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REPORT OF THE INDIVIDUAL REVIEW OF THE GREENHOUSE GAS INVENTORY OF ICELAND SUBMITTED IN THE YEAR 2001[1]

Desk review

I. OVERVIEW

A. Introduction

1. The Conference of the Parties (COP), at its fifth session, by its decision 6/CP.5, adopted guidelines for the technical review of greenhouse gas (GHG) inventories from Parties included in Annex I to the Convention, hereinafter referred to as the review guidelines,[2] for a trial period covering the GHG inventory submissions for the years 2000 and 2001. The COP requested the secretariat to conduct individual reviews of GHG inventories for a limited number of Annex I Parties on a voluntary basis. In so doing, the secretariat was requested to use different approaches to individual reviews by coordinating desk reviews, centralized reviews and in-country reviews.

2. In response to the mandate by the COP, the secretariat coordinated a desk review of five national GHG inventories (Bulgaria, France, Iceland, Latvia and Switzerland) submitted in 2001, which took place from 19 November to 14 December 2001. The review was carried out by a team of nominated experts from the roster of experts. The members of the team were: Mr. Jose Ramon Villarin (Philippines), Mr. Arthur Rypinski (United States of America), Professor Anthony Adegbulugbe (Nigeria), Mr. Domenico Gaudioso (Italy), Ms. Nadzeya Zaleuskaya (Belarus), Dr. Lorna Brown (United Kingdom), Ms. Punsalmaa Batima (Mongolia), Mr. Rizaldi Boer (Indonesia), Mr. Josef Mindas (Slovakia), and Mr. Charles Jubb (Australia). The review was coordinated by Ms. Astrid Olsson (UNFCCC secretariat). Professor Anthony Adegbulugbe and Mr. Charles Jubb were the lead authors of this report.

3. The principle objective of the review of the GHG inventories was to ensure that the COP had adequate information on the GHG inventories. The review should also further assess the progress of the Parties toward fulfilling the requirement outlined in the UNFCCC reporting guidelines[3] on annual inventories (FCCC/CP/1999/7). In this context, the review team checked the responses of the Parties to questions raised in the previous stages of the review process, and the consistency of the inventory submission with the UNFCCC reporting guidelines and the

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[1] In the symbol for this document, 2001 refers to the year in which the inventory was submitted, and not to the year of publication. The number (1) indicates that this is a desk review report.
[2] Document FCCC/CP/1999/7, in particular the UNFCCC review guidelines (pages 109 to 114), and decision 6/CP.5 (pages 121 to 122).
[3] 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 (FCCC/CP/1999/7), are referred to in this report as the UNFCCC reporting guidelines.

Revised 1996 IPCC Guidelines (hereinafter referred to as the IPCC Guidelines), and identified possible areas of improvement in the inventories of the five Annex I Parties. Each inventory expert reviewed the information submitted for specific IPCC sectors and each sector was reviewed by two experts, with the exception of the general review and the waste sector.

4. The review team also considered and commented upon the extent to which the reporting fulfilled the requirements included in the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (hereinafter referred to as the IPCC good practice guidance).[4]

5. In accordance with the UNFCCC review guidelines, a draft version of this report was communicated to the Government of Iceland, 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

6. Iceland submitted its common reporting format (CRF) tables for 1999 in electronic format. There was no national inventory report (NIR) to accompany these tables. This review is based on the information obtained from the CRF tables, the status report 2001, the draft synthesis and assessment (S&A) report 2001 and the preliminary key source analysis[5] prepared by the secretariat and, where appropriate, the in-depth review of Iceland's second national communication (NC2).

7. Other sources of information used during the review include: the preliminary guidance for experts participating in the individual review of GHG inventories, the UNFCCC reporting guidelines and the review guidelines (FCCC/CP/1999/7).

C. Emission profiles, trends, key sources

8. Iceland's emission trends are summarized by GHG and by sector in tables 1 and 2. Only a limited trend assessment is possible because of the absence of CRF tables for years other than 1999. Based on CRF table 10, Iceland's CO_2 (carbon dioxide) equivalent emissions fluctuated in the range 2,781 Gg–2,939 Gg for the years 1990 to 1995, and then increased progressively from 1995, growing from 2,863 Gg to 3,441 Gg. CO_2 equivalent emissions in 1999 were around 17% higher than in 1990. In 1999, CO_2 is the most significant GHG, contributing 80% of CO_2 equivalent emissions, followed by CH_4 (methane) and N_2O (nitrous oxide). Iceland's emissions profile has changed since 1990 when PFCs were more significant than either CH_4 or N_2O. Since 1993, there has been steady growth in emissions of HFCs (hydrofluorocarbons) used as substitutes for ODS (ozone depleting substances), an outcome that is consistent with what would be expected following the decision to phase out ODS.

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[4] According to the conclusions of the Subsidiary Body for Scientific and Technological Advice (SBSTA) at its twelfth session, the IPCC good practice guidance should be applied by Annex I Parties as far as possible for inventories due in 2001 and 2002, and should be used for inventories due in 2003 and beyond.

[5] The UNFCCC 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 which provided a full CRF for the year 1990. The key sources presented in this report are based on the secretariat's preliminary key sources assessment. They might differ from the key sources identified by the Party itself.

Table 1. GHG emissions by gas, 1990–1999 (Gg CO_2 equivalent)

GHGs	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	CO_2 equivalent (Gg)									
CO_2 emissions (without LUCF)[(a)]	2,144	2,075	2,209	2,309	2,273	2,309	2,393	2,468	2,506	2,737
CH_4	294	291	287	287	290	286	292	293	287	286
N_2O	192	186	169	177	178	181	192	177	177	220
HFCs	0	0	0	2	3	25	29	37	64	59
PFCs	304	249	110	53	41	57	22	60	82	133
SF_6	5	5	5	5	5	5	5	5	5	5
Total (with net CO_2 emissions/removals)	2,939	2,807	2,781	2,833	2,791	2,863	2,933	3,041	3,121	3,441
Total (without CO_2 from LUCF) [(a)]	2,939	2,807	2,781	2,833	2,791	2,863	2,933	3,041	3,121	3,441

(a) LUCF: land-use change and forestry

9. Energy is the greatest source of emissions, followed by industrial processes, agriculture, other (geothermal exploitation) and waste. With the exception of waste, emissions from all sectors increased from 1990 to 1999. Emissions from industrial processes fell by 32.8% from 1990 to 1994 and then increased substantially (77.1%) from 1994 to 1999. This appears to be explained by a sharp decline in emissions of PFCs from 1990 to 1994, followed by increasing emissions of both PFCs and HFCs from 1994 to 1999. Submission of an NIR would be of assistance in further understanding the reasons for the trend in emissions.

