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NEW ZEALAND

REPORT OF THE INDIVIDUAL REVIEW OF THE GREENHOUSE GAS INVENTORY SUBMITTED IN THE YEAR 2003[1]

(Centralized review)

I. OVERVIEW

A. Introduction

1. In accordance with decision 19/CP.8 of the Conference of the Parties, the United Nations Framework Convention on Climate Change (UNFCCC) secretariat coordinated a centralized review of the 2003 greenhouse gas (GHG) inventory submission of New Zealand. The review took place from 15 to 19 September 2003 in Bonn, Germany, and was conducted by the following team of nominated experts from the roster of experts: Generalist – Mr. Joe Mangino (United States) and Ms. Inga Konstantinaviciute (Lithuania); Energy – Mr. Leif Hockstad (United States), Mr. Michael Strogies (Germany) and Mr. James Magezi-Akiiki (Uganda); Industrial Processes – Mr. Pierre Boileau (Canada) and Mr. Klaus Radunsky (Austria); Agriculture – Mr. Samuel Adejuwon (Nigeria) and Mr. Bhawan Singh (Trinidad and Tobago); Land-use Change and Forestry – Mr. Jozef Mindas (Slovakia) and Mr. Bubu Jallow (Gambia); Waste – Mr. Eduardo Calvo (Peru) and Ms. Angelina Madete (Tanzania). Mr. Radunsky and Mr. Adejuwon were the lead reviewers of this review. The review was coordinated by Ms. Rocio Lichte (UNFCCC secretariat).

2. In accordance with the UNFCCC "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention", a draft version of this report was communicated to the Government of New Zealand, 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. New Zealand has provided a full set of common reporting format (CRF) tables for the year 2001 only. Emission estimates and recalculations for years 1990–2000 are provided in CRF table 10 and in table 8, but no complete CRFs have been provided for the years 1990–2000. The national inventory report (NIR) of the 2003 inventory submission covers the fundamental reporting requirements. The full list of materials used during the review is provided in annex 1 to this report.

C. Emission profiles and trends

4. In the year 2001, the most important greenhouse gas (GHG) in New Zealand was carbon dioxide (CO_2), contributing 44.8 per cent to total[2] national GHG emissions expressed in CO_2 equivalent,

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[1] In the symbol for this document, 2003 refers to the year in which the inventory was submitted, and not to the year of publication. The number (3) indicates that this is a centralized review report.

[2] In this report, the term total emissions refers to the aggregated national GHG emissions expressed in terms of CO_2 equivalent excluding Land-use Change and Forestry, unless otherwise specified.

followed by methane (CH_4) – 37.4 per cent, and nitrous oxide (N_2O) – 17.4 per cent. Perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF_6) taken together contributed 0.4 per cent of total GHG emissions in the country. The Agriculture sector accounted for 49.6 per cent of total GHG emissions, followed by Energy (42.8 per cent), Industrial Processes (4.4 per cent) and Waste (3.2 per cent). Total GHG emissions amounted to 72,286 Gg CO_2 equivalent and increased by 17.2 per cent from 1990 to 2001.

5. The NIR executive summary of emissions by gas for the years 1990 and 2001 is in agreement with CRF table 10 Trends, except for the entry for 2001 Net CO_2 emissions/removals. The NIR executive summary reports 8,278.76 Gg CO_2 equivalent, while table 10, sheet 5 shows a value of 8,571.39 Gg CO_2 equivalent. This results in an error in the summary value presented in the executive summary for the national Total (with net CO_2 from Land-use Change and Forestry (LUCF)).

D. Key sources

6. New Zealand has reported a key source tier 1 analysis, level and trend assessment. A comparison between the key sources reported in the NIR and those identified by the secretariat[3] shows two sources which are not included in the NIR list, but are on the secretariat's list: CO_2 from stationary combustion – oil, and CO_2 fugitive emissions – oil and gas operations. Based on an earlier response from New Zealand on this matter, the reason for this difference lies in the fact that New Zealand uses a different level of disaggregation for its key source identification.

E. Main findings

7. The NIR covers the fundamental reporting requirements and includes information on key sources, methods, data sources, emission factors (EFs), uncertainty estimates, and quality assurance/quality control (QA/QC) approaches and procedures. However, the inventory submission cannot be considered to be fully in conformity with the UNFCCC reporting guidelines because a complete set of CRF tables for the years 1990–2000 has not been provided, although recalculations for those years have been done. New Zealand informed the expert review team (ERT) that staff resources were not sufficient to enable it to prepare a complete time series of CRFs and indicated that it will endeavour to provide a complete time series with its 2004 submission. The data provided in the CRF are largely consistent with the information provided in the NIR.

