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

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

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I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2010 annual submission of Japan, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 30 August to 4 September 2010 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Suvi Monni (Finland) and Mr. Tinus Pulles (Netherlands); energy – Mr. Steven Oliver (Australia) and Mr. Nicolas Di Sbroiavacca (Argentina); industrial processes – Ms. Ils Moorkens (Belgium); agriculture – Ms. Tajda Mekinda-Majaron (Slovenia), Ms. Olga Garilova (Estonia) and Ms. Anoja Udaya Kumari Herath (Sri Lanka); land use, land-use change and forestry (LULUCF) – Ms. Kimberly Todd (United States of America), Mr. Hector Ginzo (Argentina) and Mr. Andis Lazdins (Latvia); and waste – Ms. Sirinthornthep Towprayoon (Thailand) and Ms. Kristin Haroardottir (Iceland). Ms. Towprayoon and Mr. Pulles were the lead reviewers. The review was coordinated by Mr. Matthew Dudley and Ms. Barbara Muik (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 Japan, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Emission profiles and trends

3. In 2008, the main greenhouse gas (GHG) in Japan was carbon dioxide (CO_2), accounting for 94.7 per cent of total GHG emissions[1] expressed in carbon dioxide equivalent (CO_2 eq), followed by nitrous oxide (N_2O) (1.8 per cent) and methane (CH_4) (1.7 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 1.8 per cent of the overall GHG emissions in the country. The energy sector accounted for 90.5 per cent of total GHG emissions, followed by the industrial processes sector (5.9 per cent), the agriculture sector (2.0 per cent), the waste sector (1.6 per cent) and the solvent and other product use sector (0.0 per cent). Total GHG emissions amounted to 1,281,883.87 Gg CO_2 eq and increased by 4.0 per cent between the base year[2] 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, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

[1] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from Annex A sources only.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year to 2008[a]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*	*1990*	*1995*	*2000*	*2005*	*2006*	*2007*	*2008*	*Base year–2008 (%)*
Annex A sources		CO_2	1 143 431.84	1 143 431.84	1 226 472.49	1 254 284.72	1 285 966.45	1 266 705.55	1 300 574.74	1 214 437.73	6.2
		CH_4	31 900.62	31 900.62	29 527.24	25 791.91	22 680.17	22 278.14	21 763.80	21 304.28	–33.2
		N_2O	31 502.72	31 502.72	32 339.70	28 705.02	23 863.41	23 882.66	22 606.07	22 499.21	–28.6
		HFCs	20 260.17	17 930.00	20 260.17	18 800.40	10 562.88	11 737.25	13 273.00	15 265.42	–24.7
		PFCs	14 240.36	5 670.00	14 240.36	9 519.49	7 002.07	7 315.75	6 411.99	4 616.01	–67.6
		SF_6	16 961.45	38 240.00	16 961.45	7 188.49	4 478.46	4 910.86	4 407.45	3 761.22	–77.8
KP-LULUCF	Article 3.3[b]	CO_2								2 034.30	
		CH_4								0.03	
		N_2O								4.80	
	Article 3.4[c]	CO_2	–45.51							–46 119.02	101 235.8
		CH_4	NA							12.63	NA
		N_2O	NA							1.28	NA

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

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

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

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

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

		Gg CO_2 eq								*Change*
	Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2006*	*2007*	*2008*	*Base year–2008 (%)*
Annex A	Energy	1 078 861.66	1 078 861.66	1 156 409.27	1 190 628.53	1 226 781.92	1 208 227.03	1 241 777.50	1 160 516.18	7.6
	Industrial processes	122 269.80	132 647.82	124 120.95	97 125.61	77 228.66	79 475.61	78 708.89	75 310.20	–38.4
	Solvent and other product use	287.07	287.07	437.58	340.99	266.41	242.34	159.95	160.44	–44.1
	Agriculture	31 314.77	31 314.77	30 078.14	27 677.57	26 565.64	26 475.37	26 145.60	25 844.89	–17.5
	Waste	25 563.86	25 563.86	28 755.48	28 517.34	23 710.81	22 409.85	22 245.11	20 052.15	–21.6
	Other	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA
	LULUCF	NA	–63 358.60	–73 871.60	–80 262.23	–86 123.30	–81 879.94	–81 803.52	–78 807.88	NA
	Total (with LULUCF)	**NA**	**1 179 752.72**	**1 237 174.33**	**1 235 510.47**	**1 244 719.33**	**1 232 540.41**	**1 287 233.53**	**1 203 076.00**	**NA**
	Total (without LULUCF)	**1 232 733.31**	**1 243 111.32**	**1 311 045.93**	**1 315 772.70**	**1 330 842.63**	**1 314 420.35**	**1 369 037.05**	**1 281 883.87**	**4.0**
KP-LULUCF	Article 3.3[b] Afforestation & reforestation								–391.95	
	Article 3.3[b] Deforestation								2 431.08	
	Total (3.3)								**2 039.13**	
	Article 3.4[c] Forest management								–45 388.90	
	Article 3.4[c] Cropland management	NA							NA	NA
	Article 3.4[c] Grazing land management	NA							NA	NA
	Article 3.4[c] Revegetation	–45.51							–716.21	1 473.7
	Total (3.4)	**–45.51**							**–46 105.11**	**NA**

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

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

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

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

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

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

	As reported	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve	5 335 431 899		5 335 431 899	
Annex A emissions for current inventory year				
CO_2	1 214 437 729		1 214 437 729	
CH_4	21 282 652		21 304 284	
N_2O	22 459 676		22 499 206	
HFCs	15 265 424		15 265 424	
PFCs	4 616 015		4 616 015	
SF_6	3 761 216		3 761 216	
Total Annex A sources	**1 281 822 711**		**1 281 883 873**	
Activities under Article 3, paragraph 3, for current inventory year				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	–391 950		–391 950	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA		NA	
3.3 Deforestation for current year of commitment period as reported	2 431 078		2 431 078	
Activities under Article 3, paragraph 4, for current inventory year[d]				
3.4 Forest management for current year of commitment period	–45 388 900		–45 388 900	
3.4 Cropland management for current year of commitment period				
3.4 Cropland management for base year				
3.4 Grazing land management for current year of commitment period				
3.4 Grazing land management for base year				
3.4 Revegetation for current year of commitment period	–716 207		–716 207	
3.4 Revegetation in base year	–45 511		–45 511	

Abbreviations: NA = not applicable.