Table 2. GHG emissions by sector, 1990–1999 (Gg CO_2 equivalent)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	CO_2 equivalent (Gg)									
Energy	1,648	1,609	1,740	1,797	1,768	1,799	1,888	1,913	1,906	1,971
Industrial processes	748	659	518	513	503	555	530	626	697	891
Solvent and other product use	0	0	0	0	0	0	0	0	0	0
Agriculture	385	382	362	366	367	360	366	355	361	393
LUCF[(a)]	0	0	0	0	0	0	0	0	0	0
Waste	80	79	82	78	73	71	71	68	62	64
Other	79	79	79	79	79	79	79	79	94	123

(a) LUCF: land-use change and forestry

10. The UNFCCC secretariat's preliminary key source analysis for Iceland identifies ten key sources. There are two key sources in the energy sector, five key sources in the industrial processes sector, two key sources in the agriculture sector, and one key source in the waste sector. The most significant key sources are CO_2 from stationary combustion – oil (33.1%), CO_2 from mobile combustion – road vehicles (23.7%), and CO_2 from aluminium production (10.7%).

Table 3. Key sources Iceland: Level assessment (UNFCCC secretariat)[a]

Key source	Gas	Level assessment (%)	Cumulative total (%)
Stationary combustion – oil	CO_2	33.1	33.1
Mobile combustion – road vehicles	CO_2	23.7	56.8
Aluminium production	CO_2	10.7	67.5
Ferroalloys production	CO_2	7.7	75.2
Enteric fermentation in domestic livestock	CH_4	6.7	81.9
Direct N_2O emissions from agricultural soils	N_2O	4.5	86.4
PFCs from aluminium production	CF_4, C_2F_6	4.1	90.5
Cement production	CO_2	1.8	92.3
Solid waste disposal sites	CH_4	1.4	93.7
Other (chemical industry)	N_2O	1.1	94.8

[a] See footnote 5 of this report.

D. General assessment of the inventory

1. Completeness

11. The CRF tables are not complete in that many cells do not include either data or notation keys. The absence of notation keys means that it is not possible to determine whether all sources and gases are included. The LUCF sector is not estimated (NE) at all because of the unavailability of data (CRF table 9).

12. Discrepancies in the numerical value of emissions have also been observed between table summary 2 and the 1999 emissions reported in table 10 (trends). For example, the total emissions in 1999 according to table summary 2 are 3,243.48 Gg CO_2 equivalent, while in table 10 they are 3,440.66 Gg CO_2. These discrepancies are too large to be due to rounding errors such as those noted in the CH_4 calculations from the energy sector, and cannot be explained by the omission of emissions from the other sector (geothermal exploration) in tables summary 1.A and summary 2. In part, the differences are explained by the fact that potential emissions of HFCs and SF_6 are not carried through to summary 2 from summary 1.A (because summary 1.A is linked to actual emissions reported in table 2(I)s1 and not to potential emissions), but are included in table 10s5 linked to amounts reported in table 10s4.

13. In the summary report for methods and emission factors used (CRF summary table 3), the entry for waste incineration is a question mark.

14. The Party did not submit an NIR.

2. Transparency

15. The inventory is not transparent due to the omissions in the CRF and the lack of an NIR.

3. Cross-cutting issues

Institutional arrangements

16. Institutional arrangements are more appropriately considered during in-country reviews. The in-depth review stated that Iceland's inventory is prepared by the Environment and Food

Agency with information contributed by the appropriate authorities and from import statistics and the private sector (paragraph 9, in-depth review of NC2).

Verification and quality assurance/quality control (QA/QC) approaches

17. The qualitative indicators used in CRF table 7 provide a broad assessment of the quality of inventory estimates. However, additional information and clarification are required on the verification and QA/QC procedures implemented by Iceland in compiling the inventory. These matters would appropriately be discussed in an NIR.

Recalculations and changes in relation to previous years

18. CRF tables 8(a) and 8(b) provide no information on recalculations.

Uncertainties

19. No quantitative analysis of uncertainties was provided. Limited qualitative assessments of uncertainties are included in CRF table 7.

4. Issues relating to previous reviews

20. No response from the Party to the draft S&A report 2001 was available to the review.

E. Conformity with the UNFCCC reporting guidelines and the IPCC Guidelines

21. In CRF summary table 3, a significant portion of methods and emission factors used were from IPCC tier 1 methods and default values. The absence of an NIR and CRF tables for the years 1990 to 1998 and the omissions in the CRF mean that the inventory is not yet consistent with the UNFCCC reporting guidelines. The inventory is substantially consistent with the IPCC Guidelines.

F. Areas for further improvement

1. Issues identified by the Party

22. The Party has proposed no improvements.

2. Issues identified by the ERT

23. The review has noted the following areas for further improvement and in future inventories it is recommended that:

(a) *Reporting:* All cells in the CRF tables contain data or a notation key. This is important for both completeness and transparency of the inventory;

(b) *Discrepancies:* The Party addresses the discrepancies between the trend tables and summary tables;

(c) *Transparency and documentation*: The NIR is an indispensable reference in providing greater transparency in inventory calculations, and it is suggested that the Party submit an NIR;

(d) *Uncertainty*: The Party undertake a quantitative assessment of uncertainty in accordance with the requirements of the IPCC good practice guidance and to the extent that is reasonable.

3. Conclusion

24. The Party's submission is not yet fully consistent with the reporting requirements of the UNFCCC reporting guidelines. No information has been provided in response to issues raised in the draft S&A report 2001. In their response to the draft review, the Party advised that preparation of a NIR is in process which will address the issues identified by the review.