8. The NIR is well structured but could be improved in certain sections by the addition of more information on methodologies used, particularly where country-specific EFs are used or where significant information is referenced in background documentation (see the individual sector findings for applicable sections). In some cases, the lack of documentation in the NIR makes it difficult to assess consistency with the *Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC Guidelines) and the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). As an example, for CO_2 emissions from aluminium production, in addition to references to background literature, it would be useful to have more detailed information on the estimation method and EF used in the NIR (see also paragraph 11 below and the sector-specific findings for further details and examples).

[3] The secretariat had identified, for each individual Party, those source categories which are key sources in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance. Key sources according to the tier 1 trend assessment were also identified for those Parties providing a full CRF for the year 1990. Where the Party has performed a key source analysis, the key sources presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key source assessment conducted by the secretariat.

F. Cross-cutting topics

Completeness

9. All major source/sink categories and direct and indirect GHGs are reported in the inventory. The NIR generally adheres to the UNFCCC reporting guidelines with regard to completeness. Although New Zealand reports actual emissions from source category 2.F Consumption of halocarbons and SF_6, the inventory does not provide estimates of potential emissions from HFCs and PFCs from this source, and no explanation of this is included either in CRF table 9 or in the NIR. Carbon emissions and removals from abandonment of managed land and changes in soil carbon are currently not included (except for CO_2 emissions from liming of agricultural soils); however, the NIR describes plans to include these sinks/sources in future inventories.

10. The use of notation keys is not appropriate or is inconsistent in some tables of the CRF for the Industrial Processes and Waste sectors, as noted in the sector-specific chapters below. CRF table 7 includes notations of both "not applicable" ("NA") and not occurring ("NO") for rice cultivation and prescribed burning of savannas; these should be consistent and should reflect whether or not activity is not occurring or, alternatively, occurring but not resulting in emissions ("NA").

Transparency

11. It was noted for some categories that the assumptions and methodologies used to develop country-specific EFs are not clearly described in the NIR or that more information from background references should be incorporated into the NIR to improve transparency. For example, for agricultural soils, solid waste disposal on land, and changes in forest and other woody biomass stocks, the ERT noted that transparency would be improved by providing more information directly in the NIR from the background reference data. Also within the Energy sector (for examples see comments on feedstocks, civil aviation and geothermal activities) the ERT comments on the need for more documentation on the derivation of country-specific emission and/or activity data parameters. For greater transparency, the NIR should detail the EFs used in calculations, even if IPCC defaults are used.

Recalculations and time-series consistency

12. The major changes are due to complete time-series recalculations for CH_4 from enteric fermentation and manure management, and N_2O from agricultural soils. The recalculations resulted in a downward revision of emissions levels for the entire 1990–2000 period compared to the previous inventory submission, which is consistent with the changes described. For 1990 and 2000 total emissions (without LUCF) were 15.6 per cent and 8.6 per cent lower, respectively, than in the previous submission.

13. The recalculations shown in table 8(a) for each year are difficult to replicate because the values presented for CH_4 and N_2O do not appear to be in the correct units (they are in Gg of CH_4 and N_2O, respectively, instead of Gg CO_2 equivalent).

Uncertainties

14. The NIR (section 1.9 Uncertainty Analysis) indicates that total inventory uncertainty has not yet been calculated, but that Monte Carlo analyses have been run on categories enteric fermentation and agricultural soils. Other sectors, however, such as Energy and Industrial Processes, also show quantified uncertainty values, but these are not recognized in this section, nor is there any discussion on how these estimates were obtained. This discussion would be improved by consolidating the results of uncertainty analyses from all sources (for instance, into a table of uncertainty ranges by source category) with conclusions about the relative impact of each source on the total uncertainty of the inventory.

Verification and quality assurance/quality control approaches

15. While there is a general statement in the NIR (section 1.5 Good practice) that QA/QC has been introduced throughout the entire inventory, the information provided on QA/QC activities is not sufficient to allow the ERT to determine if IPCC good practice guidance tier 1 or tier 2 procedures have been implemented for most of the categories. There is a description of some tier 2-type QA activities related to peer review of livestock emissions and of internal division checks of energy estimates, but there is no discussion of QA/QC in the reporting of most other sources. The NIR does acknowledge that a process of cross-verification between the different government departments responsible for the inventory has been implemented, and additional work is planned to formalize the verification process further; however, there is no schedule for implementation, nor is it recognized in section 1.8 on "Planned and On-going Work". The Party is encouraged to provide information on the QA/QC and/or verification procedures used for industry data.

Follow-up to previous reviews

16. Previous reviews have indicated the need for more detailed information on the sources reported under manufacturing industries and construction of the Energy sector. Although this source has been identified as a key source, New Zealand has indicated that consistent data on consumption from this category are lacking.

17. The desk review of the 2002 submission identified the lack of a complete time series of CRF tables. New Zealand has not addressed this issue in its 2003 submission.

G. Areas for further improvement

Identified by the Party

18. The NIR identifies several areas for improvement: further revision of country-specific EFs for N_2O emissions from soil; a review of Energy sector emission factors (this commenced in February 2003); the development of a transport emissions model (VTEC); a review of the Industrial Processes sector; further methodological development of forestry models for the LUCF sector; and the establishment of a process for approving changes to EFs.

