### Overview

161. France submitted estimates for afforestation, reforestation and deforestation activities under Article 3, paragraph 3, of the Kyoto Protocol. France has elected the activity forest management under Article 3, paragraph 4, of the Kyoto Protocol. France has chosen to account for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol annually.

162. In its original submission,<sup>30</sup> France provided a complete set of CRF tables for the purpose of submitting information on LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (KP-LULUCF CRF tables), but did not report all the information outlined in paragraphs 5–9 of the annex to decision 15/CMP.1. In particular, the Party did not:

(a) Provide information on the year of the onset of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol that started after the beginning of the commitment period, as required by paragraph 6(d);

(b) Account for changes in carbon storage in the deadwood carbon pool or did not provide verifiable information that demonstrates that this unaccounted pool was not a net source of anthropogenic GHG emissions, as required by paragraph 6(e);

(c) Provide documentation of the directly human-induced condition of the area reported under afforestation and reforestation activities, as required by paragraph 8(a).

163. In response to the questions raised by the ERT during the course of the review,<sup>31</sup> France submitted revised estimates and reported additional information on the issues mentioned above (see paras. 170, 174 and 179–180 below). The ERT considers that France is fulfilling the requirements of paragraphs 6(e) and 8(a) of the annex to decision

<sup>30</sup> Submitted on 12 April 2010 and resubmitted on 7 May 2010.

<sup>31</sup> Submissions of 17 September 2010 and 22 October 2010.

15/CMP.1, and recommends that the Party, in its next annual submission, include information on the year of the onset of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol that started after the beginning of the commitment period, as required by paragraph 6(d) of the annex to decision 15/CMP.1.

164. The ERT identified a number of omissions and errors in the KP-LULUCF CRF tables in the original submission:

- (a) Table NIR-3 does not contain information;
- (b) CH<sub>4</sub> emissions are reported in CRF table 5(KP) as “NA” for afforestation/reforestation;
- (c) Areas under deforestation that would otherwise be subject to elected activities under Article 3, paragraph 4, of the Kyoto Protocol were reported as “NE” in CRF table 5(KP-I)A.2.1;
- (d) N<sub>2</sub>O emissions from disturbance associated with land-use conversion to cropland, referring to units of deforested land otherwise included under Article 3, paragraph 4, of the Kyoto Protocol, were reported as “NE” in CRF table 5(KP-II)3;
- (e) No information was provided in the documentation boxes;
- (f) Net emissions/removals and the accounting quantities in the accounting table were indicated as not reported (“NR”) for afforestation and reforestation activities, while emissions and removals were reported for afforestation and reforestation in CRF tables 5(KP), 5(KP)A.1.1 and 5(KP)A.1.2. The ERT notes that this reporting has implications on the use of offsets from forest management in accordance with paragraph 10 of the annex to decision 16/CMP.1.

165. During the review week, France submitted a new version of the KP-LULUCF CRF tables where the accounting table is reported with net emissions and removals, consistent with information in CRF table 5(KP). The ERT recommends that France resolve the remaining issues (see para. 164, subparas. (a–e) above) for the next annual submission. France is also encouraged to implement measures as part of its QC plan to avoid the occurrence of these errors in future annual submissions.

166. For the representation of land use, France uses the IPCC approach 2, based on data from the Teruti-LUCAS survey and the NFI. The reporting of land units corresponding to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is based on the IPCC approach 2 (broad area identification).

167. The ERT considers that arrangements in the national system enable an accurate estimation of the areas of forest land, which is the most relevant land-use category for the purposes of accounting activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The national system also allows an accurate estimation of changes in carbon stocks and GHG emissions in forest land. However, the ERT noted that there is very little information on the management practices applied to lands converted from forest land, and this may lead to a lower accuracy of emission estimates on lands under deforestation. The ERT encourages France to develop more detailed information on management practices occurring on deforested land for future annual submissions.