II. ENERGY SECTOR

A. Sector overview

25. According to Iceland's 1999 inventory, energy-sector emissions accounted for 61% of total GHG emissions, a relatively low share in comparison with other Annex I Parties. This is due to several unusual features in Iceland's national circumstances and energy situation. These include:

(a) Iceland has abundant resources of commercial geothermal heat and hydroelectric power. Almost all electric power (99.9%) is generated from these non-fossil sources, eliminating power generation as an important source of emissions;

(b) Iceland has a highly developed system of geothermal heat. Some 85% of Iceland's population is provided with space heating via central district heating. Some 99.9% of the heat used in district heating is provided from geothermal sources, eliminating most space heating services as an important source of emissions;

(c) Iceland has essentially no domestic fossil fuel resources. There is no reported production of oil, gas or coal, and there are no oil refineries and no coke ovens. There is no natural gas production, imports or consumption. Thus, emissions from energy transformation and energy production are unimportant, and all fossil fuels are imported as finished products, in principal simplifying energy and emission accounting;

(d) While per capita fossil energy consumption is relatively low, per capita total energy consumption is relatively high: Iceland is home to energy-intensive heavy industry, including aluminium smelting (170,000 metric tons produced in 1999), cement (118,000 metric tons) and ferro-silicon (68,000 metric tons). Half of the electricity produced in Iceland is used in aluminium smelters.[6] Some plants both consume fossil fuels and have significant process emissions of carbon dioxide. Reported industrial process emissions of carbon dioxide were 656 Gg or 20% of Iceland's 1999 GHG emissions;

(e) Iceland also has an extensive fishing industry, including some 1,976 fishing boats at 1 January 2000. Energy-related emissions from agriculture/forestry/fisheries are almost entirely accounted for by fisheries.

26. These national circumstances produce an unusual pattern of national energy-related emissions, where fisheries and transport account for the bulk of fossil fuel emissions (39% and 44% respectively), and emissions from energy industries are negligible.

27. Some 98% of energy-related CO_2 equivalent emissions were accounted for by carbon dioxide, which is typical of inventories where there are no production-related CH_4 emissions.

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[6] Hagstofa Islands/Statistics Iceland, *Iceland in Figures 2000–2001* (Reykjavik, December 2000), p. 13. Production figures quoted refer to 1999. Note that the Iceland inventory reports aluminum production of 221,000 tons. This figure refers to aluminum exports, rather than to domestic production. Available via the Internet at: http://www.statice.is/.

28. Between 1990 and 1999, energy-related emissions increased by 18.2%. Emissions increased in all three of the principal sectors; there were, however, variations in the rate of growth, with manufacturing emissions volatile and increasing by 52%, while transport and other sectors (mostly fisheries) increased by about 13%. Minor emissions from the heat and electric power category declined 20%.

1. Completeness

29. Iceland did not submit an NIR. No description of the methods used to prepare the inventory was available. All CRF tables for the energy sector were submitted but they are not complete. Several of the sectoral background tables omit data entries or notation keys. CRF table 1.A(d) covering feedstocks and non-energy use of fuels shows the notation key, NO, in the completed cells. Since industrial process emissions are of particular importance in Iceland, this table would assist in making more transparent the disposition of coal and coke used in the industrial sector.

30. Fugitive emissions from fuels are not reported. Since there is no domestic oil, gas or coal production, and no oil refineries and no coke ovens, there is no reason to expect that there would be any significant fugitive emissions from fuels. There would be some fugitive emissions from distribution of products.

31. CRF tables summary 1 and summary 2 do not report any emissions of CO_2 from geothermal steam. The trend table (table 10) indicates that emissions from geothermal steam increased from 78 Gg in 1990 to 122 Gg in 1999. In CRF table 10, geothermal steam is reported under category 7 (other). This is an emission source which is not covered under the IPCC Guidelines, but is moderately important in an Icelandic context.

2. Transparency

32. The lack of an NIR means that the transparency of the inventory is limited. The relatively minor omissions from the CRF tables for the energy sector do not have a major impact on transparency.

3. Methodologies, emission factors and activity data

33. The Icelandic inventory was prepared using a tier 1 approach, with default emission factors. The actual emission factors used in the inventory are not specified. A review of implied emission factors (IEF) indicates that, as stated, default emission factors were used for liquid fuels, with the exception of the manufacturing sector, where the reported IEF (81.2 t CO_2/TJ) for manufacturing sector liquid fuels is higher than the default residual oil coefficient.[7] The solid fuels emission factor may be slightly low in view of the fact that coke accounts for a third of coal and coke.

34. The CRF includes a summary of the energy consumption upon which the inventory is based. There is no specific information available about the source of this information. However, the Icelandic government separately publishes energy data through both Statistics Iceland (Hagstofa Islands) and also through the Icelandic Energy Forecast Committee (*Orkusparnefnd*).

35. After studying this data, it is likely that estimated energy consumption and emissions from the transport and fisheries/other sectors are drawn from, and consistent with, national

[7] Noted by the UNFCCC secretariat in its draft S&A report 2001.

energy statistics. Emissions from the manufacturing sector, the residential sector and the electricity/heat sectors contain significant differences in comparison with national energy statistics.

(a) It appears that fossil fuel consumption used for district heating, properly classified in electricity and heat production may have been classified as residential. This does not affect aggregate emissions;

(b) Manufacturing sector emissions and energy consumption cannot be reconciled with national energy statistics. In particular, some 2,500 TJ of manufacturing coal and coke consumption, equivalent to more than 7% of national emissions, does not appear in reported energy consumption or emissions. There are two probable explanations for this difference; some or all of the missing coal is reported in Iceland's unusually large industrial process emissions or, alternatively, a particular category of energy consumption, *0820-kol og koks-storioja*, was inadvertently not included in the inventory;

(c) The emission factor for petroleum in the manufacturing sector appears to be about 10% too high, given the apparent composition of consumption.

36. Energy and emission data for Iceland compiled by the International Energy Agency (IEA) have also been reviewed. While generally consistent with, and more detailed than, either Icelandic national energy statistics or the Iceland inventory, the IEA data were often difficult to reconcile with either source.

4. Recalculation

37. No information on recalculations is reported in the CRF. However, a comparison with Icelandic data available on the UNFCCC website (www.unfccc.int) and the time series data provided in table 10 of the CRF indicates that revisions have been made to historical data, and that estimates for the period 1996–1998 are now available.

5. Uncertainty estimates

38. No information about quantitative uncertainty estimates is available. As noted above, the assessment of the reliability of energy data is high. A qualitative uncertainty assessment is included in CRF table 7.

B. Conformity with the UNFCCC reporting guidelines and IPCC Guidelines

39. The Iceland inventory appears to have been prepared in conformity with the IPCC Guidelines, although there are several matters requiring explanation. The Party's inventory is not yet consistent with the UNFCCC reporting guidelines in that an NIR has not been submitted. The Party has not implemented the IPCC good practice guidance.

C. Reference and sectoral approach

1. Comparison between reference and sectoral approach

40. The CRF reports emissions calculated using both the reference and sectoral approaches. Since all fossil fuels are imported, and there are no oil refineries or coke ovens, there is no real difference between the two approaches. Consumption and apparent consumption are the same figures, and should receive the same emission factors. It is likely that the 1% difference between

the two estimates is accounted for entirely by statistical discrepancies between recorded imports and consumption.