Identified by the ERT

19. The Party should address transparency problems with recalculations by including a full set of CRF tables for all years (see paragraph 7 above).

20. Further integration and documentation of the methodological steps involved in developing the inventory spreadsheets into the NIR, especially in regard to the development of country-specific factors, would improve the overall transparency of the inventory. This could be done, for example, by including additional information from the referenced publications into the NIR (see sector findings for specific areas where additional methodological descriptions would be helpful to ERT). The NIR would also be improved by the inclusion of a table of contents to facilitate reference to the pertinent sections.

21. The NIR explains that data on activities and emissions were obtained from industry for the Industrial Processes sector. For non-CO_2 emissions, data are primarily collected through a questionnaire submitted directly to companies by consultants. No further information on the methodology for emission estimates is provided, nor is there any explanation for variations in emissions over time. As the CRF has only been completed for 2001, no assessment of the time series or implied emission factors (IEFs) is possible. The ERT would welcome information on the QA/QC and/or verification procedures used for the submission of industry emissions data and on the procedures used by industry to recalculate emissions if methodologies are changed. This would allow an assessment of whether the IPCC good practice guidance has been applied for key sources. In responding to the draft of this report, New Zealand indicated that as regards non-CO_2 emissions only PFCs from aluminium production and HFCs

from ODS substitutes constitute key sources within Industrial Processes, and thus are of lower priority for resources.

II. ENERGY

A. Sector overview

22. Emissions from the Energy sector increased by approximately 30 per cent from 1990 to 2001. The emission calculation methodologies generally comply with the IPCC Guidelines. Energy use is derived from the New Zealand Ministry of Economic Development's energy database. While the 2001 CRF tables appear to be complete, a full time series of CRF tables would increase the transparency of fuel consumption trends. The ERT recommends that New Zealand expand its discussion of methodologies and data sources in the NIR. Currently, the NIR provides few details on recalculations and verification programmes, the sources of country-specific EFs, and the reporting of "Other" fuels in the CRF tables. The ERT also recommends that New Zealand provide a complete time series of EFs used in the energy calculations; currently, the NIR only provides current-year EFs for fuel combustion.

23. The ERT noted an inconsistency regarding this sector's contribution to 2001 emissions. Figure 1 of the NIR shows that the Energy sector contributed 39 per cent to total emissions, whereas according to CRF table 10 it accounted for 43 per cent of total emissions in 2001.

B. Reference and sectoral approaches

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

24. The reference and sectoral approaches show very close agreement. New Zealand's apparent consumption data roughly correspond with international data.

International bunker fuels

25. The data used on fuel consumption by international transportation are based on the Energy Data File (a Ministry of Economic Development publication). Data on fuel use by domestic transport are sourced from the Deliveries of Petroleum Fuels by Industry survey undertaken by Statistics New Zealand. The NIR states that the distinction between national and international transport is easy to make because of the country's island nature. For the purposes of transparency it would nevertheless be helpful if more information could be provided. In contrast to a number of other countries, New Zealand has a more or less constant relation for national total CO_2 emissions from transport and CO_2 emissions caused by international aviation between 1990 (15.7 per cent) and 2001 (15.5 per cent). More detailed information for the underlying trends would be helpful.

Feedstocks and non-energy use of fuels

26. Feedstocks are accounted for in the New Zealand inventory by estimating the difference between the carbon content of the fuels supplied to industrial companies and the carbon sequestered in the final output by those companies. This difference is assumed to be the amount of carbon emitted. For greater transparency, data sources should be provided for the industry production values used to determine the carbon stored. Details should also be provided on the carbon content factors used for both fuel consumption and the final product outputs. Further details should be provided on steps taken to avoid double counting and to coordinate results with emission calculations in the Industrial Processes sector. The ERT recommends a sizeable increase in the scope of the discussion of feedstocks in the NIR in order to account for these details more fully.

Country-specific issues

27. New Zealand makes extensive use of country-specific EFs. The NIR acknowledges that a review of the energy EFs will begin in 2003.

28. In the CRF it is stated that all estimates within the sectoral approach are based on the use of gross caloric value (GCV)-related EFs. The IPCC good practice guidance recommends that, where EFs are expressed on an energy basis, this should normally be done in terms of the net (or lower) heating value of the product. To convert from energy data on a GCV basis to a net caloric value (NCV) basis, the International Energy Agency (IEA) assumes a difference of 5 per cent for oil and coal and 10 per cent for natural gas. Although in response to a request by the ERT New Zealand explained the underlying assumptions used,[4] such information which would allow the calculation of activity data (AD) based on net calorific values should be provided in the NIR.