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

##### *Afforestation and reforestation – CO<sub>2</sub>*

168. In the original submission, France reports an area under afforestation and reforestation of 1,809.68 kha in 2008 and net removals of 13,591.42 Gg CO<sub>2</sub> eq, which corresponds to an implied stock change factor of 7.51 Mg CO<sub>2</sub>/ha. There is consistency

between the areas and removals reported under the Convention and under Article 3, paragraph 3, of the Kyoto Protocol.

169. The ERT noted that France reports net removals for this activity in CRF table 5(KP)A.1.1, but decides not to account for removals under this category. France does this by reporting afforestation and reforestation activities as “NR” in the CRF accounting table. The ERT considers that this is not in line with the provisions of paragraph 25 of the annex to decision 13/CMP.1 and is not in line with the reporting guidelines in decision 6/CMP.3. In response to comments from the ERT, France submitted a full set of revised KP-LULUCF CRF tables in its resubmission of 17 September 2010, where the problem was solved.

170. The ERT also notes that France did not provide documentation on how afforestation and reforestation activities were directly human-induced, as required by paragraph 8(a) of the annex to decision 15/CMP.1. This issue had been raised in the previous review report.<sup>32</sup> The Party reports that all afforested areas becoming managed forest land were considered to be human-induced. The IPCC good practice guidance for LULUCF (section 4.2.5.2) states that: “It is good practice to provide documentation that identified units of land are direct human-induced. Relevant documentation includes forest management records or other documentation that demonstrates that a decision had been taken to replant or to allow forest regeneration by other means.” At the end of the review week, the ERT requested that France provide such documentation in the list of potential problems and further questions. In response to this request, France provided a new submission (on 22 October 2010) reporting a reduced area of afforestation and reforestation (953.30 kha) and lower net removals (7,677.29 Gg CO<sub>2</sub> eq). The Party also provided the necessary documentation to justify the human-induced nature of the revised area: only afforestation and reforestation under cropland converted to forest land, grassland converted to forest land, and settlements converted to forest land are considered to be human-induced; as the situation for conversions from other land and wetlands was not as clear, France decided to exclude these areas. The ERT concluded that this potential problem had been resolved in the course of the review.

#### *Deforestation – CO<sub>2</sub> and N<sub>2</sub>O*

171. In its original submission, France reported an area under deforestation of 846.50 kha in 2008 and corresponding net emissions of 11,926.21 Gg CO<sub>2</sub> eq. The ERT found that there was consistency between the areas and emissions reported under the Convention and those under Article 3, paragraph 3, of the Kyoto Protocol, but that the transparency of reporting could be enhanced. The biomass, deadwood and litter pools were assumed to be oxidized in the year of deforestation, while the loss of soil organic carbon was assumed to occur linearly during a transition period of 20 years after deforestation. During the course of the review, France submitted revised estimates (see paras. 174–175 below) and the net emissions were increased to 12,664.69 Gg CO<sub>2</sub> eq.

172. The ERT considers that the current system for the representation of land use does not enable an adequate assessment of land use and management on deforested lands. This may lead to an inaccurate estimation of emissions or removals other than those related to the losses of carbon in forest land pools currently estimated by France. The ERT recommends that France improve the tracking of deforested lands, including information on management practices applied to them (e.g. practices leading to changes in soil organic carbon, use of lime and burning of biomass), in order to enhance the accuracy of emission and removal estimates for the next annual submission.

173. France did not report separately the emissions from lands deforested in the first year of the commitment period (45.50 kha, according to table NIR-2) from those from lands

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<sup>32</sup> FCCC/ARR/2009/FRA, paragraphs 121(c) and 124(b).

deforested in previous years (731.00 kha). The ERT recommends that France follow the IPCC good practice guidance for LULUCF and paragraph 6(d) of the annex to decision 15/CMP.1, and report separately the emissions and removals occurring in lands deforested in each year of the commitment period from those occurring in areas deforested in earlier years.

