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Report of the individual review of the greenhouse gas inventory of Japan submitted in 2006*

* In the symbol for this document, 2006 refers to the year in which the inventory was submitted, and not to the year of publication.

CONTENTS

I. Overview

A. Introduction

1. This report covers the in-country review of the 2006 greenhouse gas (GHG) inventory submission of Japan, coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, in accordance with decision 19/CP.8. The review took place from 29 January to 3 February 2007 in Tokyo, Japan, and was conducted by the following team of nominated experts from the roster of experts: generalist – Mr. William Kojo Agyemang-Bonsu (Ghana); energy – Ms. Sophia Mylona (Norway); industrial processes – Ms. Natalya Parasyuk (Ukraine); agriculture – Mr. Sergio González (Chile); land use, land-use change and forestry (LULUCF) – Ms. Thelma Krug (Brazil); waste – Mr. Davor Vešligaj (Croatia). Ms. Natalya Parasyuk and Ms. Thelma Krug were the lead reviewers. The review was coordinated by Ms. Katia Simeonova and Ms. Astrid Olsson (UNFCCC secretariat).

2. In accordance with the "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention" (hereinafter referred to as the UNFCCC review guidelines), a draft version of this report was communicated to the Government of Japan, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Inventory submission and other sources of information

3. In its 2006 submission, Japan submitted a complete set of common reporting format (CRF) tables for the years 1990–2004 and a national inventory report (NIR). Where needed, the expert review team (ERT) also used previous years' submissions, additional information provided during the in-country review and other information. The full list of materials used during the review is provided in the annex to this report.

C. Emission profiles and trends

4. In 2004, the most important GHG in Japan was carbon dioxide (CO_2), contributing 94.9 per cent to total[1] national GHG emissions expressed in CO_2 equivalent, followed by nitrous oxide (N_2O), 1.9 per cent and methane (CH_4), 1.8 per cent. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6) taken together contributed 1.4 per cent of the overall GHG emissions in the country. The energy sector accounted for 88.9 per cent of total GHG emissions, followed by industrial processes (5.5 per cent), waste (3.6 per cent) and agriculture (2.0 per cent). Total GHG emissions amounted to 1,355,270 Gg CO_2 equivalent and increased by 6.5, per cent from 1990 to 2004. Actual emissions of HFCs, PFCs and SF_6 from 1990 to 1994 have not been estimated, but potential emissions have been estimated for these years. Tables 1 and 2 provide an overview of the trend in GHG emissions and removals for Japan from 1990 to 2004 under the Convention.

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

Table 1. Greenhouse gas emissions by gas, 1990–2004

Greenhouse gas emissions	Gg CO_2 equivalent								Change from base year (Convention) to 2004 (%)
	Base year (Convention)[a]	1990	1995	2000	2001	2002	2003	2004[a]	
CO_2 (with LULUCF)	1 069 335.57	1 069 335.57	1 144 901.10	1 169 582.95	1 154 393.81	1 191 376.49	1 189 357.55	1 190 889.09	11.4
CO_2 (without LULUCF)	1 144 129.51	1 144 129.51	1 226 389.96	1 254 619.01	1 239 274.57	1 276 772.17	1 284 376.08	1 285 813.80	12.4
CH_4	33 481.67	33 481.67	31 030.75	27 023.79	26 230.97	25 262.27	24 759.14	24 456.50	-26.96
N_2O	32 705.97	32 705.97	33 594.20	29 940.13	26 448.16	26 047.60	25 769.80	25 902.82	-20.8
HFCs	17 930.00	17 930.00	20 211.80	18 585.39	15 837.00	13 147.94	12 519.09	8 349.96	–53.4
PFCs	5 670.00	5 670.00	14 045.93	8 610.59	7 191.30	6 521.39	6 194.39	6 318.17	11.4
SF_6	38 240.00	38 240.00	16 928.79	6 823.27	5 678.65	5 306.86	4 745.95	4 474.32	–88.3

Note: LULUCF = Land use, land-use change and forestry.

[a] Japan submitted revised estimates for the base year and 2004 for N_2O emissions from agricultural soils in the course of the initial review on 16 March 2007. These estimates differ from Japan's GHG inventory submitted in 2006.

Table 2. Greenhouse gas emissions by sector, 1990–2004

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Gg CO_2 equivalent								Change from base year (Convention) to 2004 (%)[a]
	Base year (Convention)[a]	1990	1995	2000	2001	2002	2003	2004	
Energy	1 069 514.73	1 069 514.73	1 144 100.31	1 175 259.72	1 161 767.52	1 200 787.23	1 205 767.46	1 205 367.74	12.7
Industrial processes	132 782.92	132 782.92	123 986.12	95 767.65	85 014.47	78 969.72	77 105.91	74 129.86	–44.2
Solvent and other product use	287.07	287.07	437.58	340.99	343.60	334.05	320.83	297.54	3.6
Agriculture [a]	32 217.84	32 217.84	30 965.92	28 438.15	28 132.98	27 862.15	27 648.95	27 611.89	–14.3
Land use, land-use change and forestry	–74 621.68	–74 621.68	–81 371.29	–84 964.70	–84 807.87	–85 333.18	–94 978.14	–94 879.19	27.1
Waste	37 182.33	37 182.33	42 593.94	45 724.31	45 329.18	45 042.58	47 480.91	47 863.01	28.7
Other	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA
Total (with LULUCF)	**1 197 363.21**	**1 197 363.21**	**1 260 712.57**	**1 260 566.12**	**1 235 779.90**	**1 267 662.55**	**1 263 345.93**	**1 260 390.86**	**5.3**
Total (without LULUCF)	**1 271 984.89**	**1 271 984.89**	**1 342 083.87**	**1 345 530.83**	**1 320 587.76**	**1 352 995.73**	**1 358 324.07**	**1 355 270.05**	**6.5**

Note: LULUCF = Land use, land-use change and forestry, NA = Not applicable and NO = Not occurring.

[a]: Japan submitted revised estimates for the base year and 2004 for N_2O emissions from agricultural soils in the course of the initial review on 16 March 2007. These estimates differ from Japan's GHG inventory submitted in 2006.

D. Key categories

5. Japan has conducted key category tier 1 and tier 2 analyses, both level and trend assessment, as part of its 2006 submission. The key category analyses performed by the Party and the secretariat[2] 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 as the IPCC good practice guidance). The key category analysis constitutes an important component of Japan's inventory preparation, especially for identifying areas which require further improvement.