C. Key sources

Stationary combustion: manufacturing industries and construction – CO_2

29. Data are collected in New Zealand for major gas users, such as electricity generation providers, the oil refinery, the methanol and synthetic petrol producer, and the ammonia and urea plants. Data confidentiality means that some of the gas quantities are not detailed. The emissions and the IEF for gaseous fuels associated with 1.A.2.c – Chemicals seem low. The comments attached to the corresponding cells in the CRF table document the emissions as being associated with methanol and urea production (in New Zealand's energy worksheet, the fuel consumption from natural gas is listed as "confidential"). An explanation of these processes and the method of estimating corresponding emissions should be provided in the NIR.

Stationary combustion: coal – CO_2

30. New Zealand states that CO_2 emissions are provided each year by the sole electricity generator that uses coal. It is not clear how CO_2 emissions from the electricity generation facility are provided or whether there are any QA/QC and/or verification procedures in place at the facility for its emission measurements. The Party acknowledges that more QA/QC and/or verification of AD supplied by industry would be beneficial and will endeavour to address this in its next NIR.

31. New Zealand acknowledges that CO_2 emissions from solid fuels used in the energy industry show large year-to-year fluctuations, and informed the ERT that coal-based activity is related to different amounts of coal being used for generation in a "normal" hydro year (low coal use) as opposed to a "dry" hydro year (higher coal use). The ERT recommends New Zealand to include in the NIR a brief discussion of hydro-year conditions to make it easier to understand its fuel use trends.

32. New Zealand states that CO_2 emissions from coal use in other sectors are calculated using sectoral data and the EF for sub-bituminous coal. For greater transparency, there should be an explanation of how coal sales were converted to fuel consumption for the other sectors. It should also be explained why only an EF for sub-bituminous coal was used to calculate CO_2 emissions, while the reference approach shows consumption of other coal types in New Zealand. The Party informed the ERT that the "Other" sector covers the commercial/institutional, residential and agricultural sectors. These sectors predominantly use sub-bituminous coal; hence a single EF is used.

Road transportation – CO_2

33. The energy consumption of natural gas has been taken from the national energy statistics. Comparison of the national data used with the international published figures (IEA, *Energy Statistics of OECD Countries 2000–2001*, Paris, 2003) shows significant differences; for example, figures for consumption of natural gas within the transport sector differ by 25 per cent between the two data sets.

[4] New Zealand explained that its emission factors are based on GCVs since energy use in New Zealand is conventionally reported in gross terms, with some minor exceptions. The convention adopted by New Zealand is to follow the OECD/IEA assumptions, as follows: NCV = 0.95 * GCV for coal and liquid fuels; NCV = 0.90* GCV for gas.

34. There is still a need for more information about quality assurance for the CO_2 EFs used. Compared to those reported by other Parties, the IEFs reported by New Zealand are always lower than the median (gasoline – 6 per cent, diesel – 7 per cent, natural gas – 9 per cent).

Civil aviation – CO_2

35. The energy consumption data for national aviation are approximately 27 per cent lower than the IEA consumption data (IEA, *Energy Balances of OECD Countries 2000–2001*, Paris, 2003, page II–115). Because this source category is considered to be key, more information should be provided.

Fugitive emissions: coal mining and handling

36. Values from the middle of the IPCC default range of EFs are used for surface mining, handling of surface-mined coal and handling of underground-mined coal. The average factors for underground coal mining used are based on the country-specific values established by Beamish and Vance, 1992. CO_2 reporting is in general complete. There are, however, annual fluctuations in total CO_2 and CH_4 emissions, and the ERT encourages New Zealand to provide some explanation in the NIR on those fluctuations.

Fugitive emissions: oil and natural gas

37. Natural gas emission factors are estimated from the sectoral approach data. In the sectoral approach, CO_2 emissions from oil are reported as "not estimated" ("NE"), and CO_2 emissions from natural gas for the sub-sources exploration, production/processing, distribution and other leakage have also been reported as "NE" but no explanation is given. The worksheet for fugitive CH_4 emissions from oil and gas activities (worksheet 1.7 of the NIR) is incomplete because of lack of data; however, it does include some of the fugitive CO_2 emissions from these activities. Total fugitive CO_2 emissions from oil and gas handling decreased by 21 per cent between 2000 and 2001.

Fugitive emissions: geothermal activities – CO_2, CH_4

38. New Zealand has reported fugitive emissions from geothermal activities (268.29 Gg CO_2 and 2.47 Gg CH_4). An additional worksheet is included to cover fugitive emissions from geothermal fields where electricity or heat generation plants are in operation. The geothermal field operators supply the emission estimates, and these estimates are used in conjunction with geothermal energy data to derive EFs. The proportion of these emissions that would have occurred normally in the absence of the geothermal plant has not been accounted for in the estimate. (Sites with naturally occurring emissions where no human activity is present are excluded from the inventory). However, it is not clear from the NIR how the emissions from the geothermal activities are actually generated. The ERT would welcome a description of the processes of geothermal power generation and emission measurement in the 2004 NIR.

