Advance Version

COMPLIANCE COMMITTEE

CC/ERT/ARR/2011/35
22 December 2011

Report of the individual review of the annual submission of Iceland submitted in 2011

Note by the secretariat

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

ADVANCE VERSION

United Nations FCCC/ARR/2011/ISL

Framework Convention on Climate Change

Distr.: General
19 December 2011

English only

Report of the individual review of the annual submission of Iceland submitted in 2011*

* In the symbol for this document, 2011 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

1. This report covers the in-country review of the 2011 annual submission of Iceland, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 22 to 28 August 2011 in Reykjavik, Iceland, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Mr. Riccardo De Lauretis (Italy); energy – Mr. Norbert Nziramasanga (Zimbabwe); industrial processes – Ms. Valentina Idrissova (Kazakhstan); agriculture – Mr. Etienne Mathias (France); land use, land-use change and forestry (LULUCF) – Mr. Sandro Federici (San Marino); and waste – Ms. Medea Inashvili (Georgia). Mr. De Lauretis and Mr. Nziramasanga were the lead reviewers. The review was coordinated by Ms. Astrid Olsson and Mr. Roman Payo (UNFCCC secretariat).

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

3. In 2009, the main greenhouse gas (GHG) in Iceland was carbon dioxide (CO_2), accounting for 76.5 per cent of total GHG emissions[1] expressed in CO_2 eq, followed by methane (CH_4) (10.3 per cent) and nitrous oxide (N_2O) (8.0 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 5.3 per cent of the overall GHG emissions in the country. The energy sector accounted for 43.7 per cent of total GHG emissions, followed by industrial processes (39.3 per cent), agriculture (12.3 per cent), waste (4.6 per cent) and solvent and other product use (0.1 per cent). Total GHG emissions amounted to 4,649.08 Gg CO_2 eq and increased by 35.1 per cent between the base year[2] and 2009.

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

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

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

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year emissions include emissions from Annex A sources only.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year to 2009[a]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A sources		CO_2	2 172.15	2 172.15	2 325.59	2 774.81	2 876.93	3 301.15	3 594.63	3 555.62	63.7
		CH_4	462.60	462.60	457.51	461.54	448.52	486.83	484.02	478.22	3.4
		N_2O	385.82	385.82	378.09	396.81	352.45	398.57	409.15	370.34	–4.0
		HFCs	NA, NE, NO	NA, NE, NO	4.24	26.96	48.83	58.50	67.01	86.21	NA
		PFCs	419.63	419.63	58.84	127.16	26.09	281.13	349.00	152.75	–63.6
		SF_6	1.13	1.13	1.46	3.05	4.23	10.15	6.26	5.94	427.5
KP-LULUCF	Article 3.3[b]	CO_2							–115.02	–147.36	
		CH_4							NA	NA	
		N_2O							0.11	0.12	
	Article 3.4[c]	CO_2	–250.31						–430.71	–439.38	75.5
		CH_4	NA						NA	NA	NA
		N_2O	NA						NA	NA	NA

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

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

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

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

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2009

			Gg CO_2 eq								*Change*
		Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A		Energy	1 783.29	1 783.29	1 918.54	2 053.03	2 101.65	2 234.37	2 091.61	2 032.50	14.0
		Industrial processes	862.99	862.99	534.93	945.55	917.88	1 485.14	1 992.31	1 828.83	111.9
		Solvent and other product use	13.94	13.94	14.09	14.89	16.18	12.47	9.25	5.88	–57.8
		Agriculture	601.55	601.55	564.23	576.26	527.76	578.03	595.82	569.78	–5.3
		Waste	179.57	179.57	193.93	200.61	193.58	226.33	221.06	212.09	18.1
		LULUCF	1 102.70	1 102.70	1 054.30	929.24	803.74	743.49	713.72	677.29	–38.6
		Total (with LULUCF)	**NA**	**4 544.04**	**4 280.03**	**4 719.58**	**4 560.79**	**5 279.84**	**5 623.78**	**5 326.38**	**NA**
		Total (without LULUCF)	**3 441.33**	**3 441.33**	**3 225.73**	**3 790.34**	**3 757.05**	**4 536.34**	**4 910.06**	**4 649.08**	**35.1**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation							–114.91	–147.23	
		Deforestation							NA	NA	
		Total (3.3)							**–114.91**	**–147.23**	
	Article 3.4[d]	Forest management							NA	NA	
		Cropland management	NA						NA	NA	NA
		Grazing land management	NA						NA	NA	NA
		Revegetation	–250.31						–430.71	–439.38	75.5
		Total (3.4)	**–250.31**						**–430.71**	**–439.38**	**75.5**

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

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in the national totals.