E. Main findings

6. Japan's 2006 submission shows a significant improvement compared to the previous years' submission. Major comments raised by the previous review teams have been addressed as far as possible and a high degree of consistency has been ensured between the information provided in the NIR and the CRF tables. The use of the notation keys has contributed to the completeness of Japan's inventory, even though the use of some of them, particularly in the agriculture and LULUCF sectors, is not yet adequate and needs to be addressed in the Party's future reporting. The structure of Japan's NIR does not follow 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 ERT recommends that Japan present the NIR in accordance with the following format: description of category; methodological issues (choice of methods, activity data (AD), emissions factors (EFs) and the rationale for their selection, etc.); uncertainties; category-specific quality assurance/quality control (QA/QC) and verification; category-specific recalculations; and category-specific planned improvements.

F. Cross-cutting issues

1. Completeness

7. The inventory covers all sources for the whole period 1990–2004 and is complete in terms of geographical coverage. Japan has submitted a complete set of CRF tables covering all years, all categories and almost all gases. It reports potential emissions for the fluorinated gases (F-gases) for the whole time series but has not estimated actual emissions for the F-gases from 1990 to 1994 because of lack of activity data. Japan indicated that any attempt to calculate them could lead to the introduction of significant uncertainties and errors in the inventory. The ERT encourages Japan to estimate actual emissions for the years 1990–1994 following the IPCC good practice guidance, to the extent possible. The ERT also recommends Japan to complete CRF table 7 for the base year and the latest reported inventory year manually.

2. Transparency

8. Japan's CRF is generally transparent. However, there are some areas where improvement is needed. Information on the energy sector, for instance, is scattered in the NIR. The ERT recommends that Japan structure the presentation for all sectors according to the UNFCCC reporting guidelines. During the in-country review, the ERT was presented with a document explaining relevant parts of

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

Japan's general energy statistics. This document provided valuable explanations for queries from the ERT concerning the energy sector. In order to improve transparency, the ERT recommends that Japan include in its future submissions relevant elements of the extensive documentation that is already available. This applies equally to explanations concerning the nature of emission trends, which should include the main drivers of emission trends, as presented during the review.

3. Recalculations and time-series consistency

9. The institutional arrangements ensure that recalculations of previously submitted estimates of GHG emissions and removals are prepared in accordance with the IPCC good practice guidance. The rationale for these recalculations is provided in the NIR. They are due to methodological improvements, revisions in certain EFs and AD, and the inclusion of emissions from categories that were not addressed previously. The effect of major recalculations for 2003 is an increase in the estimates of total emissions (excluding LULUCF) by about 1.4 per cent and a decrease in the estimates of total emissions (including LULUCF) by 5.7 per cent. The ERT encourages Japan to continue to report on the new categories that have been included in the current inventory in order to ensure time-series consistency.

10. The ERT noted that the recalculations reported had been undertaken for the whole time series 1990–2003. The major changes for 2003 include:

(a) In the energy sector, estimated CH_4 emissions have increased by 10.9 per cent and N_2O emissions have decreased by 16.8 per cent. This was due to the revision of the relevant EFs in the energy sector, which resulted in the country-specific EFs that were used previously being replaced by IPCC default ones for several fuels;

(b) In the industrial processes sector, estimated emissions of CO_2, CH_4 and N_2O increased by, respectively, 8.9 per cent, 14.7 per cent and 4.3 per cent, while estimated emissions of PFCs decreased by 31.4 per cent. As noted in the NIR, the main reasons for these changes were the application of new methodologies and revised AD, especially for cement and lime production;

(c) In the agriculture sector, estimates of CH_4 emissions in 2003 have increased by 16.1 per cent, mainly due to manure management, while estimates of N_2O emissions decreased by 39.1 per cent, due to decreases in manure management and indirect emissions from agricultural soils;

(d) In the waste sector, the emission estimates for 2003 have been revised upwards by around 50 per cent due to new or revised estimation methods;

(e) In the LULUCF sector the offset decreased slightly, to 7 per cent of total national GHG emissions in 2003. This is the result of, inter alia, changes to the method of estimating changes in carbon stock in forest land from the default method to the stock change method in the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF), as well as changes in the definition of forest and corresponding parameters.

4. Uncertainties

11. Japan provides tier 1 and tier 2 (level and trend) qualitative and quantitative uncertainty estimates for the entire inventory and for all sectors, in accordance with the IPCC good practice guidance. It reports an overall uncertainty for the national total GHG emissions of 2 per cent, and a trend uncertainty of 2 per cent. The ERT noted that the overall uncertainty for the national total is very low. Further consideration needs to be given to the feasibility of applying the Monte Carlo method to

categories that have large coefficients of variation. Japan explains in its NIR that the low uncertainty value as compared to those of other Annex I countries is, for example, attributable to the low ratio of Japan's N_2O emissions from agricultural soils (category 4.D.1). Given that the contribution of N_2O emissions to total national emissions is very minimal, the ERT recommends that Japan improve its estimate of the overall uncertainty of its inventory.

5. Verification and quality assurance/quality control approaches

12. Japan has in place a comprehensive QA/QC plan with clear institutional responsibilities and implementation procedures. The QA/QC plan is in accordance with the IPCC good practice guidance, except that QA is performed by experts who are members of Japan's Committee for the Greenhouse Gases Emissions Estimation Methods, and are therefore part of the inventory preparation process. Taking into account the IPCC good practice guidance, the ERT recommends that Japan invite experts who are not involved in the inventory process to undertake QA of its future GHG inventories.

6. Follow-up to previous reviews

13. Japan has in place a well-developed inventory system that ensures that comments from previous reviews are properly evaluated and addressed. A number of inconsistencies in emission trends and emissions that were not estimated in the 2005 submission have been adequately addressed in the 2006 submission. Recalculations have been conducted to reflect methodological improvements and new activity data and emission factors. The use of the notation keys has improved significantly compared to the previous submission, although some inconsistencies and misallocations still remain.

G. Areas for further improvement

1. Identified by the Party

14. The NIR identifies several areas for improvement. Japan indicates that it will carry out investigations into categories which are currently reported as "not estimated" ("NE") to take these emissions/removals into account in its future submission. Japan has plans for further work to improve the estimates of emissions/removals from categories where default IPCC values have been used, since default values may not correctly reflect Japan's specific national circumstances, for example, emission factors for N_2O emissions for road transportation. Japan also plans to address the problems of non-availability of data arising from the discontinuity in data collection and/or the exclusion of these data from national statistics.