2. Treatment of feedstocks and non-energy use of fuels

41. CRF table 1.A(d) is not completed. This makes it difficult to ascertain the treatment of non-energy uses of fuels. It does not appear that Iceland possesses either petrochemical industries or coke ovens, and so the largest non-energy uses of fossil fuels are excluded. However, the Party does have a significant aluminium smelting industry, and aluminium smelters use large volumes of petroleum coke to manufacture sacrificial anodes, which are then oxidized as part of the production process. In its response to the draft review report the Party commented that there is no manufacture of sacrificial anodes in Iceland with all of these anodes imported. Oxidation of these anodes is included in the industrial processes sector. The cement industry has significant process emissions of carbon dioxide (from calcining limestone) coupled with significant energy emissions from furnace operations.

42. The Party's inventory reports significant carbon dioxide industrial process emissions from several industries, including ferroalloys (250 Gg), aluminium (347 Gg) and cement (58 Gg). It would be of assistance to know whether or not these process emissions include any fossil fuels withdrawn from the energy accounts, or whether they reflect only fuels excluded from the energy statistics. If fuels have been withdrawn from the energy accounts, data on the quantity of fuel withdrawn should be reported.

43. This question is important, because about 2,500 TJ of coal and coke consumption is "missing" from the energy section of the Icelandic inventory. It may have been withdrawn to prevent double counting with process emissions, but there is no evidence to confirm or refute this assumption. The Party advised that the "missing energy" was withdrawn to prevent double counting and is accounted for in the industrial processes sector.

44. The IEA reports that some 7 MTOE (293 TJ) of lubricants were consumed in Iceland in 1999. Lubricants do not appear in the national energy statistics, nor in the national emissions inventory. Used lubricants are often combusted.

3. International bunker fuels

45. The Icelandic inventory reported marine bunker fuel consumption of 2,230 TJ in 1999, and international aviation bunker fuel consumption of 5,133 TJ. Combined bunker fuel consumption accounts for about 25% of total domestic fossil fuel consumption, and more than 90% of aviation and marine fuel consumption.

46. Carbon dioxide emissions from this source total 164 Gg for marine bunker fuel consumption, and 363 Gg for aviation bunker fuel consumption; once again, about a quarter of domestic energy-related carbon dioxide emissions. The IEA reports 1999 marine bunker fuel emissions as about 180 Gg, and aviation bunker fuel emissions as about 340 Gg, yielding a slightly lower total, but with a distribution towards marine bunkers.

D. Key sources

47. The UNFCCC secretariat's preliminary key source analysis for the Icelandic inventory indicates that the two main sources of emissions are attributable to emissions of energy-related CO_2, accounting for 57% of Icelandic 1999 emissions. The listed key sources are CO_2 stationary combustion – oil (33.1%), and CO_2 mobile combustion – road vehicles (23.7%).

48. This review will combine coverage of stationary source emissions into a single grouping, followed by consideration of transport emissions.

1. Stationary combustion: coal and oil – CO_2

Trends

49. The CRF divides stationary combustion into three broad categories: energy industries, manufacturing and other sectors.

50. This review includes a calculation of Iceland's energy-related carbon dioxide emissions based on national energy statistics published by the Icelandic Energy Forecast Committee, affiliated with the National Energy Authority of Iceland.[8]

51. Emissions have been rising in all cases, though the different sources indicate differences in the temporal pattern of emissions.

52. The large gap between the IEA data and the national inventory is probably due to the differing treatment of a particular category of energy consumption: diesel fuel consumption in equipment (*0533, gasolia, taeki, (fra bil)*). It appears that this category is treated as part of the transport sector by the Party, and as part of the manufacturing/construction sector by the IEA.

53. In 1995 and subsequent years, the review inventory includes a "new" category of coal and coke consumption from energy-intensive industry (*0820, kol og koks, storioja*) which appears to be excluded from the Icelandic inventory. This may be due to *storioja* coal/coke being treated as an industrial process emission. This is discussed in more detail below, under "activity data".

Completeness

54. Coverage of emissions appears to be complete, except for the possible exclusion of *storioja* coal, and the provision of insufficient information to reconcile process and combustion emissions, as noted elsewhere.

Methodologies

55. The methods used to calculate emissions for Iceland's inventory appear to have been standard and consistent with the IPCC Guidelines.

Activity data

56. The activity data used for the energy section of the inventory appear to have been drawn largely from Iceland's national energy statistics, collected by the National Energy Authority. Every country's national statistics have a distinctive format, shaped by national circumstances and national institutions.

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8 Orkusparnefnd (Energy Forecast Committee), *Eldsneytisspa 2001–2030* (Reykjavik, June 2001), *Vidauki 1* and *Vidauki 2* (appendices 1 and 2). Available via the internet: http://www.orkuspa.is/eldsneyti/eldsheim.htm.

Appendix 1 contains historical energy consumption data in metric tons. Appendix 2 contains energy conversion factors and carbon dioxide emission factors. This reviewer organized the energy data in a format consistent with the CRF, and multiplied by the conversion and emission factors shown.

It should be noted that there were three minor fuels listed whose treatment was unclear: *urgangsolia, skautleifar*, and *timnburkuri*. *Urgangsolia* is residual fuel, though how it differs from *svartolia* (fuel oil) is unclear. This reviewer combined them. *Skautleifar* is used in the aluminum industry, and may be pitch. *Timburkuri* appears to be used in the cement industry, and seems to be of Icelandic origin. It is probably municipal solid waste (MSW). The treatment of these unknown fuels is not material to the results.

57. *Energy industries:* Since 99.5% of the energy input to Iceland's power generation and district heat production is attributable to hydroelectric and geothermal power, it is unsurprising that emissions from this source are very small. However, comparison of the inventory report with IEA data produced a surprise. The inventory indicated energy consumption of 45 TJ and emissions of 3 Gg, used entirely for power generation, while the IEA reported energy consumption of 461 TJ and emissions of 30 Gg, used entirely for heat production.

58. Iceland has a single fossil power plant (at Straunsvik) and some 56 small diesel (*disilstoovar*) plants. These plants consumed about 1,050 metric tons of gas oil and fuel oil, causing emissions of about 3 Gg, just as reported in the Icelandic inventory. On the other hand, this review identified specific public heat plants which reported consuming fossil fuels in 1999 of about 7,750 metric tons of gas and fuel oil, with carbon dioxide emissions of about 33 Gg. Thus, the emissions should probably be about 36 Gg, rather than 3 Gg.