[a] "Adjustment" is relevant only for Parties for which the ERT has calculated one or several adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

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

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

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2010 annual inventory submission was submitted on 15 April 2010; it contains a complete set of common reporting format (CRF) tables for the period 1990–2008 and a national inventory report (NIR). Japan also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2010.

7. Japan officially submitted revised emission estimates on 18 October 2010 in response to questions raised by the expert review team (ERT) during the course of the review. Japan also officially submitted revised information on 18 October 2010 on the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol in response to a question raised by the ERT during the review.

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

9. During the review, Japan provided the ERT with additional information and documents which are not part of the annual submission but are in many cases referenced in the NIR. The full list of information and documents used during the review is provided in annex I to this report.

Completeness of inventory

10. The inventory covers all source and sink categories for the period 1990–2008 and is complete in terms of gases, years and geographical coverage. However, Japan continues to report actual emissions of fluorinated gases (F-gases) as not estimated ("NE") for the years 1990–1994 due to a lack of activity data (AD) for these years. The ERT reiterates a recommendation made in previous review reports that Japan report in its next annual submission a complete time series of actual F-gas emissions.

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

Overview

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

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

12. From the NIR, the ERT identified that in annex 10, section 10.3, Japan had stated that there has been no change in the national system when compared with the previous annual submission. However, the ERT concluded that procedures and arrangements have been introduced by the Party since the previous annual submission to allow the Inventory Quality Assurance Working Group (the QA-WG, introduced in 2009) to take up its role in the quality assurance/quality control (QA/QC) process (see para. 13 below). In response to a question from the ERT, Japan confirmed that this was a change in the national system described in annex 6, section 6.1.7 of the NIR. The ERT recommends that, in its next annual submission, Japan reflect any changes in the national system as part of the information required under Article 7, paragraph 1, of the Kyoto Protocol.

Inventory planning

13. The NIR described the national system and the institutional arrangements for the preparation of the inventory. The Ministry of the Environment (MoE) has overall responsibility for the national inventory. The Greenhouse Gas Inventory Office of Japan (GIO), part of the Centre for Global Environmental Research of the National Institute for Environmental Studies, is responsible for the calculations, inventory compilation and the archiving of all data. Other agencies and ministries are also involved in the preparation of the inventory and have clearly defined roles and responsibilities. The Committee for Greenhouse Gas Emissions Estimation Methods (hereinafter referred to as the Committee) is responsible for the selection of methods and parameters. The QA-WG is responsible for QA carried out by personnel not directly involved in the inventory preparation process.

14. In the NIR, Japan describes the annual cycle of the inventory development process, including milestones in the reporting cycle and defined responsibilities. These responsibilities begin with discussions at the beginning of the cycle on improving the inventory (MoE, GIO). In the 2010 inventory compilation, conclusions from the QA-WG constituted, for the first time, an important input for these discussions. The Committee meets regularly during the first eight months of the cycle. Once data for the inventory have been collected and draft CRF tables and a draft NIR have been prepared, external QC is undertaken by private consultants and relevant ministries and agencies are consulted. The NIR and CRF tables are then finalized and the inventory is submitted and officially announced. Meetings of the QA-WG are held after submission, feeding into the discussions on inventory improvement for the next cycle. The ERT commends Japan for this well-structured planning process.

Inventory preparation

Key categories

15. Japan has reported key category tier 1 and tier 2 analyses, both level and trend assessment, as part of its 2010 submission. The key category analysis performed by the Party and that performed by the secretariat[4] produced similar results. Japan has included the LULUCF sector in its key category analysis, which was performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to

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

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).

16. The results of Japan's key category analyses are not fully reflected in CRF table 7. The NIR lists 38 key categories for 2008, whereas the CRF table 7 includes only 21 key categories. The ERT found that CRF table 7 does not include those categories identified as key in the analysis that excludes LULUCF. The ERT recommends that Japan report all key categories identified in tables 3–8 of annex I to the NIR in the CRF for the base year and the latest inventory year.

Uncertainties

17. Japan calculates the total uncertainty in the inventory by aggregating category and gas uncertainties in two steps: first, those that are towards the high level of aggregation in the 10 sectors, as shown in table 1-4 of the NIR; and, second, aggregating these to the total uncertainty by a relatively simple combination rule (table 7-3 in annex 7). In addition, in annex 7 to the NIR, Japan presents the output of this analysis in the format of table 6-1 of the uncertainty chapter of the IPCC good practice guidance.

Recalculations and time-series consistency

18. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party for the years 1990–2007 have been undertaken to take into account:

(a) Energy: a revision of AD that resulted in a reallocation of AD from the manufacturing industries and construction category to other sectors (energy) within the national statistics; a revision of the emission factor (EF) for liquefied petroleum gas since 2005, resulting from a revision of the gross calorific value (GCV) in the national statistics data, which also resulted in a revision of the town gas EF; a revision of national statistics for transport; and also a revision of CH_4 and N_2O EFs based on data from the Japan Automobile Manufacturers Association arising from the new long-term regulations for exhaust gas;

(b) Industrial processes: a revision of the EFs for mineral production (soda ash use), chemical industry (ethylene and coke), metal production and consumption of halocarbons and SF_6;

(c) Agriculture: a revision of the EFs and AD in several categories as a result of additional research activities;

(d) LULUCF: a revision of the methods used to calculate various carbon stocks and carbon stock changes for various land-use categories;

(e) Waste: revised and new AD for solid waste disposal on land and wastewater handling, and a revision of the EF for N_2O emissions from waste incineration.