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

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

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

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve	16 671 462	16 671 462		16 671 462	
Annex A emissions for current inventory year					
CO2	3 555 623	3 555 623		3 555 623	
CH4	460 313	478 223		478 223	
N2O	357 728	370 345		370 345	
HFCs	85 816	86 208		86 208	
PFCs	152 745	152 745		152 745	
SF6	5 938	5 938		5 938	
Total Annex A sources	**4 618 163**	**4 649 082**		**4 649 082**	
Activities under Article 3, paragraph 3, for current inventory year					
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	147 234			147 234	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA			NA	
3.3 Deforestation for current year of commitment period as reported	NA			NA	
Activities under Article 3, paragraph 4, for current inventory year[d]					
3.4 Forest management for current year of commitment period					
3.4 Cropland management for current year of commitment period					
3.4 Cropland management for base year					
3.4 Grazing land management for current year of commitment period					
3.4 Grazing land management for base year					
3.4 Revegetation for current year of commitment period	–439 383			–439 383	
3.4 Revegetation for base year	–250 310			–250 310	

Abbreviations: NA = not applicable.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

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

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

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

6. The GHG inventory is generally in line with the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). However, there is a need for further improvements, especially in the LULUCF sector.

7. The 2011 inventory submission is generally of a high quality, but the expert review team (ERT) identified a need for further improvements: the application of higher-tier methods for estimating emissions from stationary combustion; the collection of plant-specific data to estimate CO_2 emission factors (EFs) for ferrosilicon and aluminium production; the use of higher-tier estimation methods in the agriculture sector, especially for the categories enteric fermentation and manure management; the provision of a consistent land representation for each land use and land-use change category; and the establishment of country-specific EFs in the waste sector.

8. During the review week, the ERT detected some potential underestimations in the industrial processes and agriculture sectors, in particular: HFC emissions from foam blowing, N_2O emissions from the cultivation of histosols and from the use of fertilizer in revegetated areas, and CH_4 and N_2O emissions from sheep, goats and horses. Iceland acknowledged these findings at the time of the review and undertook measures to correct the relevant emission estimates; the Party provided revised estimates for the identified categories by officially submitting a complete revised inventory for the complete time series during the review week.

9. By submitting the revised inventory and supplying the additional information requested by the ERT during the review week, Iceland has demonstrated sufficient capacity to comply with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the UNFCCC reporting guidelines).

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

11. Iceland has chosen to account for activities under Article 3, paragraph 3, of the Kyoto Protocol at the end of the commitment period. The Party has elected revegetation under Article 3, paragraph 4, of the Kyoto Protocol and has chosen accounting at the end of the commitment period. Iceland has reported information on activities under Article 3, paragraph 3, of the Kyoto Protocol and elected activities under Article 3, paragraph 4, of the Kyoto Protocol in accordance with decisions 15/CMP.1, 16/CMP.1 and 6/CMP.3. The ERT noted that the information on land areas subject to activities under the Kyoto Protocol needs to be improved.

12. Iceland has reported information on its accounting of Kyoto Protocol units in accordance with chapter I.E of the annex to decision 15/CMP.1, and has not used the standard electronic format (SEF) tables as required by decision 14/CMP.1, as it has not yet transferred or acquired any Kyoto Protocol units.

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

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

decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

15. Iceland has reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1, in its national inventory report (NIR). The reported information is considered complete and transparent.

16. In the course of the review, the ERT formulated a number of recommendations relating to: the completeness of the annual submission, in particular relating to the categories reported as not estimated in the LULUCF sector (see para. 92 below); the improvement of the transparency of the reporting of methodologies, trends and choice of activity data (AD) and EFs across the different sectors; and the improvement of the estimation processes using higher-tier methods, especially for key categories.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

17. The 2011 annual inventory submission was submitted on 16 April 2011; it contains a complete set of common reporting format (CRF) tables for the period 1990–2009. Iceland submitted its NIR on 13 May 2011. Iceland also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The SEF tables were not submitted in accordance with the annex to decision 15/CMP.1, as Iceland has not yet issued its assigned amount units and no Kyoto Protocol units have been acquired or transferred. The annual submission was submitted in accordance with decision 15/CMP.1.

18. The ERT noted that Iceland's annual submission was submitted after the due date of 15 April 2011 and therefore encourages the Party to submit its next annual submission by 15 April 2012 as required by decision 15/CMP.1.