59. It is possible that emissions from public heat plants have been attributed to the residential sector, where there seems to be surplus energy consumption by comparison with Iceland's energy statistics, and the emission factor is consistent with the use of a gas oil/fuel oil mix.

60. *Manufacturing:* In 1999, several published sources indicate that Iceland consumed 2,863 TJ of coal and coke, all used in the manufacturing sector.[9] However, the inventory reports consumption of only 358 TJ of solid fuels, with emissions of about 33 Gg. The IEA reported consumption of 1,675 TJ of coal and 712 TJ of coke, totalling 2,387 TJ and carbon dioxide emissions of 230 Gg.

61. Since Iceland has a significant aluminium industry, and relatively large industrial process emissions (660 Gg CO_2), the most probable explanation is that coal and coke in the energy statistics include petroleum coke used by the aluminium industry, even though petroleum coke is usually treated as a liquid fuel for accounting purposes. (Neither the IEA nor national energy statistics report any petroleum coke consumption for fuel purposes; so it seems reasonable to assume that "liquids" consumption excludes any petroleum coke.)

62. According to the energy statistics, coal and coke consumption totalled about 100,000 metric tons in 1999, of which 87,000 tons was accounted for by *storioja* (energy intensive industry) and the balance (13,000 tons) by *ionaour* (industry). According to the IEA, Iceland imported and consumed 60,000 tons of coal, 27,000 tons of coke for fuel use, and 115,000 tons of petroleum coke for non-fuel use.[10] According to the Icelandic trade statistics, Iceland imported 61,000 tons of coal and 27,000 tons of coke (matching the IEA data). The Icelandic trade statistics, however, report a total of 8.5 tons of petroleum coke imports.[11]

63. As a rule of thumb, an aluminium smelter uses about 0.5 tons of petroleum coke for each ton of aluminium smelted. Therefore, it is reasonable to expect to see non-fuel consumption of 85,000 tons of imported petroleum coke.

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[9] Hagstofa Islands/Statistics Iceland, *Landshagir 2001/Statistical Yearbook of Iceland 2001*. (Reykjavik, 2001). Available via the Internet at: http://www.hagstofa.is/talnaefn/Lh_2001/LH_2001.HTM.

[10] IEA, *Energy Statistics of OECD Countries, 1998–1999* (Paris, 2001).

[11] Hagstofa Islands/Statistics Iceland, *Utanrikisverlsan eftir tollskrarnumerum 1999/External Trade by HS Numbers 1999* (Reykjavik, 2000). Coal and coke are in chapter 27. Available via the Internet at: www.statice.is.

64. This issue cannot be resolved by this review. The *storioja* coal and coke might be entirely destined for anode use in the aluminium industry, and there are no petroleum coke imports.

65. The gap between recorded imports of 87,000 tons of coal and coke (by Statistics Iceland), and reported consumption of 100,000 tons (by the National Energy Authority) should be explained.

66. The bulk of manufacturing energy consumption and carbon dioxide emissions is accounted for by liquid fuels. National energy statistics reconcile reasonably well with reported liquids consumption, though carbon dioxide emissions are higher than expected, presumably due to an emission factor aspect (see paragraph 71).

67. The IEA manufacturing energy data for Iceland contain one other irregularity; there seems to be "too much" diesel fuel consumed in the manufacturing sector, and "too little" diesel fuel in the transport sector. National energy statistics include an ambiguous category (*gasolia, taeki*) which appears to mean "equipment". It would appear that the inventory attributed *taeki* gas oil consumption to road transport, while the IEA attributed the same fuel to manufacturing.

68. *Other sectors:* Other sectors include residential, commercial, and agriculture and fisheries. In Iceland, no emissions are attributed to agriculture or to the commercial sector, and only a tiny amount of emissions (33 Gg of CO_2) are attributed to the residential sector. Hence, "other sectors" emissions are dominated by fisheries (765 Gg of CO_2). Iceland's energy statistics distinguish carefully between domestic consumption (*innlend notkun*) and international usage and between fishing and other forms of maritime activities. Both the IEA and the national inventory appear to have followed the energy statistics closely.

69. The inventory reports emissions of 444 TJ of residential sector energy consumption, equivalent to carbon dioxide emissions of 33 Gg with an IEF slightly higher than that for gas oil. However, the national energy statistics do not report any gas oil consumption attributable to the residential sector. Instead, reported residential sector consumption is composed of a small amount (740 tons) of liquefied petroleum gas (LPG). Combining this quantity with an even smaller quantity of commercial sector LPG produces a total of 56 TJ of energy consumption, equivalent to carbon dioxide emissions of only 3 Gg.

70. The most likely explanation for this difference is that energy consumption (434 TJ) and emissions (33 Gg CO_2) from fossil fuel combustion in public heat plants have been attributed to the residential sector. LPG and kerosene use may have been included here or attributed to some other sector.

<u>Emission factors</u>

71. Emission factors used in the manufacturing sector are not directly recoverable. However, the two implied emission factors shown in table 1.A(a) are both a bit puzzling. The liquid fuels factor of 81.2 t CO_2/TJ is unusually high, even though the underlying energy data suggest that 84% of manufacturing petroleum was attributable to residual fuel (*svartolia* and *urgangsolia*).

72. The emission factor for coal, on the other hand, at 92.71 t CO_2/TJ, is perhaps a bit on the low side considering that available information suggests that Icelandic coal consumption is heavily oriented towards coke. As noted above, reported Icelandic coal imports include 40,000 tons of metallurgical coal, 20,000 tons of ordinary bituminous coal and 27,000 tons of

coke. As noted above, it is not clear that coke is included in manufacturing emissions. If it were to be included, there should be a weighted average emission factor taking into account the greater carbon content (and hence emission factor) of metallurgical coals and coke.

2. Transport emissions – CO_2

Trends

73. Transport sector emissions have grown by about 13% since 1990.

Completeness

74. Reported emissions appear to be complete, with the possible exception of emissions from lubricants. The Icelandic inventory does not appear to report any transport sector emissions associated with the combustion of lubricants, though it is not impossible that such consumption is included within liquid fuels.

Methodology

75. Emissions have apparently been calculated by multiplying energy consumption, as reported in national energy statistics, by IPCC default emission factors.