19. The major changes, and the magnitude of the impact, include an increase in the estimated total GHG emissions in the base year (0.8 per cent) and a decrease in 2007 (0.4 per cent). The rationale for these recalculations is in all cases provided in the NIR. However, CRF table 8(b) does not include explanations for the recalculations in sector 2 (industrial processes) and sector 3 (solvent and other product use). The ERT recommends that Japan ensure that CRF table 8(b) is complete in the next annual submission.

Verification and quality assurance/quality control approaches

20. In 2009, Japan established a new working group (QA-WG) to arrange for an independent external review of its inventory submission. The QA-WG was identified by the previous ERT as a change to the national system. The 2010 NIR states that procedures have been developed and implemented to allow this working group to function. The working group became operational for the 2010 submission and delivered a detailed review for two sectors: agriculture and waste.

Transparency

21. The NIR and the CRF tables are presented in a transparent way. Japan uses notation keys throughout the CRF tables and includes explanations in CRF table 9(a) for emissions that are not estimated ("NE") or are included elsewhere ("IE"). However, the ERT noted that the transparency of the NIR could be improved in several sectors. The ERT recommends that Japan incorporate into its NIR information (on AD and EFs) from key background documents. If this cannot be achieved, then the ERT encourages Japan to make English translations of key background documents available in its next annual submission.

Inventory management

22. Japan has a centralized archiving system, managed by GIO, 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 also includes documentation on QA/QC procedures, external and internal review documents, and documentation on annual key categories and key category identification and planned inventory improvements.

3. Follow-up to previous reviews

23. The ERT acknowledges the improvements made by Japan in response to previous reviews. However, the ERT noted that Japan has not followed up on some of the recommendations of previous review reports, such as the recommendation to provide better documentation of the drivers of emission trends and to provide estimates of actual emissions of HFCs, PFCs and SF_6 for the years 1990–1994. The ERT recommends that Japan include a table in the QA/QC section of the NIR providing explicit information on Japan's follow-up of ERT recommendations from earlier reviews.

4. Areas for further improvement

Identified by the Party

24. The 2010 NIR identifies two areas for improvement:

(a) Estimation methods: as part of Japan's inventory cycle, AD, EFs and other elements will be discussed in meetings of the Committee to identify and consider improvements thereof. Within this procedure, Japan will prioritize highly important issues such as those relevant to key categories and those pointed out in previous review reports;

(b) The improvement of transparency: Japan will further improve the transparency of the inventory by examining descriptions of methodologies, assumptions, data and other elements in the NIR, and by adding necessary information to the NIR.

Identified by the expert review team

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

(a) The improvement of transparency on country-specific EFs and other parameters by providing English translations of key background documents, describing the rationale behind such parameters;

(b) The provision of information quantifying the size of the recalculation at the category level within the respective category-specific recalculation sections of the NIR;

(c) The provision of a table in the QA/QC section of the NIR, providing explicit information on Japan's follow-up of ERT recommendations from earlier reviews;

(d) The correct allocation of CO_2 emissions from process emissions (e.g. emissions from iron and steel production and other subcategories of industrial production) under the industrial processes sector and not under the energy sector;

(e) The provision and completion of information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, for the Party's next annual submission.

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

B. Energy

1. Sector overview

27. The energy sector is the main sector in the GHG inventory of Japan. In 2008, emissions from the energy sector amounted to 1,160,516.18 Gg CO_2 eq, or 90.5 per cent of total GHG emissions. Since 1990, emissions have increased by 7.6 per cent. The key driver for the rise in emissions is energy industries. Within the sector, 36.3 per cent of the emissions were from energy industries, followed by 29.2 per cent from manufacturing industries and construction, 19.9 per cent from transport and 14.5 per cent from other sectors.

28. The discussion of the energy sector within the NIR is generally transparent. Japan has provided a complete set of GHG EFs and GCVs with references and trends, and the sources of the AD. Japan has also responded to a recommendation of the previous expert review by including a complete time series of energy balances in annex 2 to the NIR. A carbon balance is provided for iron and steel production and for the manufacture of town gas. The ERT commends Japan for including these balances and recommends that the Party further enhance the transparency of the NIR by considering the inclusion of balances for other carbon flow systems, such as solid fuel transformation and petroleum refining systems.

29. The ERT reiterates the recommendation of the previous review in regard to Japan improving the transparency of the NIR by including a discussion on the basis for its country-specific CO_2 EFs. The ERT notes that Japan's CO_2 EFs rely substantially on two key documents: *Report on the Estimation of CO_2 Emissions in Japan* (1992) and *Analysis and adequacy review of carbon emission factors for energy sources* (2005). During the review, Japan noted that there were no copies of these reports available in English, but offered to provide translated copies of selective sections. The ERT commends Japan for offering to translate selective parts of the documents; however, the ERT recommends that Japan incorporate AD and EFs from these documents into the NIR. If Japan cannot provide this information in the NIR, then the ERT encourages the Party to make available English translations of these documents prior to the next review. This will assist the expert review process and help the next ERT to suggest ways to incorporate information into the next NIR in order to assist Japan in improving transparency in this area.

30. Despite previous recommendations, Japan has not provided information on or an explanation of the drivers of energy sector emission trends. The ERT reiterates this recommendation and emphasizes the importance of providing information on the underlying variables, both in general and particularly as they relate to the trends in CO_2 emissions from energy industries, transport and the commercial/institutional and residential categories, and N_2O emissions from stationary combustion and transport.