D. Non-key sources

Stationary combustion: all fuels – non-CO_2 gases

39. For greater transparency, the NIR should provide further discussion of non-CO_2 emission calculations from stationary combustion (only the transport sector is explicitly mentioned in the NIR). An examination of New Zealand's energy worksheet for non-CO_2 calculations from fuel combustion shows an inconsistency. It appears that the calculations made in the energy worksheet reference EFs other than the IPCC default values: for instance, the cell for the energy industries oil CH_4 EF is a calculation cell (oil CH_4 emissions divided by oil consumption quantity). Further explanation is needed on the calculation methodologies. The Party informed the ERT that the factor derived (2.893kg/TJ) was not substantially different from the corresponding IPCC default factor (2.9t/PJ), and indicated its intention to remove any likely anomalies reported in the methodology for the next NIR.

III. INDUSTRIAL PROCESSES AND SOLVENT USE

A. Sector overview

40. Emissions from the Industrial Processes sector increased by 3.8 per cent between 2000 and 2001, and are now 6.4 per cent above 1990 levels.

41. CO_2 and CH_4 emissions from this sector contributed 8.9 per cent and 0.01 per cent of total CO_2 and CH_4 emissions, respectively, in 2001. CO_2 emissions increased by 20.5 per cent between 1990 and 2001, while CH_4 emissions decreased by 8.3 per cent. HFC emissions increased by a factor of 28 (corresponding to an increase of approximately 2,800 per cent) between 1992 and 2001, while PFC emissions decreased by 90.2 per cent (1990–2001) and SF_6 emissions increased by 487 per cent after 1990. New Zealand does not report significant N_2O emissions from this sector owing to a lack of activities associated with such emissions.

42. Quantitative uncertainty estimates are provided in the NIR for emissions by gas but not by category. Variations of uncertainties are discussed for some sources of HFCs and PFCs; however, no information on uncertainties concerning AD and EFs or on the methods used is provided in the NIR. Although the NIR includes a reference to background literature where more information on uncertainties is provided, the ERT recommends that more detail from this source be included in future NIRs to improve transparency.

43. The ERT observed that no information on methods and EFs used for estimating CH_4 and N_2O is given in table Summary 3. The ERT would recommend, at a minimum, including this type of information for CH_4 emissions from carbide production.

B. Key sources

2.C.1 Iron and steel industry – CO_2

44. The 2001 value of the CO_2 IEF for steel has been identified as the highest of reporting Parties (1.95 t/t). The Party has explained that the emissions data were compiled from the Ministry of Economic Development data based on production and emissions data from industry. The Party considers that the emissions estimates supplied are accurate to 5 per cent. However, no additional information is provided on the data-gathering or QA/QC and/or verification procedures for these industry-supplied emissions data. The ERT would welcome information on the data-gathering procedures of the Ministry of Economic Development and the procedures used by the Inventory Agency to ensure the quality of these data. The Party acknowledges that more QA/QC and/or verification of data supplied by industry would be beneficial and has indicated its intention to address this in the next NIR.

45. CO_2 emissions and AD for sinter and coke have been reported as "NE". No information is provided in the completeness table as to why these emissions are not estimated. The Party informed the ERT that the "NO" notation key is more appropriate than "NE". Current information from industry shows no activity on sinter within the New Zealand steel industry or the allied activities. The coke used for steel making in New Zealand is imported by BHP NZ steel and there is no production of coke in the country.

2.C.3 Aluminium production – CO_2

46. No information on methods and EFs used for estimating PFC emissions is provided in table Summary 3 or in the NIR. New Zealand has explained that the method is tier 2 and the EF is country-specific. The IEFs for perfluoromethane(CF_4) and perfluoroethane (C_2F_6) from aluminium production are among the lowest of reporting Parties. The Party reported that CF_4 emissions from aluminium production decreased by 90 per cent between 1990 and 2001 and explained that this reduction is due to policies and measures described in its National Communication (2001). However, a review of this document (page 51) does not provide sufficient detail about the methods for measurement or estimation of emissions to allow the ERT to feel confident that the trend is properly quantified. The ERT would

welcome a more detailed explanation of the estimation method and the EF, and of the reasons for this emission trend.

2.F.1 – 2.F.5 Emissions from ozone-depleting substances substitutes – HFCs

47. New Zealand provided actual emission estimates for these sources. However, potential emissions of HFCs and PFCs have not been estimated (indicated as "NE", except for gases that do not occur). For HFC-227ea, numerical values are reported for actual emissions; however, potential emissions are reported as "NO". The ERT would welcome that New Zealand provide estimates of potential emissions for all substances in addition to actual emissions for the sources where the concept of potential emissions applies, for reasons of transparency and comparability, as indicated in the UNFCCC reporting guidelines.[5]

C. Non-key sources

2.A.5 Asphalt roofing

48. No data or notation keys have been reported for this source.

2.A.6 Road paving

49. No emission estimates or notation keys have been reported, though AD have been provided. The ERT would welcome information on the reasons for the lack of emission estimates.