Activity data

76. Transport sector emissions and energy consumption correspond well with calculations based on national energy statistics. The IEA transport energy consumption and emissions are considerably lower than the national energy statistics would suggest. We believe that the Icelandic inventory attributes some 2,560 TJ of gas oil consumption for *taeki* (equipment) to the road transport sector while the IEA attributes it to the manufacturing and construction sector. This is equivalent to about 200 Gg of carbon dioxide emissions.

Emission factors

77. As noted above, IPCC default emission factors appear to have been used to calculate emissions from this sector.

E. Non-key sources

1. Energy combustion emissions – N_2O

78. Energy combustion emissions of N_2O were 0.12 Gg of N_2O, equivalent to 38 Gg of CO_2 equivalent, or just over 1% of Icelandic national emissions. Some 30 Gg of CO_2 equivalent were accounted for by emissions from the transport sector, presumably from catalytic converter-equipped vehicles.

2. Energy combustion emissions of "other sectors" – CO_2

79. The source category "other" covers 68 TJ of energy consumption, amounting to about 5 Gg of carbon dioxide emissions, or about 0.15% of national emissions. These figures correspond reasonably well to sectorally unattributed consumption in the national energy statistics, and does not represent a "statistical discrepancy".

3. Energy combustion emissions – CH_4

80. Reported 1999 energy combustion-related CH_4 emissions were 0.19 Gg of CH_4, or 3.6 Gg of CO_2 equivalent, equal to just over 0.1% of national emissions. Reported CH_4 emissions were concentrated in the transport and fisheries sectors.

F. Areas for further improvement

1. Issues identified by the Party

81. The Party has proposed no improvements.

2. Issues identified by the ERT

82. The following improvements would assist in improving the Party's inventory:

(a) A narrative description of the construction of the inventory, with a table illustrating the derivation of the division between energy-related and process emissions, would make review of the Icelandic inventory more straightforward;

(b) Further research into historical energy consumption, particularly covering LPG, coal and coke usage during the period 1990–1995, would help to ensure that 1990 and current emissions are fully comparable;

(c) Discussion of uncertainty issues with respect to the construction of the inventory would be helpful.

III. INDUSTRIAL PROCESSES

A. Sector overview

83. Emissions from industrial processes represented around 25.9% of total GHG emissions in 1999 compared with 25.5% in 1990. Over the period from 1990 to 1999, emissions increased by 19.0%, and from 1998 to 1999 emissions increased by 27.8%.

84. The key source analysis prepared by the UNFCCC secretariat identifies five key sources in the industrial processes sector, as follows:

(a) CO_2 from aluminium production – 10.7%, ferroalloys production – 7.7%, and cement production – 1.8%;

(b) PFCs from aluminium production – 4.1%;

(c) N_2O from chemical industry - 1.1%.

85. The country reported activity data and emissions of CO_2 as "0" from ammonia production, although United Nations data indicate that in 1998 ammonia production was 9 kt.

1. Completeness

86. For the industrial processes sector and solvent use, all tables for 1999 were submitted but these did not include all requested data or notation keys. The absence of data and notation keys in some cells prevents any assessment as to whether the inventory is complete in terms of sources and gases.

87. On consumption of halocarbons and SF_6, only information on potential emissions of HFCs and SF_6 was provided; but there is no information on actual emissions.

88. In table 2(I) in the source category “consumption of halocarbons and SF_6” only aggregated data are given on HFCs emissions and only SF_6 emissions from electrical equipment are reported.

89. In table 2(II) in the source category “consumption of halocarbons and SF_6” (actual emissions) the totals are reported as 0. Disaggregated information by chemicals and sub-sources is not provided. In table 2(II).F Consumption of halocarbons and SF_6, no data are reported.

90. In table 2(II).C,E no information on production of halocarbons and SF_6 is reported. In table 2(II) in the source category “production of halocarbons and SF_6 “0” is reported as total. Summary table 7 indicates that there is no production of halocarbons and SF_6 in Iceland. The entry of “0” should not be used where emissions are not estimated (NE) or not occurring (NO). The correct notation keys, NE or NO should be used.

91. CRF table 7 was completed. The completeness of the reported data for industrial processes was assessed as full estimation for CO_2 emissions with a high quality, NE for CH_4 emissions, and partial estimation for N_2O emissions comprising full estimation for chemical industry with low quality of the estimate, and NE for other industrial processes sub-sources. In respect of CO_2, this appears to conflict with table 9 where the absence of data for some mineral products was provided as an explanation for not estimating CO_2 emissions from these sources.

2. Transparency

92. Transparency is limited by the omission of notation keys from tables and the lack of an NIR. Appropriate use of notation keys would assist in the review of the inventory.

3. Methodologies, emission factors and activity data

93. Summary table 3 indicates that methodologies and emission factors for CO_2 and SF_6 emissions from industrial processes are IPCC defaults. For N_2O and PFCs they are country-specific (CS), and for HFCs potential emissions are estimated using a tier 1 method and default emission factors.

4. Recalculations

94. Table 8 on recalculation for industrial processes and solvents has not been completed.

5. Uncertainties

95. The Party has provided a qualitative assessment of uncertainty in CRF table 7. No quantitative analysis has been submitted.

6. Trends

96. CO_2 emissions from metal production are volatile. The most significant growth between years is observed in 1993 (369.89 Gg from 316.43 Gg in 1992) and in 1999 (597.12 Gg from 457.84 Gg in 1998).

97. The summary table on emission trends, table 10, shows a substantial increase in GHG emissions from industrial processes (from 748.17 Gg in 1990 to 890.56 Gg in 1999). GHG emissions from industrial processes declined between 1990 and 1994 and increased between

1996 and 1999. This appears to be due largely to a sharp fall in PFC emissions (from 109.67 Gg to 53.48 Gg) followed by substantial increases in emissions of both PFCs (81.58 Gg to 133.30 Gg) and HFCs (from 3.12 Gg to 63.90 Gg). SF_6 emissions are reported as stable across the full time series.

B. Consistency with the IPCCC Guidelines and the UNFCCC reporting guidelines

98. The reporting of emissions appears to be broadly consistent with the IPCC Guidelines. The absence of an NIR and the omissions of notation keys from the CRF tables mean that the Party's inventory is not fully consistent with the UNFCCC reporting guidelines.

C. Key sources

99. The issues relating to the key sources are similar and are summarized for each key source. The fact that an NIR has not been submitted restricts the review of each of the key sources to the basic information included in the CRF.

1. Aluminium production – CO_2

100. CO_2 from aluminium production contributed 10.7% to the total GHG inventory in 1999. The Party reports that it used the IPCC default method and emission factor. No information is provided on the source of activity data.