31. The CRF tables and the NIR are almost complete. The ERT commends Japan for reporting emissions of GHGs for nearly all energy categories for which the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and/or the IPCC good practice guidance provide methodologies for estimation. However, the ERT noted that Japan reported CH_4 and N_2O emissions as not occurring ("NO") for the combustion of biomass fuels within public electricity and heat production. Japan was unable to provide a satisfactory explanation for this during the review week. In response to questions from the ERT, on 18 October 2010 Japan submitted new estimates for these emissions covering the years 2003–2008. Japan informed the ERT in its resubmission that it had also identified other minor errors in its 2010 annual submission, namely: relating to missing CH_4 and N_2O emissions from biomass combustion in several other categories within manufacturing industries and construction (e.g. pulp, paper and print, and other (machinery). The ERT considered Japan's revised estimates and determined that these were prepared in accordance with the IPCC good practice guidance. The ERT commends Japan for rectifying the issues raised in the review and recommends that the Party conduct QC checks to ensure that all non-CO_2 combustion emissions are reported in the inventory submission.

32. Japan does not report in the CRF AD for "other fuels". The ERT reiterates a recommendation from the previous review report that the Party report AD in CRF table 1.A(a) for "other fuels".

33. Japan includes a numerical assessment of recalculations at a highly aggregated sectoral level in the NIR. The understanding of the impacts of individual recalculations would be made more transparent by the inclusion of a more detailed numerical breakdown of the recalculations at the category level. The ERT recommends that Japan include a brief quantification of the size of the recalculation at the category level within the respective category-specific recalculation sections in the energy chapter.

34. The ERT noted several errors in Japan's CRF submission, namely: incorrect AD entered for flaring (oil) in the fugitive emissions from fuel; and biomass combustion for non-CO_2 emissions in public electricity and heat production reported as "NO". The ERT recommends that Japan implement specific QC measures in order to prevent these errors from reoccurring and report these measures in the next annual submission.

2. Reference and sectoral approaches

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

35. CO_2 emissions from fuel combustion were calculated using the reference approach and the sectoral approach. For the year 2008, there is a difference of 0.36 per cent in the CO_2 emission estimates between the reference approach and the sectoral approach. The NIR provides explanations for the fluctuations in the differences between the two approaches over the years.

36. Apparent consumption reported to the UNFCCC for Japan corresponds to that reported to the International Energy Agency (IEA), within 1 per cent for all the available years except for 1991 and 2008 (2 per cent). The growth rate for the period 1990–2008 for the total apparent consumption is 9 per cent for the CRF and 11 per cent for the IEA data.

Japan has provided a detailed discussion and analysis of the discrepancies between the figures reported in the CRF tables and the IEA statistics in annex 2 to the NIR. The analysis examines data for the year 2005. The ERT commends Japan for including this detailed analysis and discussion, and encourages Japan to update this initiative for the latest inventory year in future annual submissions.

International bunker fuels

37. The apparent consumption for international aviation and international marine bunkers, as reported in CRF table 1.C, is generally comparable when compared to the IEA data. In particular: for international marine bunkers, the products reported in the CRF tables are different from the IEA data (e.g. heavy oil in the CRF tables compared with gas/diesel oil and residual fuel oil in the IEA data), but the total quantities are generally comparable within a few per cent, except for 1995. For domestic navigation, the classification also differs, and the IEA totals are lower by up to 10 per cent. Japan provides a detailed discussion on these discrepancies in the NIR.

Feedstocks and non-energy use of fuels

38. Japan uses the default values for the fraction of stored carbon provided in the Revised 1996 IPCC Guidelines. The ERT recommends that Japan state this explicitly in the NIR in the next annual submission.

3. Key categories

Stationary combustion: solid fuel – CO_2

39. The trend in the CO_2 implied emission factor (IEF) for the manufacture of solid fuels and other energy industries has decreased by 6.3 per cent between 1990 and 2008 and there are large inter-annual changes, particularly between 2005 and 2008 (–11.5 per cent, 2005/2006, –11.0 per cent, 2006/2007 and 18.5 per cent, 2007/2008). In response to a question from the ERT, Japan stated that the IEFs are driven by changes in the carbon balances derived from the transformation of solid fuels, and that the difference in the mass balance between coking coal, coke and other coal products has been caused by a statistical error, unobserved stockpiles in the process and/or spontaneous input-output imbalance. The ERT recommends that Japan include this explanation in the NIR, along with a summary of the carbon balance for solid fuel transformation, in order to provide greater transparency to the solid fuel transformation system. The ERT commends Japan for the inclusion of a carbon balance in the NIR for iron and steel, which shows how the blast furnace EF is derived. The ERT notes the additional transparency that this provides and furthermore notes that transparency would be further improved by the inclusion of a solid fuel transformation balance.

Manufacturing industries and construction: solid fuel – CO_2

40. The gross calorific value (GCV) trends for solid fuel presented in the NIR for iron and steel show that, for coals associated with steel making, there is a declining trend in the GCVs since 1990. In response to a question from the ERT, Japan stated that steel manufacturers have been trying to make high-quality coke from cheap coal for economic reasons. From 1970 to 1990, it used conventional coking coal for feedstock for coke. However, due to the shortage of coking coal and price increases, it developed new coke-making technology using steam coal with pre-treatment as feedstock for coke. Similarly, Japan changed from pulverized coal injection (PCI) coal to coking coal and a steam coal mixture to steam coal with pre-treatment. For example, the use of steel-making coal has declined by 8.8 per cent since 1990, coking coal has declined by 8.5 per cent and PCI coal

has declined by 11.3 per cent. The use of coke also shows a 2.5 per cent decline. As conventional coking coal has a higher carbon content and GCV than steam coal, and the new technologies have been introduced stepwise, the apparent GCV has gradually decreased over time. The ERT recommends that Japan include this explanation in the next annual submission and notes that this is an example of the usefulness in explaining the drivers of trends.