2. Identified by the ERT

15. The ERT identified the following cross-cutting issues for improvement. The Party should:

(a) Include a reasonable amount of the information that was provided to the ERT during the course of the in-country review in the NIR and provide as necessary additional information in the documentation boxes in the CRF tables;

(b) Provide a transparent explanation of its emission trends to facilitate the understanding of the drivers for these trends;

(c) Improve its quality assurance procedures.

16. Recommended improvements relating to specific source/sink categories are presented in the relevant sector sections of this report.

II. Energy

A. Sector overview

17. In 2004, total GHG emissions from the energy sector in Japan amounted to 1,205,367.74 Gg CO_2 equivalent, accounting for 88.9 per cent of total national emissions. Energy industries was the largest emitting category in 2004, contributing 31.8 per cent to the sectoral total, followed by manufacturing industries and construction, transport and other sectors, with contributions of 31.1 per cent, 21.4 per cent and 15.5 per cent, respectively. Between 1990 and 2004 emissions from the sector increased by 12.7 per cent. Japan experienced a marginal decrease in emissions from the energy sector in 2004 compared with 2003, of approximately 0.03 per cent. Fugitive emissions, a relatively minor source, decreased substantially over the years, rendering its share in total GHG emissions in 2004 as low as 0.03 per cent.

18. Japan's 2006 submission for the energy sector suggests that considerable improvements have been made compared to earlier reports, and shows that the recommendations of several previous reviews have been appropriately addressed. Both the NIR and the CRF tables are complete in terms of categories and gases. Ample additional background data and information have been provided through electronic spreadsheets. However, major elements remain to be addressed, mainly concerning issues of transparency and, to a lesser extent, consistency, as specified in the relevant sector sections below. To improve transparency, the ERT recommends that Japan include in its future NIRs relevant information from the extensive national documentation on its general energy statistics that is readily available (see para. 30). Additionally, emission trends and their notable features should be clearly explained and, if necessary, documented. Feedstocks and non-energy use of fuels, as well as any source-specific verification studies conducted, also need to be explicitly discussed in the NIR.

19. The recalculations performed in the energy sector are due to methodological improvements, revisions to certain EFs and AD, and the inclusion of emissions from categories not previously addressed. The effect of these recalculations on the 2003 energy sector emission estimates is increases in the estimated emissions of CO_2 and CH_4 by 0.7 and 10.9 per cent, respectively; and a decrease in the estimated emissions of N_2O by 16.8 per cent.

20. The tier 2 key category analysis conducted by Japan for 2004 has resulted in four additional key categories compared to those from the secretariat's tier 1 analysis. These are emissions of N_2O from stationary combustion, road transportation, navigation and civil aviation.

B. Reference and sectoral approaches

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

21. Emissions of CO_2 from fuel combustion have been calculated using both the reference and the sectoral approach. For the year 2004, the difference between the two approaches was 0.40 per cent for CO_2 emissions. For energy consumption, the corresponding difference appearing in CRF table 1.A(c) (1.4 per cent for 2004) is not identical with that shown in the NIR (0.62 per cent for 2004). During the in-country review Japan explained that this discrepancy is due to the fact that energy consumption figures in the CRF table include non-energy use and feedstocks, while the corresponding NIR figures exclude those amounts. In addition, Japan indicated that the CRF figures were incorrect. The ERT recommends that Japan correct these discrepancies and provide consistent information as between the CRF tables and the NIR in its next submission.

22. The NIR addresses the differences between the emission estimates in the reference and the sectoral approach, and provides explanations for the discrepancies, one of them being that stock changes are not reflected in the emission estimates in the reference approach. However, stock changes are

reported in the CRF tables. During the in-country review Japan explained that the figures reported under stock changes refer to what it calls "stockpile changes", that is, changes in stocks in the energy supply sector. What Japan calls "stock changes", on the other hand, is meant to be stock changes in the energy conversion and final consumption sectors; it is these latter changes that are not reflected in the calculation of emissions. The ERT encourages Japan to report stock changes as recommended in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines). Any deviations from this recommendation, as well as the role of stock changes in explaining differences between the reference and the sectoral approaches, should be clearly explained in Japan's next submission.

23. The ERT noted several discrepancies between the data reported in the CRF tables and the statistics of the International Energy Agency (IEA) report. In particular, exports of liquid fuels are between 40 and 70 per cent lower in the IEA data; the differences are due in particular to differences in the figures for jet kerosene and residual fuel oil, with the largest errors occurring in recent years. Imports of jet kerosene have been reported to the IEA, but are shown as zero in the CRFs for the years 1990–1997, while imports of gas/diesel oil are systematically about 80 per cent lower in the CRF tables than in the IEA figures. Furthermore, the figures for imports of coking coal are systematically lower in the CRF tables than those in the IEA statistics, with the largest discrepancy occurring in 1999. In addition, the data on stock changes are not consistent for liquid and gaseous fuels. The ERT recommends that Japan provide a clear explanation for the discrepancies between the data in the CRF tables and the IEA statistics in the next submission.

2. International bunker fuels

24. Japan allocates emissions from all aircraft and ships engaged in international transport as emissions from international bunkers based on the bonded fuel concept (bonded export/import fuels are fuels that are exempt from certain taxes for domestic fuel use in Japan because they are used for the purposes of international aviation/navigation). During the review, Japan informed the ERT that in Japan, all the aircraft and ships that depart in Japan for arrival in another county do not drop off passengers or freight when they stop at another place in Japan. Therefore, the domestic segment as defined in the IPCC good practice guidance does not exist in Japan. The ERT recommends that Japan document the methodology and assumptions for estimating emissions from international bunkers, including the information provided to the ERT during the review in its next inventory submission.

25. The trend of CO_2 emissions from international marine bunkers exhibits pronounced fluctuations, especially in the years 1995–1997 and 2000–2001. Similar features appear in the corresponding trend for international aviation bunkers. The ERT recommends that Japan include in its future submissions an explanation for such fluctuations, as provided during the in-country review.

26. In its latest submission, Japan has changed the method used to estimate emissions from international bunkers to make it consistent with the fuel types accounted for by the IEA. For international marine bunkers, the total quantities are generally consistent, except for 1995. For international aviation, the figures in the CRF tables are generally about 6 per cent lower than the IEA data for all years except 1995 and 1999. The ERT encourages Japan to investigate the possible reasons for this discrepancy in its next submission.