2. Ferroalloys production – CO_2

101. CO_2 from ferroalloys production contributed 7.7% to the total GHG inventory in 1999. The Party reports that it used the IPCC default method and emission factor. The CO_2 IEF (3.455 t/t) is high compared to most Parties and should be explained. No information is provided on the source of activity data.

3. Cement production – CO_2

102. CO_2 from cement production contributed 1.8% to the total GHG inventory in 1999. The Party reports that it used the IPCC default method and emission factor. The IEF of 0.44 is lower than the IPCC default and needs clarification given that the emission factor is stated to be default. No information is provided on the source of activity data.

4. Aluminium production – PFCs

103. PFCs emissions from aluminium production contributed 4.1% to the total GHG inventory in 1999. The methods and emission factors used are reported as country specific with no further explanation available. No information is provided on the source of activity data.

5. Chemical industry – N_2O

104. N_2O from the chemical industry (fertilizer production) contributed 1.1% to total GHG emissions in 1999, declining from 0.16 Gg in 1990 to 0.12 Gg in 1999. The Party reports that it used a country-specific method and emission factor for emissions from fertilizer production. Additional explanation has not been provided. No information is provided on the source of activity data.

D. Non-key sources

105. Mineral wool production is the only non-key source. No detailed information is available for this source.

E. Solvent and other product use

106. The Party provided no information on reported method and emission factor used. The CRF tables for this sector are incomplete with a large number of cells not filled in. Use of notation keys is recommended.

F. Areas for further improvement

1. Issues identified by the Party

107. No areas for improvement have been proposed by the Party.

2. Issues identified by the ERT

108. It is suggested that for future inventory submissions the Party should:

(a) Ensure that all cells of the CRF contain data or a notation key. Where the activity does not occur, the correct entry is NO; “0” should be used where emissions occur but are negligible;

(b) Consider the reasons for the different IEFs for ferroalloys and cement production and provide an explanation;

(c) Submit an NIR which includes an explanation of methodologies used and the source of activity data and emission factors;

(d) Progressively implement the IPCC good practice guidance and include quantitative uncertainty analysis in the NIR as far as possible.

IV. AGRICULTURE

A. Sector overview

109. Agriculture accounts for 83% and 66% of national emissions of CH_4 and N_2O, respectively. There has been a 5% reduction in CH_4 emission since 1990 (due to a reduction in emissions from enteric fermentation), and a 1.1% reduction since 1998. There has been an 11.5% increase in N_2O emissions since 1990, and a 29.7% increase since 1998. No reasons are given for these increases.

110. Key sources, identified by the secretariat, are direct soil emissions for N_2O (4.5% of national GHG emissions) and enteric fermentation for CH_4 (6.7% of national GHG emissions). No key sources are identified by the Party.

1. Completeness

111. No NIR has been provided for Iceland; many aspects of the inventory submission cannot, therefore, be assessed. CRF tables are provided for the agriculture sector for 1999 only. For N_2O, only direct soil emissions were estimated. Indirect emissions and emissions of N_2O from animal production are reported as NE. Gaps in tables are not always appropriately annotated

(e.g. 10, 4.A, 4.B(a); in table 4, indirect emissions and animal production should be reported as NE (as table 4.D) not 0.00).

2. Transparency

112. Transparency of Iceland's inventory is limited due to the lack of an NIR. There is little information in the CRF to aid transparency; sources of activity data are not specified in the CRF and additional information (e.g. in tables 4.B(a) and 4.D) have not been supplied.

3. Methodology

113. The methodology and emission factors are given as default for both CH_4 and N_2O. However, there are some wide discrepancies between IEFs in the CRF and the default IPCC values (see paragraph 133).

114. The population of swine is given as 4,000, compared to 43,000 from the United Nations Food and Agricultural Organization (FAO). N excretion rates for all livestock are very small, for example dairy cows 0.07 kg N/hd/year, 0 for sheep and poultry. Although the documentation box (table 4.B(b)) states that N_2O emissions from manure management are reported as NE, the N excretion information is also needed for manure N application to soils (which is estimated). The figure given for animal waste application cannot have been calculated from the animal numbers and excretion rates as given in table 4.B(b). No information is given on the source of activity data or emission factors used.

115. Indirect emissions are reported as NE (i.e. N from atmospheric deposition and nitrogen leaching and runoff); therefore the agricultural soils emission (CRF table 4) consists only of emissions from synthetic fertilizers and applied animal manure (CRF table 4.D).

4. Recalculation

116. There are no recalculations relating to agriculture.

5. Uncertainty

117. The qualitative assessment of the estimate is given as low for N_2O and medium for CH_4. No quantitative uncertainty analysis has been submitted.

6. QA/QC

118. No information is given.

B. Consistency with the IPCC Guidelines and the UNFCCC reporting guidelines

119. Iceland has adopted an IPCC-based method with default emission factors. As no NIR has been supplied, there is no information on the sources of data, nor detail on how the data were disaggregated. The provision of an NIR is required under the UNFCCC reporting guidelines. Some sources within the agricultural sector have not been estimated (N excretion on pasture, range and paddock, animal waste management systems and indirect emissions). It is not clear why an estimation of the last mentioned has not been made, since the data required for an IPCC default-based calculation is already available in the CRF. There seem to be errors in N excretion, and it is not clear how “animal wastes applied to soils” has been calculated.

120. According to the decision tree approach of the IPCC good practice guidance, it would be appropriate (given sufficient data availability) to adopt a tier 2 approach for CH_4, and more country-specific fractions and emission factors for N_2O.

121. The approach is substantially consistent with the IPCC Guidelines but is not yet fully consistent with the UNFCCC reporting guidelines because an NIR and CRF tables for 1990 to 1998 have not been submitted.

C. Key sources

1. Enteric fermentation – CH_4

122. This source accounts for 92% of agricultural CH_4 emissions.

Trends

123. There has been a 5% reduction in enteric CH_4 emissions since 1990.

Completeness

124. The information required for a tier 1 estimation of this source is complete. Notation keys are not used appropriately to fill in the gaps in tables (e.g. animal classes should be noted as NO or NE in tables 4.A and 4.B(a)).

Methodology

125. Enteric CH_4 emissions have been calculated using IPCC default methods.

Activity data

126. No source is given for activity data. There is a large discrepancy between population of swine according to the CRF and in FAO data. The N excretion rates for all livestock are very small compared to other Parties.