C. Industrial processes and solvent and other product use

1. Sector overview

41. In 2008, emissions from the industrial processes sector amounted to 75,310.20 Gg CO_2 eq, or 5.9 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 160.44 Gg CO_2 eq, or 0.0 per cent of total GHG emissions. Since the base year, emissions have decreased by 38.4 per cent in the industrial processes sector, and decreased by 44.1 per cent in the solvent and other product use sector. The key driver for the decline is a reduction in cement production, a decrease in the emissions from adipic acid production and a decrease in the consumption and production of halocarbons and SF_6. Within the industrial processes sector, 62.9 per cent of the emissions were from mineral products, followed by 27.2 per cent from the consumption of halocarbons and SF_6, 5.5 per cent from the chemical industry, 3.3 per cent from the production of halocarbons and SF_6 and 1.1 per cent from metal production.

42. The ERT encourages Japan to continue to improve the transparency of the reporting of this sector in the NIR by including explanations of the emission trends in all categories across the time series, and to improve the reporting of information on recalculations in relation to rationale and justification, and impact on the emission trend.

43. The reporting of the industrial processes and solvent and other product use sectors is generally complete, with emission estimates provided for most categories. The ERT notes that the notation key "NE" is used for PFC emissions from aluminium production and for actual emissions from consumption of halocarbons and SF_6 for the years 1990–1994. During the previous review, Japan had explained that it was investigating ways to provide estimates for these years. The previous ERT welcomed these efforts and recommended that Japan estimate emissions for these years in the 2010 annual submission. The ERT reiterates the recommendation from the previous review report that Japan prepare and report PFC emissions for the years 1990–1994.

44. Japan reports CO_2 emissions for some categories (e.g. emissions from iron and steel production (excluding those of electric arc furnaces), ferroalloys and aluminium production) under the energy sector, not under the industrial processes sector. The ERT reiterates the recommendation that Japan allocate these emissions in line with the IPCC good practice guidance.

45. The ERT commends Japan for its examination of the uses of limestone to confirm that there is no double counting and/or omissions. The ERT recommends that Japan provide such findings in its next annual submission.

2. Key categories

Lime production – CO_2

46. The previous expert review noted that Japan had recalculated the emissions from lime production for all years of the inventory time series by replacing default EFs contained in the IPCC good practice guidance (0.75 for high-calcium lime and 0.86 for dolomitic lime) with country-specific EFs (0.75 for high-calcium lime and 0.82 for dolomitic lime).

The same ERT recommended that Japan report, in its 2010 annual submission, an explanation for using the lower country-specific EF for dolomitic lime. This ERT found that Japan had not implemented this recommendation. In response to a question from the ERT on this matter, Japan stated that the lower country-specific EF is possibly a result of a higher calcium oxide/magnesium oxide (CaO/MgO) content in the dolomite before calcination, and that Japanese dolomite is considered to have a higher purity because of its formation process in the Pacific Ocean where it is free of sediment deposition from the continents. The ERT recommends that Japan verify the assumption on the purity of the dolomite (per cent CaO/MgO content) and to report on this in its next annual submission.

Production of HCFC-22 – HFC-23

47. The ERT found that the NIR did not provide explanations on, for example, abatement methods, that have contributed to the strong decreasing rate in emissions. The method used to estimate emissions is not completely transparent in the NIR. In response to a question from the ERT, Japan provided more information on the method, the number of producers and the frequency of carrying out composition analysis. The ERT recommends that Japan include this information in its next annual submission. However, although more information has been provided by Japan, the IEF is very low (0.66 kg/t) when compared with other producing countries and with the default contained in the IPCC good practice guidance (tier 1 method, 4 per cent of HFC-23 produced per tonne of HCFC-22 manufactured). The ERT recommends that Japan include an explanation for this in its next annual submission.

D. Agriculture

1. Sector overview

48. In 2008, emissions from the agriculture sector amounted to 25,844.89 Gg CO_2 eq, or 2.0 per cent of total GHG emissions. Since the base year, emissions have decreased by 17.5 per cent. The key drivers for the fall are a reduction in emissions from field burning of agricultural residues and a reduction in emissions from agricultural soils due to decreases in the quantities of synthetic fertilizers and animal manure applied to agricultural soils. Within the sector, 27.5 per cent of the emissions are from manure management, followed by 26.9 per cent from enteric fermentation, 23.4 per cent from agricultural soils, 21.7 per cent from rice cultivation and 0.5 per cent from field burning of agricultural residues.

49. Japan has prepared its inventory submission in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. However, the ERT recommends that Japan improve its documentation on the rationale for the selection of EFs in its next annual submission.

50. The ERT noted that AD on cattle population differ from corresponding information provided by the Party to the Food and Agriculture Organization of the United Nations (FAO). In response to a question raised by the ERT, Japan indicated that cattle which are less than five months old are not included in the CRF tables. The ERT accepts this response and recommends that Japan report this information in its next annual submission to improve the transparency of the calculation.

2. Key categories

Manure management – N_2O

51. The ERT noted that Japan characterizes cows that do not produce milk as dairy cattle. This is not consistent with the IPCC good practice guidance, which states that cattle

are considered to be dairy cattle only if they are used for commercial milk production. The ERT recommends that Japan revise the characterization of cattle livestock in its next annual submission.

52. The ERT also noted that Japan applied two approaches in estimating N_2O emissions from animal waste management systems (AWMS) for stall and grazing cattle. N_2O emissions from stall cattle are estimated in line with the IPCC good practice guidance where amounts of nitrogen excreted (N-ex) are presented by AWMS in CRF table 4B(b). Further, N_2O emissions from grazing cattle are estimated based on a country-specific approach that uses an N_2O EF per head of grazing cattle (g N_2O/head/day) and based on the total number of grazing cattle. However, Japan did not report the amounts of N-ex on pasture (reported as not applicable ("NA") in CRF table 4B(b)), which is not consistent with the IPCC good practice guidance. In response to a question raised by the ERT, Japan indicated that, as N_2O emissions from grazing cattle are calculated based on the N_2O EF per head, it is therefore not necessary to report in CRF table 4.B(b) the amounts of N-ex by cattle on pasture. The ERT recommends that Japan follow the IPCC good practice guidance and report the N-ex by cattle on pasture in CRF table 4B(b).