19. Iceland officially submitted revised emission estimates on 27 August 2011 in response to questions raised by the ERT during the course of the in-country visit. The values used in this report are based on the values contained in the submission of 27 August 2011.

20. The ERT also used the previous years' submissions during the review. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the national registry.[3]

21. During the review, Iceland provided the ERT with additional information. The documents concerned are part of the annual submission. The full list of materials used during the review is provided in annex I to this report.

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

Completeness of inventory

22. The inventory is complete in terms of years, geographical coverage and sectors and generally complete in terms of categories and gases. The exception is in the LULUCF sector, where some mandatory categories are reported as not estimated ("NE"): in particular, CO_2 emissions and removals from mineral soils under cropland and grassland, CO_2 emissions from biomass burning and CO_2 emissions from deforestation, in the KP-LULUCF table. The ERT recommends that Iceland estimate emissions and removals for those categories for which estimation methods are available in the IPCC good practice guidance for LULUCF. HFC emissions from foam blowing had been reported as not occurring ("NO") by Iceland in its original 2011 annual submission. During the review week, this category was identified as a not estimated category and the Party provided emission estimates for the category.

23. In its 2011 annual submission, Iceland improved the completeness of its reporting by providing complete explanatory information in CRF table 8(b) on the recalculations performed and in CRF table 9(a) on the notation keys used. The ERT commends Iceland for this improvement.

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

Overview

24. The ERT concluded that the national system continues to perform its required functions. The Party has reported no changes in the national system since the previous annual submission. The ERT agrees with this.

Inventory planning

25. During the in-country visit, Iceland explained the national system for the preparation of the inventory. The Environment Agency of Iceland (EA), under the supervision of the Ministry for the Environment (MFE), has overall responsibility for the national inventory. EA compiles and manages the whole inventory, except for the information on the LULUCF sector, which is compiled by the Agricultural University of Iceland (AUI). EA collects and processes AD, selects methodologies and appropriate EFs, ensures quality management activities, and manages and implements the quality assurance/quality control (QA/QC) plan and the archiving system. A coordinating team was established in 2008 as part of the national system, with representatives of EA, AUI and MFE not directly involved in preparing the inventory, which has the role of reviewing the inventory before its official submission to the UNFCCC secretariat by EA. Other agencies, ministries and organizations, such as the National Energy Authority (NEA), the Farmers Association of Iceland (FAI), Statistics Iceland, the Soil Conservation Service of Iceland and the Iceland Forest Service, are also involved in the inventory preparation process, for the provision of AD or EFs. The Party's NIR described the national system and the flow of information and allocation of responsibilities.

26. During the in-country visit, Iceland provided additional information for each sector on the role of the different institutions in providing AD and EFs and in producing emission estimates. The ERT encourages Iceland to report this information in the NIR of its next annual submission.

27. The ERT was informed by the Party that a new formal agreement between NEA and EA needs to be established to ensure the availability of the national energy balance and fuel-related information in time for the inventory preparation each year. The ERT identified

additional areas for possible improvement, such as the reconciliation of official agricultural statistics provided by Statistics Iceland, published on the Internet and supplied to international organizations, with those used by the Party for estimating emissions. The ERT recommends that Iceland report on these improvements in its next annual submission.

28. Iceland reported in the NIR the planned and implemented improvements to the inventory. During the review week, Iceland provided a prioritization of the planned improvements, to be completed by the next annual submission, in the mid term and in the long term. The ERT encourages Iceland to report this information in the relevant chapter of the NIR of its next annual submission.

Inventory preparation

Key categories

29. Iceland has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2011 annual submission. The key category analysis performed by the Party and that performed by the secretariat[4] produced similar results, with differences owing to the different levels of aggregation used by the Party and by the secretariat as well as to some minor errors in the analysis. Iceland has included the LULUCF sector in its key category analysis, which was performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. During the review week, some errors were detected by the ERT: for instance, some minor categories were not included in the analysis; emission estimates in the analysis for some categories were not equal to those reported in the CRF tables for the same year; and estimated CO_2 emissions for the commercial/institutional subcategory under the energy sector were not included in the total for the category other categories that was used for the key category assessment. In response to questions raised by the ERT during the review week, Iceland provided a revised key category tier 1 analysis, both level and trend assessment. The ERT recommends that Iceland include all categories in the key category assessment, improve its QC activities for the next annual submission, and expand the table reported in the NIR to include the non-key categories, in order to improve the transparency of its reporting. Furthermore, the ERT encourages Iceland to use a tier 2 method for the key category assessment and/or to use a qualitative approach to identify possible additional key categories, for which the emission estimates have a high uncertainty, for its next annual submission.