174. In the Party's original submission, emissions from deforestation in mainland France did not include losses from the deadwood carbon pool, and the Party did not provide any information demonstrating that this pool is not a net source, which is not in line with the requirements of decisions 15/CMP.1 and 16/CMP.1. During the review, the French experts acknowledged that this had caused an underestimation of emissions from a potential key category, and explained to the ERT that deadwood pool changes were not accounted for because of a lack of data. However, France later provided the ERT with scientific literature containing nationally averaged estimates of losses from the deadwood carbon pool in four forest types in France. During the course of the review (22 October 2010), France submitted revised estimates for losses in the deadwood carbon pool due to deforestation and also small corrections to estimates of emissions from the litter pool. The ERT concluded that this potential problem had been resolved in the course of the review.

175. In the original submission, carbon emissions from lime application on deforested land areas were reported as "NO" in KP-LULUCF CRF table 5(KP-II)4. However, the ERT notes that, in CRF table 5.B (LULUCF sector), 1,662.90 kha were reported under forest land converted to cropland in 2008. Moreover, lime application on cropland is a common practice in France, as documented in CRF table 5(IV), where the use of 2,384,305.31 Mg of limestone is reported for 2008. France did not provide documentation in the NIR to justify the assumption that there is no lime application on the cropland area included in the "deforestation" land category, and the ERT considered that this may result in an underestimation of the emissions from deforestation. During the review, the Party acknowledged that this source of emissions had been overlooked. France resubmitted, during the course of the review and in response to a request by the ERT at the end of the visit, revised estimates for CO<sub>2</sub> emissions from lime application on cropland converted from forest land (6.63 Gg CO<sub>2</sub>). Emissions were calculated by using the average rate of liming on cropland: the CO<sub>2</sub> EF (440.5 kg CO<sub>2</sub>/Mg limestone) was multiplied by the total limestone use (2,234,811 Mg), multiplied by the area of forest land converted to cropland (122,543 ha), and divided by the total cropland area (18,143,455 ha). The ERT concluded that this potential problem had been resolved in the course of the review.

176. The ERT noted that the reported area of forest land converted to cropland in KP-LULUCF CRF table 5(KP-II)3 (122.54 kha), which is used to estimate N<sub>2</sub>O emissions from disturbance associated with land-use conversion to cropland, is lower than the area reported in CRF table 5(III) (162.90 kha). The ERT found that there was no underestimation of emissions, but encourages France to implement measures in its QC plan to avoid this type of mistake in future annual submissions.

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

##### *Forest management – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O*

177. In its original submission, France reported an area under forest management of 14,573.55 kha for 2008, and associated net removals of 84,620.04 Gg CO<sub>2</sub> eq (total GHG net removals of 83,971.21 Gg CO<sub>2</sub> eq). This corresponds to an implied stock change factor of 5.81 Mg CO<sub>2</sub>/ha. The net removal in 2008 is much higher than the cap of 16,133.33 Gg CO<sub>2</sub> eq established in decision 16/CMP.1 for forest management in the commitment period. The ERT noted that there is consistency between the areas and removals reported in the LULUCF sector under the Convention and under Article 3, paragraph 4, of the Kyoto

Protocol. During the course of the review, France submitted revised estimates (see para. 180 below) and the recalculated net removals were reduced to 83,821.47 Gg CO<sub>2</sub> eq.

178. The ERT found that the transparency of reporting could still be improved. The criteria for the selection of land units under forest management were not described in the NIR. During the review, France explained that all forest land areas which are managed for wood production are considered under this activity. As a result, approximately 95 per cent of forest area in mainland France, and 15 per cent in overseas territories, are included under forest management. The ERT encourages France to provide a detailed description of the criteria for allocating lands to this activity, including documented justification.

179. The ERT noted that France, in its original submission, reported CO<sub>2</sub> emissions from biomass burning due to wildfires in forest management activity as "IE" in CRF table 5(KP-II)5. France explained in the NIR (section B.4.2) that CO<sub>2</sub> emissions from wildfires in forests were included in the changes in the biomass pool (provided in KP-LULUCF CRF table 5(KP-I)B.1 by way of the growth factors used to estimate biomass growth. The information provided by France during the review led the ERT to the conclusion that the growth factors used to estimate biomass growth do not capture the biomass losses from biomass burning. Consequently, CO<sub>2</sub> emissions (losses in carbon stocks) from biomass burning were not reported in forest management activity. The ERT considered that this was an underestimation of emissions from forest management activity in the year 2008.