53. Japan reports the quantities of N-ex on pasture by sheep, goats, horses and buffalo under other (AWMS). This approach is not in line with the IPCC good practice guidance. The ERT recommends that Japan review the reporting practice to ensure consistency with the IPCC good practice guidance.

54. Japan uses a country-specific N-ex factor (85.08 kg N/head/year) for dairy cattle to estimate N_2O emissions from manure management; this factor is consistent with other Parties. However, the ERT concluded that the N-ex factor contradicts the EF used to estimate CH_4 emissions from manure management of dairy cattle (62.24 kg CH_4/head/year). In response to a question raised by the previous ERT, Japan responded that a manure management practice called "pilling" has a high CH_4 EF and a high N-ex factor for dairy cattle. However, it is generally accepted that a system that emits high CH_4 emissions has lower N_2O emissions, and vice versa. The ERT recommends that Japan improve the documentation in the NIR on the development of country-specific EFs for AWMS and ensure that clear descriptions of the AWMS used are provided in the NIR.

55. The ERT found errors in the reporting of N-ex under manure management for swine and poultry (CRF table 4.B(b)). The error does not result in an incorrect estimate of N_2O emissions under direct and indirect emissions from agricultural soils (table 4.Ds1), nor N_2O emissions from manure management. The ERT recommends that Japan revise the estimates in its next annual submission.

3. Non-key categories

Enteric fermentation – CH_4

56. Japan used a country-specific method and EFs to estimate CH_4 emissions from dairy and non-dairy cattle. The method is based on estimates of dry matter intake and is consistent with the tier 2 method contained in the IPCC good practice guidance and is documented in a published paper (Shibata et al., 1993[5]). The ERT reiterates a recommendation from the previous review report that Japan incorporate key elements of this paper in its NIR (including the equation adopted to estimate dry matter intake by cattle type, as reported in table 6-2 of the NIR) and provide details of the additional parameters (i.e. weight of animals, weight gain, milk fat content) used in the emissions estimation.

[5] Shibata M, Terada F, Kurihara M, Nishida T, and Iwasaki K. 1993. Estimation of methane production in ruminants. Animal Sciences and Technology, Vol. 64, No. 8.

57. The ERT noted that population data for sheep in 2008 are 13 per cent lower than published FAO data, and that corresponding data for goats and horses in 2008 are 125 per cent and 70 per cent higher, respectively, than the FAO data. In response to a question raised by the ERT during the review, Japan indicated that it uses country-specific livestock population data because it is of better quality than the FAO data. The ERT recommends that, in its next annual submission, Japan provide results of the examination of the quality of its national population statistics when compared with corresponding FAO data.

E. Land use, land-use change and forestry

1. Sector overview

58. In 2008, net removals from the LULUCF sector amounted to 78,807.88 Gg CO_2 eq. Since the base year, net removals have increased by 24.4 per cent. The key drivers for the increase in removals were a small but sustained increase in the net removals from grassland, combined with marked decreases in the net emissions from cropland, settlements and wetlands.

59. The ERT concluded that the Party's LULUCF inventory, including data collection and methods, are in line with the IPCC good practice guidance for LULUCF.

60. Japan has provided summary tables containing definitions of land-use categories, and explanations of how the land-use categories and areas are determined. Japan shows only two land-use matrices – one for 1990 and the other for 2008 – which would be more informative if the destinations of some data "included elsewhere" were shown in the text accompanying these tables. The ERT reiterates recommendations made in previous review reports, in 2006 and 2008, that Japan improve transparency in the presentation of AD. In response to questions raised during the review, Japan clarified many issues relating to the collection and processing of both AD and emissions/removals data. The ERT recommends that Japan include this information in its next annual submission.

2. Key categories

Forest land remaining forest land – CO_2

61. All forests are managed forests and accounted for 66.1 per cent of the national land area in 2008. The area covered by the most relevant tree formations – intensively managed forests and semi-natural forests – was 94.7 per cent of Japan's total forest area, of which 41.2 per cent was intensively managed forests and 53.5 per cent was semi-natural forests.

62. Carbon stock changes in living biomass were estimated using a tier 2 IPCC good practice guidance for LULUCF methodology. Carbon stock changes in dead organic matter and soil were estimated with the CENTURY-jfos model, which is a tier 3 IPCC good practice guidance for LULUCF equivalent method. Following a recommendation from the previous ERT, Japan has improved the documentation in the NIR, with information on key assumptions and sources of country-specific parameters for the CENTURY-jfos model.

63. Net CO_2 removals in 2008 were 10.9 per cent higher than those in the base year and 3.5 per cent lower than in 2007. These removals were mostly driven by changes in living biomass stocks (95.7 per cent) and, to a much lesser extent, by changes in soil carbon stocks (3.7 per cent)

64. Japan has resolved most of the time-series consistency problems with the application of IPCC good practice guidance interpolation techniques. However, the incomplete series of carbon stock changes in dead organic matter in forest land remains unresolved. In response to a question from the ERT, Japan stated that a solution for this consistency

problem is still being sought. The ERT recommends that Japan resolve this problem and report on the outcome in future annual submissions.

65. The ERT noted that the methodology used to estimate changes in carbon stocks of living biomass does not allow for the independent reporting of those changes for forest land remaining forest land and land converted to forest land. In response to a question from the ERT during the review week, Japan stated that this is a consequence of using data obtained from the Forest Registers of the country's prefectures or Regional Forest Offices for the estimation of changes in living biomass stocks. The ERT recommends that Japan improve the documentation on this in its next annual submission.

F. Waste

1. Sector overview

66. In 2008, emissions from the waste sector amounted to 20,052.15Gg CO_2 eq, or 1.6 per cent of total GHG emissions. Since the base year, emissions have decreased by 21.6 per cent. The key drivers for the fall in emissions are: a reduction in waste disposal; the allocation of emissions from waste incineration used for energy purposes to the energy sector; and improved technology in waste incineration. Within the sector, 66.8 per cent of the emissions were from waste incineration, followed by 17.9 per cent from solid waste disposal on land, 12.5 per cent from wastewater handling and 2.8 per cent from other (waste).