2.C.2 Ferroalloys production

50. CO_2 emissions and AD from this category have been reported as "NE". No information is provided in the completeness table 9 as to the reason for not estimating these emissions. The ERT would welcome further elaboration on this issue.

3 Solvent and other product use

51. CO_2 and N_2O emissions have been reported as "NE" for all categories of this sector. Non-methane volatile compound (NMVOC) emissions and corresponding AD are reported; however, NMVOC emissions from 3.D Other – steel production were reported as "0". The ERT would welcome the submission of an NMVOC estimate for this sub-source. The Party has requested further clarification of the need to report carbon emitted as NMVOC in the CO_2 column.

IV. AGRICULTURE

A. Sector overview

52. The NIR shows significant improvements compared to previous submissions. A re-evaluation of animal productivity and feed intakes has been used in estimating emissions of both CH_4 and N_2O from ruminants. The entire time series has been recalculated for CH_4 emissions from both enteric fermentation and manure management, as well as for N_2O emissions from agricultural soils. The introduction of good practice into the estimation of emissions from this sector has resulted in the calculation of CH_4 emissions from enteric fermentation using a higher tier method, and to a complete review of N_2O emissions from soils.

53. Overall emissions of CH_4 and N_2O from agriculture have increased by 12 per cent since 1990.

54. The methodology used to estimate CH_4 emissions from ruminants has been upgraded from a tier 1 to a tier 2 approach consistent with the IPCC good practice guidance. The tier 2 approach has been applied across the whole time series from 1990.

[5] See FCCC/CP/1999/7, page 7, paragraph 16.

55. As part of the ongoing improvement to estimates of N_2O from agricultural sources, a complete recalculation of the time series has been carried out using revised EFs from the IPCC good practice guidance, some revised country-specific EFs and new annual nitrogen (N) excretion rates for the most significant animal classes.

56. The QA/QC procedures introduced throughout the inventory and the scientific peer review carried out on the reports underpin the improvements to the reporting of emissions in this sector.

B. Key sources

4.A Enteric fermentation – CH_4

57. The methodologies used for gathering the AD and EFs are for the most part in compliance with the IPCC good practice guidance. However, there are some gaps and some issues that relate to accuracy and transparency, as noted below.

58. The ERT noted that the 2001 CH_4 IEF for goats (8.9 kg CH_4/head/yr) is at the high end of the range of reporting Parties. The IPCC default EF for developed countries for goats is 5 kg CH_4/head/year, which is much less than that for sheep (8 kg CH_4/head/year). New Zealand informed the ERT that emissions from goats account for a very small fraction (0.13 per cent) of enteric fermentation emissions, and that no production data are available for goats. A very simple and conservative approach was therefore taken, equating the EF for goats to that for sheep. This is likely to overestimate CH_4 emissions since goats are in general smaller than sheep.

59. The NIR states that there has been a reduction in numbers of sheep and goats in recent years. The ERT would welcome an explanation for these reductions in livestock numbers.

60. In the NIR a number of assumptions are made (e.g., "the average weight of breeding bulls was 500 kg and they were growing at 0.5 kg/day") relating to the tier 2 methodology for estimating CH_4 emissions from ruminants. However, in most instances, the NIR itself does not provide justification for these assumptions, nor does it provide information on their impact on the uncertainties that are thus associated with CH_4 emissions, and though New Zealand provided the ERT with further information on its tier 2 methodology, the ERT encourages New Zealand to provide, in its next NIR, further information that documents the basis for any underlying assumptions including their associated uncertainties.

4.D Direct N_2O emissions from agricultural soils

61. New Zealand reports that N_2O emissions from excreta deposited during grazing increased from 29.8 Gg in 1990 to 32.8 Gg in 2001, but no adequate explanation is reported in the NIR. New Zealand explained this by attributing the increase to a fourfold increase in emissions from nitrogen fertilizer use and a 12 per cent increase in excreta N due to improved animal performance, balanced by halving the activity factor for leaching ($Frac_{LEACH}$) from 15 per cent to 7.5 per cent based on an analysis of a series of national field trials (Kelliher et al. 2003).

62. No detailed description of the methodologies used for estimating national EFs in this source category has been reported by New Zealand. Although the NIR includes a reference to relevant background literature the ERT encourages New Zealand to include such details in its next NIR in order to improve transparency.

C. Non-key sources

4.F Field burning of agricultural residues

63. Emissions from burning of pulse, tuber and root have not been estimated.

V. LAND-USE CHANGE AND FORESTRY

A. Sector overview

64. New Zealand reports only net CO_2 emissions/removals in CRF table 5 for category 5.A Changes in Forests and Other Woody Biomass Stocks. The ERT encourages New Zealand to report separate estimates for CO_2 emissions and removals in the CRF tables as well.