27. The ERT noted that the notation key used for residual fuel oil in CRF table 1.C is "included elsewhere" ("IE"), but no information is provided in CRF table 9(a) or in the documentation box of CRF table 1.C. The ERT recommends that Japan provide an explanation indicating where these data are included.

3. Feedstocks and non-energy use of fuels

28. This part of the inventory is not discussed in the NIR, despite the recommendations of previous review teams that elaboration was needed. Data related to feedstocks and non-energy use of fuels are reported in CRF table 1.A(d). The country-specific fractions of carbon stored vary considerably from the default values provided by the Revised 1996 IPCC Guidelines. Japan explained during the review that the country-specific fractions of carbon stored were derived by dividing the total amount of non-energy use by the amount of total energy supply, defined as domestic primary energy supply plus production. However, this equation indicates the fraction of carbon in non-energy use, rather than the carbon actually stored under non-energy use. The ERT recommends that Japan review its calculation methodology in the light of the guidance available in the Revised 1996 IPCC Guidelines, and include an explicit discussion on this issue in its future NIRs, along with documentation justifying the fractions of carbon stored that it has adopted.

4. Country-specific issues

29. Japan reports negative emissions under the category manufacturing industries and construction: other (CRF table 1). This results from the use of a duplication adjustment in the energy statistics, aimed at rectifying an overlap of CO_2 emissions from enterprises that operate in two or more industrial modes. The ERT recommends that Japan explain the rationale for the use of this adjustment in the documentation box to CRF table 1 in its future submissions.

C. Key categories

1. Stationary combustion: liquid, solid, gas – CO_2 and N_2O

30. Estimates of emissions from stationary combustion are based on Japan's general energy statistics and emission factors that are largely country-specific. To improve transparency, the ERT recommends that Japan include elements of the available documentation on the general energy statistics, particularly those related to choice of methodology and the rationale for that choice in the compilation of the energy inventory.

31. From 1998 the scope of the energy consumption survey of small and medium-size enterprises was changed and less information is collected. However, these enterprises do seem to influence emission levels in this category, though in the case of CO_2, the total national energy-originated emissions remain unchanged. The ERT recommends that Japan make efforts to resume the full scope of these surveys. In addition, gathering information on the technological development of industrial enterprises through the so-called MAP surveys, took place in 1989, 1992, 1995, 1996 and 1999. The MAP survey has not been used since 2002 because a rule was implemented which prohibits the use of the MAP survey for purposes other than the original intent. Inability to use updated information on technological development of these enterprises will eventually result in less accurate estimates of CH_4 and N_2O emissions from this category. The ERT recommends that Japan make efforts to reintroduce similar surveys in order to maintain and improve the accuracy of its inventory. It also recommends that Japan elaborate in its future NIRs on the way in which the MAP survey data are used for the purposes of the emissions inventory for this category.

32. The ERT noted that the CO_2 implied emission factor (IEF) for solid fuels for manufacturing industries and construction for the years 1990–2004 (84.04–92.49 t/TJ) is among the lowest of reporting Parties and lower than the IPCC default range (94.60–106.7 t/TJ). During the in-country review Japan explained that this is most likely due to the use of country-specific values for solid fuel, which are generally lower than those of the IPCC. However, this seems to contradict the fact that for some solid fuels country-specific EFs were replaced by (higher) IPCC EFs. Another possible explanation suggested by Japan was the use of blast furnace gas, which is classified as solid fuel; its EF value is estimated based

on carbon flow analysis. To improve the transparency of the inventory, the ERT recommends that Japan explain in its future NIRs the reason for the relatively low CO_2 IEF in this category.

33. Japan reports emissions from waste used as an alternative fuel in the waste sector and not under the energy sector as required by the Revised 1996 IPCC Guidelines. During the in-country review Japan explained that this is because national practices make it difficult to estimate accurately the amount of waste used as fuel. In the case of moisture-containing waste such as paper and food waste, for example, the operation of recovery units attached to incineration units is often discontinued depending on the moisture content of the waste or the level of hazardous releases occurring during incineration. The ERT recognizes the difficulties involved in differentiating waste fuel types in these cases, but encourages Japan to report emissions from fuel derived from non-moisture-containing waste (such as tyres and waste oils) under the energy sector.

2. Road transportation: liquid – N_2O

34. Japan uses a country-specific methodology to assess N_2O emissions from road transportation. This methodology is consistent with the IPCC tier 3 approach. The resulting IEF for N_2O for gasoline from road transportation exhibits an unusual trend compared to that of other Annex I Parties: there is a steady decline from the 1990 value of 6.82 kg/TJ to 3.91 kg/TJ in 2004. The trend of the N_2O IEF in other Annex I Parties is either a steady increase since 1990, or increases in the early 1990s and decreases from then onwards. During the in-country review Japan explained that the specific profile of the N_2O IEF in the early 1990s is a result of the implementation of the 1978 Emission Regulation on Gasoline Automobiles: regulations were introduced much earlier than they were in other Annex I Parties. As this regulation required the installation of three-way catalytic converters in gasoline automobiles, it follows that the peak of N_2O emissions in Japan must have appeared before or around 1990, followed by a steady decline due to stricter regulations introduced in subsequent years.

35. Emissions of N_2O from gaseous fuels are reported in CRF table 1.A(a), but AD are denoted as "not occurring" ("NO"). Although these emissions are negligible, Japan should delete the notation key and report the actual consumption figure instead.

3. Navigation: liquid – CO_2

36. Japan explains in the NIR that emissions from the consumption of residual fuel oil in navigation are reported under other liquid fuels, and are therefore denoted as "IE" in CRF table 1.A(a). The same information should be provided in the documentation box and in CRF table 9(a).

D. Non-key categories

1. Stationary combustion: other – CO_2, CH_4 and N_2O

37. Fuel combustion in mining is the only subcategory reported under 1.A.5 other. As this source is not discussed in the NIR, it is recommended that Japan provide further information in its next submission.

2. Railways: solid – CH_4 and N_2O

38. Emissions of CH_4 and N_2O from the consumption of coal in steam locomotives are estimated, but AD are denoted as "NO" in CRF table 1A(a). Even if emissions in this category are negligible, Japan should report the actual consumption figure.