30. Iceland reported in the NIR that the results of the key category analysis are a driving factor in the preparation of the inventory, particularly in the prioritization of resources and the selection of methodological complexity.

31. Iceland identified afforestation and reforestation, and revegetation as key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Uncertainties

32. In annex II to the NIR, Iceland has reported a quantitative uncertainty analysis, performed using a tier 1 method in line with the IPCC good practice guidance, which shows that the uncertainty of the trend is 6.8 per cent, while the level uncertainty is 7.1 per cent

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

(6.6 per cent in 2008). In response to a recommendation made in the previous review report, Iceland improved its uncertainty analysis by including the LULUCF categories in the analysis, and the Party reported in the NIR that the uncertainty analysis is used to prioritize efforts to improve the accuracy of the inventory. During the review week, uncertainties for AD were discussed and, thereafter, updated by Iceland and resubmitted during the review week. The revised total uncertainty of the trend is 8.1 per cent and of the level is 7.4 per cent. The ERT recommends that Iceland report the updated uncertainty analysis in its next annual submission. The ERT encourages the Party to improve the description of the uncertainty analysis in the appropriate section of the NIR, including the relevant references used for the uncertainties associated with the AD and EFs.

Recalculations and time-series consistency

33. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party of the whole time series have been undertaken to take into account updates of AD in the industrial processes, solvent and other product use, and waste sectors. The estimates of HFC-134a emissions have been revised taking into account new export data for the whole time series; estimated SF_6 emissions have been revised because of the availability of new data on electricity transmission system insulation; while the estimates of CO_2 emissions from solvent and other product use in degreasing and dry-cleaning activities have been updated for 2007 and 2008. In response to a recommendation made in the previous review report, major recalculations have been performed for the LULUCF sector (see para. 91 below). The major changes, and the magnitude of the impact, include increases in the estimated total GHG emissions for the base year (by 0.002 per cent) and for 2008 (by 0.001 per cent). The rationale for these recalculations is provided in the NIR and in CRF table 8(b).

34. During the review week, in response to questions raised by the ERT, Iceland submitted revised estimates for the whole time series of HFC emissions from foam blowing and of CH_4 and N_2O emissions from the agriculture sector, which resulted in an increase in the estimated total GHG emissions for the base year (by 0.77 per cent) and for 2008 (by 0.61 per cent). The ERT noted that the aforementioned recalculations led to improvements in the accuracy and consistency of the time series.

Verification and quality assurance/quality control approaches

35. Iceland provided in the NIR the web link to its QA/QC plan, which describes the QA/QC programme and the quality objectives, and includes the responsibilities and the time frame schedule for the performance of QA/QC procedures, and the QA/QC manual, which contains an overall description of the QA/QC procedures, including the checklist for QC activities. The QA/QC plan includes all mandatory elements as set out in the IPCC good practice guidance and decision 19/CMP.1.

36. The QA/QC plan is in line with the IPCC good practice guidance, but could be strengthened and improved, including through the prioritization of the planned inventory improvements. In the NIR, sector-specific QA/QC procedures need to be better described, especially for the sectors where they are not properly and fully implemented. Therefore, the ERT recommends that Iceland improve the descriptions and documentation of QA/QC and verification activities in the NIR of its next annual submission, especially for the energy, waste and LULUCF sectors, giving priority to those activities implemented for the key categories.

37. The ERT noted that, despite the availability of the elaborated QA/QC plan and the performed QC checks, some errors and inconsistencies in the NIR have been detected for different sectors, including errors in the key category analysis. The ERT recommends that

the Party further strengthen its general and sector-specific QA/QC efforts, in order to avoid such errors in the future.

Transparency

38. The NIR generally follows the outline set out in the UNFCCC reporting guidelines. However, there is a need for further improvement, especially in the energy, waste and LULUCF sectors, regarding the description of methodologies and the collection and processing of the data, assumptions, parameters, EFs and AD used for the emission estimates. The ERT recommends that Iceland further improve the transparency of its reporting by making the following improvements in its next annual submission:

(a) Provide more detailed information in the NIR on the choice of all methodologies, assumptions, EFs and AD used, for example the method used to select fuel parameters, and the amount of reducing agents and electrodes used;

(b) Fill in the additional information and documentation boxes of the CRF tables, especially for the agriculture and waste sectors;

(c) Provide information on the QA/QC and verification activities used for the key category emission estimates;

(d) Provide additional information to explain the trends in emissions, especially in the case of fluctuations;

(e) Provide comprehensive and clear information on data collection and archiving and on the registration procedures for areas subject to afforestation and reforestation, deforestation and revegetation.