67. The ERT found that the reporting is complete and covers all GHGs, categories, gases and years in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

68. Uncertainty estimates are provided for all categories and gases and are well documented in annex 7 to the NIR.

69. Japan has reported recalculations undertaken in the waste sector as a result of new and revised data in solid waste disposal on land and wastewater handling and a new N_2O EF in waste incineration. The recalculation decreased emissions from waste by 8.0 per cent in 2007 and 2.2 per cent in 1990.

2. Key categories

Solid waste disposal on land – CH_4

70. All legal waste is disposed in managed landfills. Landfill sites that do not meet the legal requirements are reported as inappropriate disposal and reported under other (solid waste disposal on land). Japan used the revised first order decay method from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) with country-specific parameters (tier 3) to estimate emissions.

Waste incineration – CO_2

71. Japan used country-specific EFs based on the carbon content and efficiency of combustion. Incineration of plastic and synthetic textiles from municipal solid waste, industrial solid waste and special control waste are included in the emissions. Emissions have decreased since 2001 due to the incineration of waste for energy purposes and, therefore, a proportion of the emissions have been allocated to the energy sector. The ERT welcomes this reallocation of emissions from the waste sector to the energy sector. The Party's reporting is now in line with the IPCC good practice guidance.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

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

Overview

72. Japan has elected forest management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol. The reporting of emissions/removals from activities under Article 3, paragraph 3, of the Kyoto Protocol – namely afforestation, reforestation and deforestation (ARD) – have been prepared in line with the IPCC good practice guidance for LULUCF. These emissions/removals are clearly differentiated from emissions from categories included in Annex A to the Kyoto Protocol, as required by paragraph 5 of the annex to decision 15/CMP.1.

73. The geographical boundaries of the areas encompassing the lands subject to ARD activities, and forest management and revegetation activities are clearly established, in line with the requirement of reporting method 1 from the IPCC good practice guidance for LULUCF, coupled with remote imagery information. There are no units of land subject to activities under ARD which otherwise should be included in the land subject to elected activities under Article 3, paragraph 4, of the Kyoto Protocol. The spatial assessment unit for accounting for ARD is 0.3 ha. Japan has used remote imagery to detect changes in the forest cover that have occurred since 1990.

74. The ERT found that all carbon pools are accounted for in the Party's annual submission. Changes in the carbon stock of dead wood in revegetation activities are not accounted for independently because they are either included in the carbon stock change in living biomass or set to zero. Data for the carbon stock change in litter are only provided for urban parks and green areas, and not for all subcategories under revegetation. However, for these subcategories, litter is assumed to have increased and, therefore, its exclusion is conservative. Japan does not factor out indirect, natural and pre-1990 effects specified in paragraph 7 of the annex to decision 15/CMP.1.

75. There is a debit incurred under ARD, but the anthropogenic GHG removals by forest management offset the debit. The amount by which forest management offset the debit incurred under ARD in 2008 is 2,039.13 Gg CO_2 eq.

76. Japan demonstrates that ARD activities began on or after 1 January 1990 by comparing orthophotos taken at the end of 1989 with recent satellite images. For forest management, this is demonstrated through survey information as well as interviews with forest owners' associations and administrative information on subsidized forest practices. For revegetation, it is demonstrated primarily through different types of surveys, dependent on the individual subdivisions.

77. Japan uses data from the Forest Registers to distinguish harvesting or disturbance followed by re-establishment from deforestation. This method has been chosen because a land conversion would exclude the land from the Forest Registers while harvested or disturbed forests would remain included.

78. Japan reports on the size of forest area that has temporarily lost forest cover but is not being classified as deforestation in the Forest Registers. This area is 1.17 million ha and is classified as "Forests with less standing trees".

79. Uncertainty estimates for KP-LULUCF were reported in the NIR.

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

Afforestation and reforestation – CO_2

80. Afforestation and reforestation (AR) activities and associated net removals are reported in line with the requirements of the annex to decision 15/CMP.1, and the removal estimates have been prepared in accordance with the IPCC good practice guidance for LULUCF.

81. The area of AR activities in 2008 was 27.49 kha. Net removals were –391.98 Gg CO_2 in 2008. The overall uncertainty of the estimation of the net removals (CO_2, N_2O and CH_4) was 6 per cent.

82. No AR lands were harvested during 2008.

Deforestation – CO_2

83. Deforestation activities and associated emissions are reported in line with the requirements of the annex to decision 15/CMP.1, and the emission estimates have been prepared in accordance with the IPCC good practice guidance for LULUCF.

84. The area of deforestation activities was 294.42 kha and emissions were 2,426.28 Gg CO_2 in 2008. The overall uncertainty of the estimation of the total emissions (CO_2, N_2O and CH_4) was 11 per cent.

85. By using aerial photographs and satellite image interpretation to detect landform transformation or artificial construction, Japan is able to distinguish tree harvesting from a permanent unstocking of forest land due to clear-cutting for the construction of buildings, roads and so on (paragraph 8(b) in the annex to decision 15/CMP.1). Deforestation can only be identified in such cases. In addition, harvested lands are distinguished from deforested lands because the lands subject to harvest are included in the Forest Registers.

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

Forest management – CO_2

86. Forest management and the associated net removals are reported in line with the requirements of the annex to decision 15/CMP.1, and the removal estimates have been prepared in accordance with the IPCC good practice guidance for LULUCF.

87. The area of forest management activities was 13,071.75 kha. Net removals were 45,402.81 Gg CO_2 in 2008. The overall uncertainty of the estimation of the total emissions (CO_2, CH_4 and N_2O) was 41 per cent.