III. Industrial processes and solvent and other product use

A. Sector overview

39. In 2004, total GHG emissions from the industrial processes sector in Japan amounted to 74,129.86 Gg CO_2 equivalent, accounting for 5.5 per cent of total national emissions. The largest category was mineral products (67.0 per cent of emissions from the industrial processes sector), followed by consumption of halocarbons and SF_6 (20.3 per cent). GHG emissions from industrial processes decreased by 44.2 per cent between 1990 and 2004, and emissions from solvent and other product use increased by 3.6 per cent over the same period. Since 1997 emissions from the sector have decreased, mostly due to decreases in emissions from the consumption and production of HFCs and SF_6, and in mineral products, mainly due to a decline in cement production.

40. The following categories are reported as "NE": asphalt roofing – CO_2; road paving with asphalt – CO_2; ammonia production – CH_4; and aluminium production – CH_4. Actual emissions of HFCs, PFCs and SF_6 have not been estimated for the period 1990–1994, mainly because of lack of data. The ERT encourages Japan to estimate these categories and include the estimates in its next submission, including actual emissions for the years 1990–1994 following the IPCC good practice guidance, to the extent possible.

41. Japan has presented in the NIR areas for further improvement. All relate to the reporting of F-gas emissions. Japan reports some categories in the industrial processes sector as confidential. During the in-country review access to these confidential data was provided to the review team. The ERT noted that, based on the review of these data, these emissions have been estimated in a correct and accurate way.

B. Key categories

1. Cement production – CO_2

42. For the first time, in its 2006 inventory submission Japan has used the IPCC good practice guidance tier 2 method for calculating emissions from this category by multiplying the amount of clinker produced (an intermediate product of cement production) by a country-specific EF. Japan has been developing a country-specific EF since 2000 taking into consideration the amount of waste used as raw material. Japan's cement industry takes in large amounts of waste and by-products from other industries and recycles them as substitutes for other raw materials in the production of cement. The EF changes from 2000 onward; the same value of CO_2 IEF is reported for the period 1990–1999. The reason for this is that data for waste used as raw material have been collected since 2000. The average lime content in waste used as a raw material for the years 2000–2003 has therefore been used for the years 1990–1999. Due to a lack of statistics on clinker production from 1990 to 1999, estimates have been made by extrapolating past clinker production (1990–1999) using the average value of the 2000–2003 ratios of clinker production and limestone consumption. All relevant data are provided by the Japan Cement Association. The ERT agrees with this approach.

2. Lime production – CO_2

43. For the first time, in its 2006 inventory submission Japan has used the IPCC methodology and default emission factors for high-calcium lime and dolomite lime. In Japan's previous submissions a country-specific method was applied using sales of limestone and dolomite as raw material as the basis for AD on lime production. Recalculations have been made and the methodology has been revised because the amount of limestone sold for lime production, which was previously used as AD, has not been published since 2001. Estimated CO_2 emissions have increased over the whole time series. During the in-country review Japan provided a clear explanation for the differences of CO_2 emission

estimates between the 2006 inventory submission and previous submissions. The main reason for the difference is the change of AD. In the 2006 submission, Japan has used high-calcium lime and dolomitic lime production as AD. Japan considered that data on "quicklime" produced indicated in the *Yearbook of Chemical Industries* are more appropriate to use as AD in estimating CO_2 emissions than the data on "limestone" and "dolomite" indicated in the *Yearbook of Minerals and Non-Ferrous Metals*. The ERT recommends that Japan continue to use quicklime production data for calculating CO_2 emissions in this sector, but encourages Japan to provide more transparent and clear explanations and description of the methods and AD used in its next submission.

C. Non-key categories

1. Ammonia production – CO_2

44. CO_2 emissions have been calculated by multiplying the amounts of fuel consumed as ammonia feedstock by emission factors used in the energy sector. The IEF is lower in 2004 than that for 1990. During the review Japan explained that the reason for this is that the share of carbon-intensive fuels used was much higher in 1990 than in later years in the time series. The ERT encourages Japan to provide a clear explanation of this in its next submission.

2. Production and consumption of halocarbons and SF_6

45. The main drivers for the trend in emissions from the production and consumption of halocarbons and SF_6 were explained to the ERT during the in-country review. Demand for PFCs is growing continuously. Since 1998, a destruction unit has been installed at all facilities which manufacture HCFC-22. Between 1995 and 2000, production of semiconductors and liquid crystal displays (LCDs) increased, and consumption of PFCs and SF_6 has also increased. The installation of removal facilities got fully under way in 2001, and since then these emissions have remained at the same level or have decreased slightly. The ERT encourages Japan to include an explanation of this trend in the NIR.

IV. Agriculture

A. Sector overview

46. In 2004, according to the 2006 inventory as submitted, emissions from the agriculture sector amounted to 27,516.84 Gg CO_2 equivalent, accounting for 2.0 per cent of total national emissions (excluding LULUCF). CH_4 contributed 56.4 per cent of the emissions from the sector and N_2O the remaining 43.6 per cent. Total emissions decreased by 14.9 per cent relative to 1990. Due to recalculations since the 2005 submission, CH_4 emissions in 1990 increased by 16.1 per cent, mainly due to manure management, while N_2O emissions decreased by 38.4 per cent, mainly due to manure management and indirect emissions from agricultural soils. The 2006 submission shows significant improvements compared to the 2005 submission, mainly due to methodological changes, new country-specific emission factors, and consideration of the findings of the 2005 review. In response to a request from the ERT during the in-country review, Japan submitted revised estimates for N_2O emissions from agricultural soils (see para. 53). According to these revised estimates, total emissions from the agriculture sector in 2004 amounted to 27,611.89 Gg CO_2 equivalent, and declined by 14.3 per cent between 1990 and 2004.

47. The treatment of some categories, especially manure management and agricultural soils, in the NIR was found to be difficult to follow and understand. The ERT recommends Japan to improve this part of the NIR in time for its next submission, providing a clearer description of these categories.

B. Key categories

1. Enteric fermentation – CH_4

48. Japan estimates emissions from this category using a method similar to the IPCC tier 2 method for cattle, tier 1 with country-specific emission factors for sheep and swine, and tier 1 and default EFs for the remaining animal species. The tiers applied and the development of country-specific EFs, based on dry matter intake and supported by references given in the NIR, are in line with the IPCC good practice guidance. As Japan excludes animals younger than five months from its calculation, this fact needs to be addressed properly in the documentation box of CRF table 4.A.