Inventory management

39. Iceland has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. All of this information is stored electronically on the server of EA. During the review, the ERT was provided with the requested additional archived information. The description of the archiving system is reported in the QA/QC manual but not in the NIR. The ERT reiterates the recommendation made in the previous review report that Iceland provide the relevant information on the archiving system in the NIR of its next annual submission.

3. Follow-up to previous reviews

40. The ERT noted that some of the recommendations made in previous review reports have been addressed by Iceland. Improvements include: the inclusion of the LULUCF sector in the uncertainty analysis; and the provision of explanatory information on the recalculations performed and the notation keys used in CRF tables 8(b) and 9(a), respectively. However, some recommendations have not been addressed in the 2011 annual submission, such as: the provision in the NIR of detailed information on archiving procedures; and the improvement of the description of QA/QC activities for the energy, waste and LULUCF sectors. The ERT recommends that Iceland implement all the recommendations made in the previous review report. Furthermore, the ERT encourages Iceland to report in the appropriate section of the NIR transparent documentation on the implementation of those recommendations, in accordance with the outline of the NIR

provided in the UNFCCC reporting guidelines, in order to facilitate the review process and increase transparency.

4. Areas for further improvement

Identified by the Party

41. Iceland identified several areas for improvement for its next annual submission:

(a) Establish new formal agreements with NEA and AUI to ensure the availability of the national energy balance and fuel-related information in time for the inventory preparation each year;

(b) Develop a web page to provide information on the GHG emission inventory and the national registry and to report the required public information in accordance with paragraphs 44–48 in section II.E of the annex to decision 13/CMP.1;

(c) Improve the accuracy of the road transportation emission estimates by using the COPERT model;

(d) Improve the accuracy of the estimates of HFC emissions from foam blowing;

(e) Revise the value for annual protein intake in Iceland used when estimating N_2O emissions from domestic wastewater;

(f) Estimate non-methane volatile organic compound (NMVOC) emissions from food and drink production.

Identified by the expert review team

42. During the review, the ERT identified cross-cutting issues for improvement. These are listed in paragraph 148 below.

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

B. Energy

1. Sector overview

44. The energy sector is the main sector in the GHG inventory of Iceland. In 2009, emissions from the energy sector amounted to 2,032.50 Gg CO_2 eq, or 43.7 per cent of total GHG emissions. Since 1990, emissions have increased by 14.0 per cent. The key drivers for the rise in emissions are the increases in emissions from road transportation, geothermal energy use and, to a limited extent, energy industries. Within the sector, 46.6 per cent of the emissions were from transport, followed by 29.7 per cent from fishing, 12.9 per cent from manufacturing industries and construction and 8.6 per cent from geothermal energy. Energy industries accounted for 0.7 per cent. The remaining 1.5 per cent were from the categories residential, commercial and institutional.

45. The Party has made no recalculations for the energy sector between the 2010 and 2011 annual submissions. Iceland continues to base its emission calculations in the energy sector on fuel allocation estimates made by NEA. The absence of a national energy balance limits the level of transparency of the emission calculations. The ERT commends Iceland for continuing to make efforts to develop a national energy balance and for the cooperation between EA and NEA. During the review week, the ERT was informed that a new agreement between EA and NEA is being developed. One of the points in the agreement is that NEA will be required to provide EA with a national energy balance annually. The ERT

welcomes this development and recommends that Iceland complete the agreement between EA and NEA and provide a national energy balance for the next annual submission.

2. Reference and sectoral approaches

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

46. Iceland is not a member of the International Energy Agency (IEA). However, the Party provides data to IEA on a voluntary basis. The data are provided in physical units and IEA uses its own conversion factors to estimate energy units. This may generate differences with the data used by Iceland for its annual submission. The energy data used by Iceland for its annual submission include data collected from energy users, fuel sales data and energy import data. Stock changes are not provided, but are estimated from the differences between sales and imports. This implies possible inaccuracies which in other countries are normally identified and corrected by the energy balance. The sectoral and reference approaches have been converging over time and the difference in 2009 between the estimates calculated using the two approaches is –2.25 per cent. The ERT encourages Iceland to continue with its efforts to compile a national energy balance in a systematic and transparent way.