180. France submitted, during the course of the review and in response to a request by the ERT at the end of the visit, revised estimates for CO<sub>2</sub> emissions from biomass burning from wildfires. For that purpose, the Party used data on the area burned annually, provided by the Ministry of Agriculture. This change generates additional emissions of 158.23 Gg CO<sub>2</sub> eq in 2008. France also provided information on the areas burned due to wildfires on areas under forest management, which were used to estimate these emissions, as requested by the ERT. The ERT concluded that this potential problem had been resolved in the course of the review.

## **2. Information on Kyoto Protocol units**

### Standard electronic format and reports from the national registry

181. France has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings and recommendations included in the SIAR on the SEF tables and the SEF comparison report.<sup>33</sup> The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

182. Information on the accounting of Kyoto units has been prepared and reported in accordance with chapter I.E of the annex to decision 15/CMP.1, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements set out in paragraph 88 (a-j) of the annex to decision 22/CMP.1. The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1.

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<sup>33</sup> The SEF comparison report is prepared by the ITL administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

183. Information reported by the Party on records of any discrepancies was found to be inconsistent with information provided to the secretariat by the ITL. This was due to the reporting periods chosen by France (16 October 2008 to 28 February 2009) instead of the reporting period 1 January 2009 to 31 December 2009. Apart from the different period chosen, no substantial differences occurred. The national registry has adequate procedures in place to minimize discrepancies. The SIAR recommended that France include the information required by paragraph 88(j) of the annex to decision 22/CMP.1 on discrepant transactions for the whole reporting period in its next annual submission. France promised to correct the reporting period in the next annual submission. No non-replacement has occurred.

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

184. France has reported information on its accounting of KP-LULUCF in the accounting table, as included in the annex to decision 6/CMP.3. In the original submission by France, information on the accounting of KP-LULUCF had not been prepared and reported in accordance with decisions 16/CMP.1 and 6/CMP.3. France submitted a revised accounting table on 17 September and 22 October 2010, which was prepared and reported in accordance with decisions 16/CMP.1 and 6/CMP.3.

185. Table 5 shows the accounting quantities for KP-LULUCF as reported by the Party and the final values after the review.

Table 5

**Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol, in t CO<sub>2</sub> eq**

<i>Activity</i>	<i>Accounting quantity</i>	
	<i>As reported</i>	<i>Final</i>
Afforestation and reforestation	NR	-7 677 292
Deforestation	12 348 940	12 664 693
Forest management	-28 482 274	-16 133 333
Article 3.3 offset <sup>a</sup>	-12 348 940	0
Forest management cap	-16 133 333	-16 133 333
Cropland management	NA	0
Grazing land management	NA	0
Revegetation	NA	0

*Abbreviations:* NA = not applicable, NR = not reported.

<sup>a</sup> Article 3.3 offset: For the first commitment period, a Party included in Annex I that incurs a net source of emissions under the provisions of Article 3, paragraph 3, may account for anthropogenic greenhouse gas (GHG) emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic GHG emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

186. Based on the information provided in table 5, France shall issue 11,145,932 removal units in its national registry.

### National registry

187. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate.

188. The ERT took note of the SIAR and its finding that the national registry has not fulfilled the requirements regarding the publicly available information in accordance with section II.E of the annex to decision 13/CMP.1. In particular, the SIAR report recommends that France enhance the interface of its registry by making publicly available the required information referred to in paragraphs 45–47 of the annex to decision 13/CMP.1. A clear statement should be made on its website regarding the components of paragraphs 45–47 of the annex to decision 13/CMP.1 that are confidential, including those that are confidential in accordance with European Union (EU) regulations for a defined time period, if applicable.