2. Manure management – CH_4 and N_2O

49. Japan estimates these emissions applying a country-specific method along with country-specific EFs for cattle, swine and poultry, and tier 1 with default EFs for buffalo, sheep, goats and horses. This approach is in line with the IPCC good practice guidance as it takes into account the national circumstances in relation to the management of animal populations and the significance of each animal type.

50. Supporting information and references are provided in the NIR and additional information was provided during the in-country review, but more information is needed to explain the country-specific EFs for grazing animals included in table 6-11 of the NIR. The ERT suggests that the Party include adequate information in the documentation box to table 4.B(b) in order to illustrate the different animal waste management systems (AWMS) included under "other". The ERT also encourages Japan to treat CH_4 and N_2O emissions separately in the NIR to make it easier to understand the issues and to improve the transparency of the submission.

51. N_2O emissions from grazing animals, which should be reported under animal production, are reported under manure management. The ERT recommends Japan to reallocate these emissions, at least for cattle, which are explicitly estimated, and to gather information for the remaining animals in order to be able to allocate these emissions correctly.

3. Rice cultivation – CH_4

52. Japan estimates CH_4 emissions from rice cultivation based on the IPCC method along with country-specific emission factors, which is in line with the IPCC good practice guidance. CRF table 4.C needs to be filled in with activity data for organic amendment.

4. Agricultural soils – N_2O

53. Japan estimates direct N_2O emissions applying a national approach that is based on the IPCC tier 1 method, bottom-up-derived activity data and country-specific emission factors based on national research which is referenced in the NIR. Taking into account the response provided by Japan after the in-country review, the ERT requested Japan to revise the AD for nitrogen (N) applied to soils as synthetic fertilizers in order to correct the inconsistency found when the bottom-up-derived AD are compared with the total annual synthetic fertilizer N applied in the country. In response to this request, Japan recalculated direct and indirect N_2O emissions due to usage of synthetic fertilizer N using the total N consumed in the country as the AD and using the bottom-up approach to disaggregate this total figure between specific crops and groups of crops to allow the use of country-specific EFs.

54. Emissions from N-fixing crops are included either under synthetic fertilizers or under animal manure applied to soils, on the basis that it is difficult to list them separately and that this is backed up by national research. The ERT encourages Japan to rectify this misallocation for its next submission, especially if the activity data needed are available.

C. Non-key categories

Field burning of crop residues – CH_4 and N_2O

55. Japan estimates emissions from this category following default methods and using a mixture of country-specific and default AD. To get crop production values, a bottom-up approach is followed. CRF table 4.F has been partly filled in, although the data that are missing are provided in the NIR and in the additional Excel files provided by Japan as part of its submission. The ERT encourages Japan to submit the CRF files filled in with the complete AD.

V. Land use, land-use change and forestry

A. Sector overview

56. Japan reports emissions/removals of CO_2, CH_4 and N_2O for all land-use categories in the LULUCF sector in accordance with the reporting requirements and following the IPCC good practice guidance for LULUCF for the entire period 1990–2004. Carbon emissions from agricultural lime application and N_2O emissions from drainage of soil have not been reported due to lack of data. Non-CO_2 emissions from biomass burning (including wildfires) have been reported following the IPCC good practice guidance for LULUCF. Key category analysis has been carried out for LULUCF, following the IPCC good practice guidance for LULUCF. Japan has provided recalculations for the LULUCF sector for the entire time series, but has not shown how the LULUCF categories map onto the categories of the Revised 1996 IPCC Guidelines. Japan has provided uncertainty estimates for all the land categories, indicating a combined uncertainty of 6 per cent for the sector. The lowest uncertainty (6 per cent) was estimated for the category forest land remaining forest land, whereas the highest (14,486 per cent) was estimated for land converted to other land. Uncertainties have also been provided for the transitions land converted to forest land (22 per cent), land converted to grassland (21 per cent) and land converted to cropland (42 per cent). The ERT noted the high value for the estimate for land converted to other land and recommends that Japan review this figure. Given these uncertainties, the ERT recommends that Japan not only provide the methodology to estimate the uncertainties, but also explain how the use of it could lead to the combined uncertainty of 6 per cent for the sector.

57. Over the whole period 1990–2004, the LULUCF sector was a net sink of emissions, the size of which increased from 74,621.68 Gg CO_2 equivalent in 1990 to 94,879.19 Gg CO_2 equivalent in 2004, thus offsetting 5.9 per cent of total national emissions in 1990 and 7.0 per cent in 2004.

58. Japan's inventory for the LULUCF sector has improved significantly compared to the 2005 submissions, but there are still several areas for improvement. In particular, the activity data in the land-use transition matrices (areas maintained or converted to and from categories in between inventories) need to be provided in a transparent manner, in particular the methods used (interpolation/extrapolation) and the identification of the latest source of data. In particular, Japan should justify the amount of land annually converted to and from the category other, since this is not entirely clear, taking into consideration the definition of the category other in the IPCC good practice guidance for LULUCF.[3] During the in-country review, Japan indicated that the data for the transition matrices will be continuously refined through the use of more reliable sources and methods. The ERT also noted a lack of consistency between the annual areas reported for the national territory and the total area under the land-use categories, and recommends Japan to ensure consistency here in its next submission.

[3] The category includes bare soil, rock, ice and all unmanaged land areas that do not fall into any of the other categories. It allows the total of identified land areas to match the national area, where data are available.

59. Japan has extensive forest data acquired during repeated forest inventories (every five and 10 years, under the Forest Status Survey and for the World Census of Agriculture and Forestry, respectively) and the ERT encourages it to provide information on the methods used for data collection. Japan explained that national data for stem volume, basic wood density, biomass expansion factor (BEF), and root-to-shoot ratio are stratified on the basis of major tree species, age classes or geographical conditions based on the field study conducted in all the 47 prefectures, to take into account local variables such as different climate zones. The ERT recommends that Japan clarify how these variables are included in its estimates of changes in carbon stocks in above-ground biomass in the next submission.

60. Japan recognizes that there are areas for further development, including consistency in land area data, improving the parameters needed to estimate emissions from biomass burning, the inclusion of emissions from dead organic matter (DOM) and soil using a tier 2 method or higher, and the inclusion of data on settlements.