65. For 2001 total net removals were 23,763 Gg CO_2 equivalent, which include CO_2 removals from temperate forests (category 5.A.2), CO_2 emissions from Other – temperate shrub lands (category 5.B.2), and CO_2 emissions from liming of agricultural soils (category 5.D). Between 1990 and 2001, net removals increased by 9.6 per cent. Inter-annual changes show a strong variation: net removals decreased by 15 per cent from 1991 to 1992 and increased by 17 per cent from 1997 to 1998. The LUCF sector offset approximately 33 per cent of total emissions in 2001.

66. Only CO_2 removals from temperate forests are included under category 5.A Changes in Forest and Other Woody Biomass, as tropical and boreal forests do not occur in New Zealand. Under 5. B Forest and Grassland Conversion, emissions of non-CO_2 gases (CH_4, N_2O, nitrogen oxide (NO_X) and carbon monoxide (CO)) are reported for temperate shrublands and, as indicated in the NIR, these estimates include emissions from fires. No estimates are reported for 5.C Abandonment of Managed Lands. Emissions from liming of agricultural lands are reported under the Soils category. Sectoral background data tables 5.A to 5.D have not been completed given that New Zealand uses a country-specific methodology.

67. The NIR states that attempts have been made to quantify uncertainties in the carbon sequestration rate. The model used indicates an uncertainty of the carbon sequestration estimates in the order of +/–25 per cent. From CRF table 7, quality estimates are categorized as medium for all gases and for the subcategories reported. The estimates are considered as only partially complete due to the fact that not all subcategories are reported, as explained in CRF table 9. This is due to lack of data, but a monitoring system is being implemented to remedy the situation.

68. New Zealand has provided recalculated emissions/removal estimates for the whole time series and explanatory information is provided in CRF table 8(b). Recalculation was made necessary by the availability of new and revised AD and EFs. The differences between the data provided in the previous submission and the 2003 submission for LUCF range from –4.6 to +1.2 per cent.

B. Sink and source categories

5.A Changes in forests and other woody biomass stocks – CO_2

69. New Zealand has used modelling to determine CO_2 EFs and country-specific methods to estimate the removals from this category. Emissions are reported as "NE". The ERT acknowledges that the NIR provides descriptions of the methodology including references to literature that provide more details on it. However, in addition to the information currently included in the NIR, the ERT encourages New Zealand to provide more detail from the referenced literature in its next NIR, to completely document and justify all underlying assumptions including the choice of the calculation approach, to include a sensitivity analysis for those parameters which have the most significant impact on those estimates, and to report on verification.

5.B Forest and grassland conversion – non-CO_2 gases

70. A country-specific method has been used with IPCC default EFs for CH_4, N_2O, NO_X and CO.

5.D Emissions and removals from soil – CO_2

71. New Zealand is also encouraged to provide data on CO_2 emissions and removals from forest soils as well as organic and mineral soils.

VI. WASTE

A. Sector overview

72. The major emission source within this sector in 2001 was CH_4 from solid waste disposal sites (86 per cent). Decreasing CH_4 emissions from solid waste cause the decreasing trend in the Waste sector, while emissions of CH_4 from waste-water handling have grown slightly over time. The decrease in CH_4 emissions is explained by improved waste management (waste minimization and resource recovery) practices in New Zealand.

73. The inventory is practically complete in terms of gases, sources and years covered. Emissions from unmanaged waste disposal sites reported as "NE" are in fact covered in the inventory through the methane correction factor (MCF) applied for managed waste disposal sites and should be noted as "included elsewhere" ("IE"). Emissions from waste incineration are considered negligible and therefore not estimated. References and documentation on methodologies and country-specific EFs, as well as additional information, are provided in the CRF tables, thus enhancing transparency. Estimates in the sector are self-assessed in table 7 as being of medium quality. Uncertainty analyses are provided for each emission source. No recalculations are reported for this sector.

74. The ERT notes inconsistencies in the reporting of N_2O emissions: whereas table 6 gives data for N_2O emissions from waste-water handling, table 10 does not include such data but shows data for N_2O emissions from solid waste disposal on land and reports "NE" for N_2O emissions from waste-water handling. The ERT encourages the Party to correct this data entry error in its next submission.