88. Forest management activities (lands) are clearly distinguished from AR lands; therefore, emissions/removals from forest management activities are accounted separately from emissions/removals from AR, which is in accordance with the provisions set out in paragraph 9(c) of the annex to decision 15/CMP.1.

Revegetation – CO_2

89. Revegetation and associated net removals have been reported in line with the requirements of the annex to decision 15/CMP.1, and net removals have been prepared in accordance with the IPCC good practice guidance for LULUCF.

90. The area of revegetation activities was 69.65 kha. Net removals were 716.21 Gg CO_2 in 2008 and net removals in the base year were 45.51Gg CO_2. The overall uncertainty of the estimation of the total emissions (CO_2, CH_4 and N_2O) was 84 per cent.

91. Revegetation activities (lands) are clearly distinguished from ARD land; therefore, emissions/removals from revegetation activities are accounted separately from emissions/removals from ARD activities in line with the provisions of paragraph 9(c) of the annex to decision 15/CMP.1. Revegetation occurs only on settlements and wetlands and, therefore, the reporting of revegetation does not overlap with lands subject to ARD.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

92. Japan 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.[6] 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.

93. 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.

94. The ERT noted the finding contained in the SIAR that Japan has provided information on notifications and non-replacements in accordance with paragraphs 13–15 of the annex to decision 15/CMP.1. The ERT reiterates the recommendation of the SIAR that, in its next annual submission, Japan further improve its reporting on notifications and non-replacements by explicitly stating a non-occurrence of notifications and non-replacements, if none occurred during the reporting period.

National registry

95. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. The SIAR identified the need for Japan to provide, in its next annual submission, an internet address that provides access to the specific public information referred to in paragraphs 44–48 of the annex to decision 13/CMP.1.

Calculation of the commitment period reserve

96. Japan has reported its commitment period reserve in its 2010 annual submission. The Party reported that its commitment period reserve has not changed since the initial report review (5,335,431,899 t CO_2 eq), as it is based on the assigned amount and not the most recently reviewed inventory. The ERT agrees with this figure.

[6] The SEF comparison report is prepared by the ITL administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

3. Changes to the national system

97. Japan reported that there had been no changes in its national system since the previous annual submission. However, the ERT identified that procedures have been implemented allowing the QA-WG to function for the first time for the 2010 submission. In response to questions raised by the ERT during the review, the Party clarified the above change in the national system. The ERT concluded that, taking into account the confirmed change in the national system, Japan's national system continues to be in accordance with the requirements of national systems set out in decision 19/CMP.1. The ERT recommends that the Party report, in its next annual submission, any change(s) in its national system in accordance with chapter I.F of the annex to decision 15/CMP.1.

4. Changes to the national registry

98. Japan reported that there had been no changes in its national registry since the previous annual submission. This was confirmed by the SIAR. The ERT concluded that the Party's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

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

99. Japan has not reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1, in its 2010 annual submission. Japan reported in the NIR that it was unable to assess the degree to which such efforts undertaken by Japan led to the minimization of adverse impacts, because the methods to evaluate these efforts are currently under discussion internationally. In response to a question from the ERT during the review, the Party submitted the required information on 18 October 2010.

100. The reported information is considered complete and transparent regarding how Japan strives to minimize adverse social, environmental and economic impacts on developing country Parties. However, Japan did not report on how it prioritizes actions in implementing its relevant commitments.

101. Japan reported, for example, that it provides technical assistance to developing countries such as China and India to develop and implement legal systems on energy conservation and renewable energy and to enhance their capacities through accepting trainees and dispatching experts. Japan also reported that there is no support for the use of environmentally unsound and unsafe technologies in Japan.

102. The ERT recommends that Japan include the reported information in its next annual submission. The ERT further recommends that Japan report, in the next annual submission, on how it gives priority to actions in implementing its commitments under Article 3, paragraph 14, of the Kyoto Protocol as required in paragraph 24 of the annex to decision 15/CMP.

III. Conclusions and recommendations

103. Japan made its annual submission on 15 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 in the national system and the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. This is in line with decision 15/CMP.1.

104. The ERT concludes that the inventory submission of Japan 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 almost complete in terms of geographical coverage, years and sectors, as well as complete in terms of categories and gases. However, Japan continues to report actual emissions of F-gases as "NE" for the years 1990–1994.

105. 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.

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

107. Japan has clearly and transparently reported on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

108. Japan 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.

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

110. 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.

111. Japan did not report information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its annual submission. However, this information was provided during the review, on 18 October 2010. The reported information is considered complete and transparent.

112. In the course of the review, the ERT formulated a number of recommendations relating to the completeness of the annual submission (including the provision of information under Article 7, paragraph 1, of the Kyoto Protocol) and the transparency of the information presented in Japan's annual submission. The key recommendations are that Japan:

(a) Provide information quantifying the size of the recalculation at the category level within the respective category-specific recalculation sections of the NIR;

(b) Include a table in the QA/QC section of the NIR, providing explicit information on Japan's follow-up of ERT recommendations from earlier reviews;

(c) Include and complete in its next submission information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

IV. Questions of implementation

113. 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>.

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B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Kohei Sakai (National Institute for Environmental Studies), including additional material on the methodologies and assumptions used. The following documents[1] were also provided by Japan:

Shibata M, Terada F, Kurihara M, Nishida T, and Iwasaki K. 1993. Estimation of methane production in ruminants. *Animal Sciences and Technology*, Vol. 64, No. 8.

[1] Reproduced as received from the Party.

Annex II

Acronyms and abbreviations

AD	activity data
AR	afforestation and reforestation
ARD	afforestation, reforestation and deforestation
AWMS	animal waste management systems
CaO/MgO	calcium oxide/magnesium oxide
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
FAO	Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
GCV	gross calorific value
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFC	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
N	nitrogen
NA	not applicable
NE	not estimated
N-ex	nitrogen excreted
NO	not occurring
N_2O	nitrous oxide
NIR	national inventory report
PFC	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
UNFCCC	United Nations Framework Convention on Climate Change