61. The ERT recognized several specific areas for improvement, including providing the methods used to interpolate or extrapolate data, and explaining how losses from felling and disturbance are accounted for during years that are not covered by national inventories. Additionally, more transparency should be provided on how land areas in transition (converted less than 20 years ago) are incorporated into a permanent land category. Some of the notation keys used by Japan need to be modified, in particular the use of "not applicable" ("NA") instead of "NE" or zero (as in changes in the soil organic carbon pool in mineral soils for forest land), and explanations provided in the documentation boxes. The ERT encourages Japan to explain in a more transparent way the equations and definitions of the variables relating to the method used to estimate changes in biomass in land converted to forest land in accordance with the IPCC good practice guidance for LULUCF.

B. Key categories

1. Forest land remaining forest land – CO_2

62. Japan estimates carbon stock changes in forest land remaining forest land using the carbon stock change method from the IPCC good practice guidance for LULUCF, which is deemed to be appropriate given the existence of detailed data from the national forest inventory that is regularly conducted by Japan (every five and 10 years). National data for volume, basic wood density, BEFs, and root-to-shoot ratio exist for the major tree species, climate zones and age classes. The values seem reasonable. Japan needs to clarify how land converted to forest land more than 20 years ago is finally aggregated into the category forest land remaining forest land (e.g. sources of data). Japan applies a tier 1 method to estimate carbon stock changes in DOM and in mineral soil, which assumes zero change. Japan indicates that data on carbon stock in DOM and soil are being collected, so that a tier 2 or tier 3 method can be applied in future submissions.

2. Land converted to forest land – CO_2

63. Japan estimates changes in carbon stock in biomass and in mineral soils using national data. For DOM Japan applies a tier 1 method that assumes zero change in carbon stock. The value used for grassland biomass before conversion is too low (2.7 tonnes dry matter per hectare) compared to the default data in the IPCC good practice guidance for LULUCF. Japan also does not include the below-ground biomass in its estimate. The ERT recommends that Japan use the value provided in table 3.4.9 of the IPCC good practice guidance for LULUCF, which is equal to 13.5 tonnes dry matter per hectare, in the absence of country-specific data or more adequate data than the IPCC default. This value already includes the carbon stored in the below-ground biomass. In addition, Japan assumes that the biomass stocks for wetland, settlements and other land, prior to conversion, are zero, following the IPCC good practice guidance for LULUCF. Japan should verify whether this tier 1 assumption in the

IPCC good practice guidance for LULUCF holds for other land. Japan assumes that there are no changes in carbon stock in DOM, following the tier 1 method. For the changes in the soil organic carbon pool, Japan uses nationally derived carbon stock for each of the land-use categories. Values for cropland are averaged over the values for rice field, crop field, and orchards.

3. Land converted to cropland – CO_2

64. Japan estimates changes in carbon stock in biomass and in mineral soils using national data. The IPCC good practice guidance for LULUCF does not provide a methodology for estimating changes in carbon stock in DOM. Since most of the land area converted to cropland is from other land, Japan should verify whether the assumption of zero biomass that is assumed for other land applies. The ERT recommends that distinct values for the forest biomass be used, as appropriate for the climate zone, soil type, forest species and stand age. The ERT also recommends that Japan reproduce the equations of the IPCC good practice guidance for LULUCF as far as possible, and use the same definitions for the variables, to avoid confusion.

4. Land converted to grassland – CO_2

65. Japan estimates changes in carbon stock in biomass and in mineral soils using national data. The IPCC good practice guidance for LULUCF does not provide a methodology for estimating changes in carbon stock in DOM. The same comments as for land converted to forest land, regarding the grassland and other land carbon stock prior to conversion, apply here.

5. Land converted to other land – CO_2

66. Japan estimates changes in carbon stock in biomass and in mineral soils using national data. The IPCC good practice guidance for LULUCF does not provide a methodology for estimating changes in carbon stock in DOM. Since most of the land converted to other land is cropland, the ERT recommends that Japan identify the subcategories of cropland converted (rice fields, crop fields, and orchards). Japan applies the IPCC good practice guidance for LULUCF methodology using nationally derived data averaged for each land-use category.

C. Non-key categories

1. Cropland remaining cropland – CO_2

67. For cropland remaining cropland, the IPCC good practice guidance for LULUCF method for estimating changes in biomass includes both annual gains and annual losses from harvested or removed crops (as part of the maturity cycle). Japan, however, accounts only for increases in biomass in perennial crops. The ERT recommends that Japan provide an estimate of the average annual area of established perennial woody crops and the annual area of perennial woody crops that are harvested or removed. A tier 1 method can be applied using the default values in table 3.3.2 in the IPCC good practice guidance for LULUCF.

2. Settlements remaining settlements – CO_2

68. Although Parties do not have to report under this category, Japan provides estimates of changes in carbon stock in living biomass, following the preliminary guidance in the IPCC good practice guidance for LULUCF. Japan applies the crown cover area method (tier 1a). The ERT acknowledges Japan's effort to provide estimates of the total tree crown area for various types of parks, which is an improvement compared to the previous year's reporting. It does, however, recommend that Japan develop removal factors for the dominant climate zones and tree species, and include loss of biomass in estimating the changes in carbon stocks (using, for instance, a loss term).

3. Biomass burning – CH_4, CO, N_2O and NO_X

69. Japan provides estimates of non-CO_2 emissions from biomass burning, following the IPCC good practice guidance for LULUCF methodology and applying default emission factors and nitrogen-to-carbon ratios.

VI. Waste

A. Sector overview

70. In 2004, total GHG emissions from the waste sector amounted to 47,863.0 Gg CO_2 equivalent, or 3.6 per cent of the total national emissions of Japan. Emissions from the sector increased by 28.7 per cent between 1990 and 2004. Emissions from waste incineration contributed 80.8 per cent of total waste sector emissions in 2004, while emissions from solid waste disposal on land, wastewater handling and other accounted for 12.5 per cent, 5.6 per cent and 1.1 per cent, respectively. CO_2 is the predominant gas, contributing 75.6 per cent of emissions from the sector.

71. According to information provided in the NIR and the CRF, recalculations in the waste sector have been made for each year in the period 1990–2003 due to new or revised estimation methods. The recalculations have resulted in increases in the emissions estimates by approximately 50 per cent in 1990 and all subsequent years. Sector-specific QA/QC procedures have not been applied in the waste sector.