B. Key sources

6.A Solid waste disposal on land – CH_4

75. Explanations of the rationale for the choice of parameters used and references are provided in the NIR. The additional information and documentation boxes are provided with table 6.A. Comparisons between the tier 1 and tier 2 estimates are provided and the ERT could not identify any inconsistencies between both. The NIR references an information source according to which 10 per cent of New Zealand's waste is disposed of to "uncategorized" sites, however, there is no mention of it in table 6.A of the CRF, nor does the NIR itself contain further information on such sites. The ERT encourages New Zealand to provide detailed information on "uncategorized" sites in its NIR. The amounts of solid waste are not comparable to those reported by other Annex I countries as a result of different methodological approaches: New Zealand includes bulky waste (from construction and demolition industries) in this category. It is recommended that the Party provide a more detailed breakdown of the data for this category in the NIR. Industrial waste is also considered along with municipal solid waste, as documented in the NIR. This approach, along with the inclusion of construction and demolition waste, ensures completeness. Although New Zealand's NIR provides references to publications for further information, for the sake of transparency, the Party is encouraged to provide more detail in the NIR, for example on the industrial waste surveys carried out and methodologies applied. The methane oxidation factor is not consistent between table 6.A and the NIR. Also the population figure given in the NIR is 3,859,000, while in the additional information box to CRF table 6.A it is 3,912,000. Although this difference is referred to in the CRF, the ERT encourages New Zealand to provide, in its next NIR, explicit explanation for using different population size figures.

76. In the calculation of the degradable organic carbon (DOC) fraction using the default DOC values there are two aspects that influence the result obtained. First, textiles are included in the category "Other" (Non-food) organic putrescibles and not in the category paper and textiles. This reduces the DOC fraction calculated. Second, food wastes are included in the category "Other" (Non-food) organic putrescibles and not in the category food waste, which increases the fraction of DOC calculated. Though the calculation approach is described in the NIR and a calculation spreadsheet is provided as well as

references to relevant literature for further details, the ERT recommends the Party to include further explanations for the reasons of the above allocation in its next NIR.

C. Non-key sources

6.B Waste-water handling – CH_4 and N_2O

77. AD and related additional information are not provided in CRF table 6.B, except for the information on handling systems for domestic waste water, while they are included in the NIR. Emissions for sludge are not appropriately reported in the CRF, where no information in this regard is provided. Information on sludge is provided in the NIR. The percentages for different domestic waste-water handling systems in table 6.B do not add up exactly: this is attributable to rounding errors.

78. CH_4 emissions from industrial waste water in this sector are low because of the high proportion that is collected and burned, and no leakage is assumed, based on expert judgement. Meat-processing industries that use anaerobic ponds with no CH_4 collection are the major sources of industrial waste-water CH_4 emissions.

6.B Emissions from human sewage – N_2O

79. Data on protein consumption are not included in the CRF and are assumed to be the same for the whole period 1990–2001. The estimate used was derived from raw sewage nitrogen content measured. This figure (4.75 kg N/person/yr), together with population and IEF data from table 6.B do not produce the figure calculated in table 6.B, because of a rounding error. Also the figure for population given in the NIR is 3,975,600, while in CRF table 6.B it is 3,912,000. Although this difference is referred to in the CRF, New Zealand is encouraged to provide, in its next NIR, explicit explanations for using different population size figures.

6.C Waste incineration

80. No estimates are provided ("NE" is reported) for this sector because only negligible quantities of waste are incinerated. The ERT recommends New Zealand to provide references to support this statement.

ANNEX 1: MATERIALS USED DURING THE REVIEW

A. Support materials used during the review

2002 and 2003 Inventory submissions of New Zealand. 2003 submissions including CRF for years 1990–2001 and an NIR.

UNFCCC secretariat (2003). "Report of the individual review of the greenhouse gas inventory of New Zealand submitted in the year 2002 (Desk review)." FCCC/WEB/IRI(1)/2002/NZL (available at http://unfccc.int/program/mis/ghg/countrep/nzldeskrev02.pdf).

UNFCCC secretariat. "2003 Status report for New Zealand " (available at http://unfccc.int/program/mis/ghg/statrep03/nz03.pdf).

UNFCCC secretariat. "Synthesis and assessment report of the greenhouse gas inventories submitted in 2003. Part I." FCCC/WEB/SAI/2003 (available at http://unfccc.int/program/mis/ghg/s_a2003.html); and Part II – the section on New Zealand) (unpublished).

New Zealand's comments on the "Draft synthesis and assessment report of the greenhouse gas inventories submitted in 2003" (unpublished).

UNFCCC secretariat. Review findings for New Zealand (unpublished).

UNFCCC secretariat. "Handbook for review of national GHG inventories." Draft 2003 (unpublished).

UNFCCC secretariat. "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories." FCCC/CP/1999/7 (available at http://www.unfccc.int/resource/docs/cop5/07.pdf).

UNFCCC secretariat. "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention." FCCC/CP/2002/8 (available at http://unfccc.int/resource/docs/cop8/08.pdf).

UNFCCC secretariat. Database search tool – *Locator* (unpublished).

IPCC. *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, 2000* (available at http://www.ipcc-nggip.iges.or.jp/public/gp/gpgaum.htm).

IPCC/OECD/IEA. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, volumes 1–3, 1997* (available at http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm).

B. Additional materials

Responses to questions during the review were received from Ms. Plume (New Zealand Climate Change Office) including additional material on the methodology and assumptions used.

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