189. During the review, France demonstrated to the ERT that the requested information is now publicly available. The ERT recommends that the Party continue to provide the publicly available information on the registry website as presented during the review and provide information in the next NIR that all required information is now publicly available.

### Calculation of the commitment period reserve

190. France reported its commitment period reserve in its 2010 annual submission. France reported that its commitment period reserve has not changed since the initial report review (2,537,663,976 t CO<sub>2</sub> eq) as it is based on the assigned amount and not the most recently reviewed inventory. The ERT agrees with this figure and recommends that France include information on its commitment period reserve in its next annual submission.

## **3. Changes to the national system**

191. France reported that there have been changes to its national system since the previous annual submission: during 2009, the responsible ministry was renamed and became MEEDDM instead of MEEDAT (Ministère de l'Écologie, de l'Énergie, du Développement Durable et de l'Aménagement du Territoire). In addition, the composition of the GCIE changed. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

## **4. Changes to the national registry**

192. France reported that there have been no changes to its national registry since the previous annual submission. The ERT concluded that the Party's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

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

193. France has reported general information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, but the ERT considers that the information included in the NIR was not fully complete and transparent. In particular,

no information related to the specific activities listed in paragraph 24 of chapter I.H of the annex to decision 15/CMP.1 was provided. However, during the review France was able to address most of the specific activities listed in paragraph 24 of the UNFCCC reporting guidelines and to provide the necessary information for complete reporting. The ERT recommends that France provide better links between the information already provided in the NIR and the specific activities listed in paragraph 24 of the UNFCCC reporting guidelines for its next annual submission. In addition, while not all activities listed in paragraph 24 may be relevant under France's national circumstances, information for some specific activities could be provided.

194. The ERT recommends that the Party improve the reporting in future NIRs by structuring the section on the minimization of adverse impacts in the NIR in line with the specific reporting requirements of paragraphs 23 and 24 of the UNFCCC reporting guidelines and by adding relevant actions addressed in paragraph 24 if relevant to France's national circumstances.

### **III. Conclusions and recommendations**

195. France made its annual submission on 12 April 2010. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes to the national system and the national registry, and minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

196. The ERT concludes that the inventory submission of France has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and the Party has submitted a complete set of CRF tables for the years 1990–2008 and an NIR; these are complete in terms of geographical coverage, years and sectors, as well as complete in terms of categories and gases.

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

198. The Party's inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. However, the ERT concluded that estimates of CH<sub>4</sub> emissions from managed solid waste disposal on land and CH<sub>4</sub> recovery from the same category had not been estimated in accordance with the IPCC good practice guidance, and for that reason applied an adjustment.

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

200. France has reported information on activities under Article 3, paragraph 3, of the Kyoto Protocol and the elected activity under Article 3, paragraph 4, of the Kyoto Protocol in accordance with decisions 15/CMP.1, 16/CMP.1 and 6/CMP.3. The ERT considers that the arrangements in the national system enable an accurate estimation of the areas of forest land, which is the most relevant land-use category for the purposes of accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

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

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

203. France has reported the information requested in chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2010 annual submission. The ERT concludes that the reporting by France, taking into account the information provided during the review, is complete but that the Party can improve the transparency of reporting by structuring the section on the minimization of adverse impacts in the NIR in line with the specific reporting requirements.

204. In the course of the review, the ERT formulated a number of recommendations relating mostly to the transparency of the information presented in France's annual submission. The key recommendations are that France:

- (a) Enhance the general transparency for all sectors, in particular where country-specific methods are used;
- (b) Continue the efforts to better balance the share of information between the main part of the NIR and the OMINEA report;
- (c) Apply a tier 2 key category analysis and include the KP-LULUCF activities;
- (d) Adjust the level of aggregation of categories and subcategories, so that the uncertainty values represent the real accuracy of methodologies and data, when carrying out the uncertainty analysis;
- (e) Improve the reporting of recalculations;
- (f) Enhance the QA/QC plan;
- (g) Increase the timeliness of the availability and approval of the detailed energy balance;
- (h) Increase the consistency of the estimates for related categories in the agriculture sector;
- (i) Collect monitored data for CH<sub>4</sub> recovery from all landfills;
- (j) Improve the cooperation with data providers for the LULUCF sector and achieve a consistent representation of land use over the whole time series.