B. Key categories

1. Solid waste disposal on land – CH_4

72. In comparison to Japan's previous (2005) submission there has been a significant increase in the total amount of municipal solid waste (MSW) disposed, and industrial solid waste (ISW) disposed used for emission calculation, and consequently in the estimates of CH_4 emissions. This is due to the introduction of sludge as a new subcategory in the 2006 submission, as the NIR explains. Also, Japan has used for the first time the tier 3 first order decay (FOD) model from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) with some country-specific parameters for the 2006 inventory submission, compared to the country-specific model used in previous submissions. Japan explained that the rationale for the use of the FOD model rather than the country-specific model was that the FOD model included in the 2006 IPCC Guidelines was revised and improved compared to the former FOD method, in particular by the introduction of delay time. As a result, this revised FOD method was considered to have same level of suitability for Japan's national circumstance as the country-specific model previously used. The ERT recommends Japan to provide the rationale for the use of this model rather than the country-specific model previously used in its next inventory submission.

2. Waste incineration – CO_2 and N_2O

73. Total emissions from waste incineration increased by 61.4 per cent from 1990 to 2004. Emissions have been estimated in line with the methodology described in the IPCC good practice guidance, and country-specific carbon content of different waste types and emission factors have been applied.

74. Emissions from waste incineration with energy recovery and use of waste as an alternative fuel are reported in the waste sector in line with Japan's waste management policy principles and due to the fact that temporal variations of the high moisture content in MSW have a direct effect on incinerator efficiency, thus preventing continuous energy recovery. The ERT recommends Japan to provide a technical explanation, in line with the explanation provided to the ERT during the review visit, as to why

emissions from incineration of MSW, where some energy recovery occurs, are reported in the waste sector.

3. Waste-water handling – N_2O

75. A country-specific methodology and country-specific EFs have been used for estimating N_2O emissions from industrial and domestic/commercial wastewater handling; this is adequately explained in the NIR. However, additional information has not been provided in the NIR, which was also pointed out in the 2005 review report. The ERT recommends Japan to provide this information in the CRF.

C. Non-key categories

1. Wastewater handling – CH_4

76. CH_4 emissions from industrial wastewater have been estimated on the basis of a country-specific EF which equals 0.0049 kg CH_4/kg biochemical oxygen demand (BOD). This value is much lower than the recommended IPCC default value, which is 0.6 kg CH_4/kg BOD. The methane recovered from treating domestic and commercial wastewater in the 2006 submission is reported for reference purposes only and is not included in the emission totals. This is because Japan's country-specific EF is calculated based on the results of measurement of actual CH_4 emissions to the atmosphere. This value represents the net emission, which takes into consideration the amount of methane recovery. The ERT encourages Japan to improve its emissions estimates by applying the chemical oxygen demand (COD) value for different types of wastewater or to provide clear explanation of using BOD-based EF of 8.2.2.1 Sewage Treatment Plant.

2. Other – CO_2 and N_2O

77. Japan reports N_2O emissions from composting and CO_2 emissions from the decomposition of petroleum-derived surfactants which are used for various industrial and domestic/commercial cleaning activities, and which are discharged into wastewater treatment facilities. The ERT encourages Japan to explore the potential interdependence between emissions from petroleum-derived surfactants and industrial/domestic wastewater treatment.

VII. Conclusions and recommendations

78. In its 2006 inventory, Japan has made significant improvements since the 2005 submission, most of them in response to recommendations made by the 2005 ERT. Some major improvements include: recalculations for some main sectors and categories for all years from 1990 to 2003 (the recalculations only go up to 2003); improvements in completeness; improvements in the transparency of the methodological descriptions of country-specific methods and EFs for certain categories, even though some further work is still needed; and the provision of planned improvements for almost all categories.

79. In the course of the review, the ERT formulated a number of recommendations relating to the completeness and transparency of Japan's GHG inventory submission. The key recommendations[4] are that Japan:

(a) Improve its QA/QC system by using experts who are not involved at all in the inventory process to undertake quality assurance of its inventory;

(b) Improve the transparency of the inventory by:

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

(i) Structuring the presentation of all sectors according to the UNFCCC reporting guidelines on annual inventories;

(ii) Providing a transparent explanation of the emission trends of the sectors to facilitate the understanding of the drivers for these trends, in the "Trends in Greenhouse Gas Emissions" section of the NIR;

(iii) Improving the completeness of the CRF tables in the parts related to additional and sectoral background information, where possible, and completing CRF table 7 for the base year and the latest reported year;

(iv) Providing better documentation on the methodologies, EFs and AD used for the specific categories that are mentioned in the corresponding sector sections of this report above, and including in its future NIRs elements of the extensive documentation that is already available;

(v) Continuing to report the new categories that were included in the 2006 inventory for the first time in order to ensure time-series consistency;

(c) Improve its reporting on recalculations by reporting any changes in emissions and removals compared to previous inventories, regardless of their magnitude, and clearly indicate the reasons for the changes (error correction, statistical or editorial changes, or reallocation of categories) using the corresponding CRF tables 8(a) and 8(b). Whenever changes result from changes in methodology, improved activity data and emission factors, or the inclusion of new categories, they should also be clearly explained in the NIR.

Annex

Documents and information used during the review

A. Reference documents

IPCC. Good practice guidance and uncertainty management in national greenhouse gas inventories, 2000. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

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UNFCCC secretariat. Synthesis and assessment report on the greenhouse gas inventories submitted in 2006. FCCC/WEB/SAI/2006. Available at <http://unfccc.int/resource/docs/webdocs/sai/sa_2006.pdf>.

UNFCCC secretariat. Japan: Report of the individual review of the greenhouse gas inventory submitted in the year 2005. FCCC/WEB/ARR/2005/JPN. Available at <http://unfccc.int/resource/docs/2006/arr/jpn.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Baba (Ministry of Environment), including additional material on the methodology and assumptions used.

Energy

Explanation of General Energy Statistics, entitled Tentative Translation Version2006Dec15.

Industrial processes

YBofMineral1990J.pdf, Related part of *Yearbook of Minerals and Non-Ferrous Metals* in 1990 (*only in Japanese*).

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YBofMineral2001EJ.pdf, Related part of *Yearbook of Minerals and Non-Ferrous Metals* in 2001 (*in both English and Japanese*).

YBofChemical1990J.pdf, Related part of *Yearbook of Chemical Industries Statistics* in 1990 (*only in Japanese*). YBofChemical1990E.doc, Related part of *Yearbook of Chemical Industries Statistics* in 1990 (*in English*).

YBofChemical2005EJ.pdf, Related part of *Yearbook of Chemical Industries Statistics* in 2005 (*in both English and Japanese*).

z070220_Lime_1.0.xls, Estimation Process of Stoichiometrical Analysis.

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