Emission factors

127. IPCC default values have been used for IEFs.

2. Direct soil emission – N_2O

128. Direct soil emissions account for 100% of N_2O emissions from agriculture, as no other sources have been estimated.

Trends

129. Emissions have increased by 11.5% since 1990, and by 29.7% since 1998.

Completeness

130. No additional information is given for fractions used in the calculation of agricultural soils (e.g. $Frac_{GRAZ}$, $Frac_{LEACH}$) since the emissions to which these relate are reported as NE. However, there is no information given on $Frac_{GASF}$ or $Frac_{GASM}$, and emission from fertilizer and manure are included in the CRF submission. Field burning of agricultural residues (4.F), N fixing crops, crop residue and cultivation of histosols (table 4.D) are all reported as NO.

Methodology

131. The method used is the IPCC default.

Activity data

132. No information is given on the source of activity data. It is not clear how animal waste applied to soils has been calculated from the N excretion figures given in table 4.B(b).

Emission factors

133. The emission factors used are IPCC default values. However, the IEF for fertilizer is 0.02 kg N_2O-N/kg-N, compared to the IPCC default of 0.0125, and is large compared to the IEFs reported by other Parties. The IEF for applied animal waste is 2 kg N_2O-N/kg-N (cf 0.0125 IPCC default). This is the largest value of all reporting Parties.

D. Non-key sources

134. CH_4 from manure management is the only non-key source. This was estimated using IPCC default methodology and emission factors. Manure management N_2O, animal production N_2O and indirect N_2O were reported as NE.

E. Results from previous reviews

135. The draft S&A report 2001 pointed out that the fractions used were not reported (table 4.D), that there was a large discrepancy in swine population figures between the CRF and FAO and that the IEFs for synthetic fertilisers and animal wastes applied to soils were large compared to other Parties.

136. It was also noted in the draft S&A report 2001 that CO_2 emissions from agricultural soils were reported in the trend table of the CRF (table 10) but under neither agriculture nor LUCF in tables summary 1.A, 1.B and summary 2.

137. Iceland did not provide any explanation with regard to the issues raised in the draft S&A report 2001.

F. Areas for further improvement

1. Issues identified by the Party

138. The Party has proposed no improvements.

2. Issues identified by the ERT

139. Without an NIR it is difficult to assess the methodology used, data availability and so on, and therefore how the methodology could be improved. Suggestions for improvement are:

(a) Checking of animal numbers in relation to FAO statistics (swine);

(b) Checking of N excretion rates for all livestock classes;

(c) Estimation of indirect N_2O emissions using the default IPCC methodology. (Since fertilizer and manure application have been calculated, the indirect emissions could be estimated using the IPCC default methodology);

(d) If sufficient data exist, an attempt to adopt an IPCC tier 2 approach for calculation of enteric CH_4.

V. LAND-USE CHANGE AND FORESTRY

A. Overview

140. GHG emissions and uptake from LUCF activities have not been estimated in Iceland. However, in table 5 (sectoral report table for LUCF), it is indicated that there are insignificant emissions and uptake of GHG under category "Other" (notation "0"), but in all sectoral background data (tables 5.A, 5.B, 5.C and 5.D) the notation key NE has been used for this category.

141. Following the UNFCCC reporting guidelines, "0" values should not be used when the emissions or uptakes are NE. In this case, all categories should use the notation key NE, and an explanation as to why the emissions and uptake are NE should be provided. Similar comments have been made in previous reviews.

VI. WASTE

A. Sector overview

142. Emissions from the waste sector contribute 1.9 % of total emissions (excluding CO_2 from LUCF) in 1999 compared with 2.8% in 1990. CH_4 emissions, the major GHG from this sector, increased by 24.3% from 1990 to 1999, and by 4.4% from 1998 to 1999. The waste sector has one key source, CH_4 from 6.A Solid waste disposal on land, which contributes 1.4% of total emissions in 1999.

1. Completeness

143. All CRF tables specific to the waste sector contain some data. The notation keys have not been used in any of the tables with the exception of N_2O from human sewage. No estimate of CH_4 recovery from wastewater is included nor is there an estimate of N_2O emissions from human sewage.

2. Transparency

144. The inventory is not transparent. Summary 3 shows the methodology and emission factors for CO_2 for solid waste disposal on land as D (default) and yet there is no CO_2 estimate for this sub-source; the methodology and emission factor for CH_4 are country-specific with no further explanation provided; the methodology for waste-water handling is shown as D and the emission factor as country-specific with no further explanation, and the methodology and emission factors for waste incineration are shown as a series of question marks (?). These do not assist in understanding the compilation and reporting of the inventory.

3. Uncertainties

145. Qualitative assessments of the estimates for all gases are noted in table 7 of the CRF. The Party has not provided any additional uncertainty analysis.

4. Recalculations

146. No information is provided on recalculations.

B. Consistency with the IPCC Guidelines and the UNFCCC reporting guidelines

147. The inventory is not yet fully consistent with the IPCC Guidelines and the UNFCCC reporting guidelines in that there are several omissions from tables and some tables have not been completed. It is not possible to assess whether the application of the IPCC default methodologies for solid waste and waste-water handling are consistent with the guidelines, because information included in the inventory is not adequate.

148. It would assist if the Party provided an NIR which commented briefly on the sources of activity data used to derive estimates from the default methodologies.

C. Key sources

1. Solid waste disposal on land – CH_4

Methodology

149. CRF summary 3 shows the methodology as being country-specific. No additional information is available.

Activity data

150. No information on activity data is provided.

Emission factors

151. The CRF (summary 3) notes the emission factor as being country-specific. Further information is required.

D. Non-key sources

152. CO_2 emissions from 6.C Waste incineration is a non-key source. Summary 3 shows the methodology and emission factor as question marks (?). This does not assist the review process and should be clarified.

E. Results from previous reviews

153. The draft S&A report 2001 commented that the methane correction factor (MCF) and DOC were not provided for 6.A Solid waste disposal on land, and noted that no background additional information was reported.

F. Areas for further improvement

1. Issues identified by the Party

154. The Party has proposed no improvements.

2. Issues identified by the ERT

155. In future inventories it is recommended that the Party ensure that:

(a) All CRF tables are completed;

(b) All cells in the background CRF tables contain data or a notation key;

(c) More detailed explanations of methodologies, sources of activity data and sources of emission factors are provided. There is a need to explain country-specific methodologies. Where default methodologies are used, the method requires input of some country-specific data and it is important that the sources be noted. It would be of assistance if the Party submitted an NIR;

(d) The source of CH_4 recovery data is explained.

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