#### **IV. Adjustments**

205. The ERT concludes, based on the review of the inventory of emissions in 2008, that for the category managed solid waste disposal on land the AD and EFs used are not fully in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance as required by Article 5, paragraph 2, of the Kyoto Protocol. The ERT recommended that the Party submit revised estimates or provide further justifications for its calculations for the identified category as a way of resolving the identified potential problem. The ERT, following the review of the additional information provided by France during and after the review week, concluded that the Party did not satisfactorily correct the problem through the submission of acceptable revised estimates and decided to calculate and recommend one adjustment in accordance with the technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (decision 20/CMP.1).

206. France, in its communication of 13 April 2011, accepted the calculated adjustment. In accordance with the Guidelines for review under Article 8 of the Kyoto Protocol, the ERT applied the calculated adjustment.

207. The application of the adjustment by the ERT resulted in a change in the estimate of the 2008 emissions from the waste sector – from 11,444.38 Gg CO<sub>2</sub> eq, as originally reported by France, to 19,540.86 Gg CO<sub>2</sub> eq, or 40.5 per cent. This in turn resulted in a change in the estimated total emissions of France for 2008 – from 528,089.71 Gg CO<sub>2</sub> eq as reported by France to 536,186.18 Gg CO<sub>2</sub> eq or 1.5 per cent.

## **V. Questions of implementation**

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

## Annex I

### Documents and information used during the review

#### A Reference documents

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

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

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

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <[http://www.ipcc-nggip.iges.or.jp/public/gp\\_lulucf/gp\\_lulucf.htm](http://www.ipcc-nggip.iges.or.jp/public/gp_lulucf/gp_lulucf.htm)>.

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

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

“Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol”. Decision 19/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Decision 15/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>>.

“Guidelines for review under Article 8 of the Kyoto Protocol”. Decision 22/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>>.

Status report for France 2010. Available at <<http://unfccc.int/resource/docs/2010/asr/fra.pdf>>.

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

FCCC/ARR/2009/FRA. Report of the individual review of the greenhouse gas inventory of France submitted in 2009. Available at <<http://unfccc.int/resource/docs/2010/arr/fra.pdf>>.

UNFCCC. *Standard Independent Assessment Report*, Parts I and II. Available at <[http://unfccc.int/kyoto\\_protocol/registry\\_systems/independent\\_assessment\\_reports/items/4061.php](http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php)>.

## B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Frédérique Millard (Ministère de l'Écologie, de l'Énergie, du Développement Durable et de la Mer), including additional material on the methodologies and assumptions used. The following documents<sup>1</sup> were also provided by France:

1. Anonymous. Not dated document. *Méthode d'estimation des gaz CH<sub>4</sub>-CO<sub>2</sub>-SO<sub>x</sub>-NO<sub>x</sub> des CET. Note méthodologique*. French.
2. Fangeat, E. 2008. *Les installations de traitement des ordures ménagères. Résultats 2006*. ADEME, Angers.
3. Fangeat, E. 2010. *Les installations de traitement des ordures ménagères. Résultats 2008*. ADEME, Angers.
4. ADEME. 2009. *Waste figures for France. Data and figures*. ADEME. Angers.
5. Fangeat, E. 2007. *French national household waste characterization survey. Results 2007*. ADEME. Angers.
6. Erwann FANGEAT. 2009. *La collecte des déchets par le service public en France. Résultats Année 2007*. ADEME, Angers.
7. Form samples of the questionnaires used in the surveys performed by ADEM in 2008 on the “non dangerous waste storage facilities” on the “waste sorting centers” on the “composting of household and similar waste” and in 2009 on the “incineration facilities”.
8. ADEME. 2003. *Outil de calcul des émissions dans l'air de CH<sub>4</sub>, CO<sub>2</sub>, SO<sub>x</sub>, NO<sub>x</sub> issues des centres de stockage de déchets ménagers et assimilés*. ADEME. Paris.
9. J. Pouilleau. *Caractérisation des biogaz. Bibliographie. Mesures sur sites. Rapport final*. INERIS (Institut National de l'Environnement Industriel et des Risques). 2002.
10. Diot, M., Bogner, J., Chanton, J., Guerbois, M., Hébé, I., Moreau le Golvan, Y., Spokas, K., Tregoures, A. 2001. *LFG Mass Balance: A key to optimise LFG Recovery*. Proceedings Sardinia 2001: Eighth International Waste Management and Landfill Symposium, Cagliari, Italy 1-5 October 2001
11. Morcet, M., Aran, C., Bogner, J., Canton, J., Spokas, K., Hébé, I. 2003. *Methane Mass Balance: A review of field results from three French landfill case studies*. Proceedings Sardinia 2003: Ninth International Waste Management and Landfill Symposium, Cagliari, Italy 6-10 October 2003
12. INRA. 2008. *Projections d'émissions/absorptions de gaz à effet de serre dans les secteurs forêt et agriculture aux horizons 2010 et 2020. Rapport Final*. 129-192
13. Vermorel, M., Jouany, J.P., Eugène, M., Sauvant, D., Noblet, J., and J.Y. Dourmad. 2008. *Evaluation quantitative des émissions de méthane entérique par les animaux d'élevage en 2007 en France*. INRA
14. Hébé, I and E. Gaucher. 2010. *Performances de captage de biogaz de décharges*. ADEME
15. Sylvain, M. and M. Morcet. 2002. *Mesure des émissions de méthane des CSD et bilan massique des sites*. ADEME
16. EEA. 2009. *The EMEP/EEA air pollutant emission inventory guidebook*. Technical Report. Technical report No 9/2009. European Environment Agency. Available at <<http://www.eea.europa.eu/publications/emep-eea-emission-inventory-guidebook-2009>>
17. Oonk and Boom. 1995. *Landfill gas formation, recovery and emissions*, TNO-report R95-203, TNO. Appeldoorn, The Netherlands.

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<sup>1</sup> Reproduced as received from the Party.

## Annex II

### Acronyms and abbreviations

AD	activity data
ADEME	Agence de l'Environnement et de la Maîtrise de l'Énergie
CGDD	Commissariat Général au Développement Durable
SoeS	Service de l'observation et des Statistiques
CH <sub>4</sub>	methane
CO <sub>2</sub>	carbon dioxide
CITEPA	Centre Interprofessionnel Technique d'Études de la Pollution Atmosphérique
CKD	cement kiln dust
CO <sub>2</sub> eq	carbon dioxide equivalent
CRF	common reporting format
DGEC	Direction générale de l'énergie et du climat
EEA	European Environment Agency
EF	emission factor
ERT	expert review team
EU	European Union
EU.ETS	European Union emissions trading scheme
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs and SF <sub>6</sub> without GHG emissions and removals from LULUCF
GCIIE	Groupe de concertation et d'information sur les inventaires d'émission
HFCs	hydrofluorocarbons
HNO <sub>3</sub>	Nitric Acid
IEA	International Energy Agency
IEFs	implied emission factors
INRA	Institut National de la Recherche Agronomique
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1,000 grams)
LULUCF	land use, land-use change and forestry
Mg	megagram (1 Mg = 1 tonne)
Mt	million tonnes
NA	not applicable
NE	not estimated
NO	not occurring
NFA	National Forest Agency
NFI	national forest inventory
NCVs	net calorific values
MEEDDM	Ministère de l'Écologie, de l'Énergie, du Développement Durable et de la Mer
N <sub>2</sub> O	nitrous oxide
NIR	national inventory report
OMINEA	Organisation et méthodes des inventaires nationaux des émissions atmosphériques
ODS	Ozone-depleting substances
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF <sub>6</sub>	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10 <sup>12</sup> joule)

UNFCCC United Nations Framework Convention on Climate Change  
USGS United States Geological Survey  
VS volatile solids

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