International bunker fuels

47. Fuel allocation between domestic and international aviation and navigation is done using the receipts of fuel sales to foreign flag carriers. This is not in line with the Revised 1996 IPCC Guidelines or the IPCC good practice guidance, as it does not account for the activity of foreign vessels and aircraft within the national boundaries. Iceland has indicated that it plans to adopt higher-tier methods for estimating emissions from aviation. The ERT recommends that Iceland also adopt a more transparent method for splitting fuel use between local and international navigation. The ERT encourages Iceland to realize these plans and to report thereon in its future annual submissions.

Country-specific issues

48. Iceland relies on geothermal energy for heating (90 per cent of homes) and for 27 per cent of electricity production. As such, CO_2 emissions from geothermal energy account for 3.8 per cent of the Party's total GHG emissions. CO_2 emissions from geothermal energy are estimated using measured data, but CH_4 emissions from geothermal energy are not measured and are reported as "NE". The ERT recommends that Iceland undertake activities to estimate CH_4 emissions from geothermal energy and report on such activities in its next annual submission.

3. Key categories

Public electricity and heat production: waste – CO_2

49. Iceland reports that some of its heat production facilities use municipal waste as fuel. In estimating the resulting emissions, Iceland uses default EFs from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines). This methodology is described under the waste sector and not under the energy sector. Also, Iceland does not provide an explanation, as required, for using the default EFs from the 2006 IPCC Guidelines. The ERT recommends that Iceland provide a description of the methodology used under the energy sector and also provide an explanation for using the default EFs from the 2006 IPCC Guidelines.

Road transportation: liquid fuels – N_2O

50. Fuel allocation to various vehicle-type categories is estimated by NEA. In estimating the N_2O emissions from liquid fuel use in road transportation, Iceland uses default EFs from the higher end of the default range contained in the IPCC good practice guidance. This tends to lead to an overestimation of the N_2O emissions. There are plans to adopt higher-tier methods, through the COPERT database, to allocate fuel use by vehicle type and to estimate N_2O emissions. The ERT recommends that Iceland realize its plans to use the COPERT model and report the data in its next annual submission.

4. Non-key categories

Stationary combustion: liquid fuels – N_2O and CH_4

51. Iceland applies the default net calorific values (NCVs) from the Revised 1996 IPCC Guidelines (43.33 TJ/kt for diesel oil and 40.19 TJ/kt for residual fuel oil) and the default EFs for liquid fuels (20.20 t C/TJ for diesel oil and 21.10 t C/TJ for residual fuel oil) to estimate emissions from stationary fuel combustion. The Revised 1996 IPCC Guidelines provide NCVs based on fuel quality. Given the limited number of stationary combustion sites, Iceland could apply higher-tier methods for estimating emissions from stationary combustion. The ERT recommends that Iceland, in addition to refining its fuel allocation data, apply country-specific EFs for stationary combustion, as this would increase the accuracy of the emission estimates and reduce uncertainty.

Geothermal energy: fugitive – CH_4

52. Iceland is one of the few countries that relies on geothermal energy. The ERT commends Iceland for applying measured data to the estimation of CO_2 emissions from geothermal energy use. CH_4 emissions are, however, reported as "NE". The ERT encourages Iceland to estimate CH_4 emissions from geothermal energy use and to report thereon in its next annual submission, in order to improve completeness.

5. Areas for further improvement

Identified by the Party

53. Planned improvements identified by Iceland include:

(a) Producing the national energy balance;

(b) Estimating emissions from fuel use in aviation by moving to a higher-tier method;

(c) Estimating emissions from road transportation using the COPERT model.

Identified by the expert review team

54. Improvements identified by the ERT include:

(a) Applying higher-tier methods for estimating emissions from stationary combustion of liquid fuels;

(b) Estimating CH_4 emissions from geothermal energy.

C. Industrial processes and solvent and other product use

1. Sector overview

55. In 2009, emissions from the industrial processes sector amounted to 1,828.83 Gg CO_2 eq, or 39.3 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 5.88 Gg CO_2 eq, or 0.1 per cent of total GHG emissions. Since the base year, emissions have increased by 111.9 per cent in the industrial processes sector and decreased by 57.8 per cent in the solvent and other product use sector. The key driver for the rise in emissions in the industrial processes sector is the expansion of aluminium and ferrosilicon production. Within the industrial processes sector, 93.3 per cent of the emissions were from metal production, followed by 5.0 per cent from consumption of halocarbons and SF_6. The remaining 1.6 per cent were from mineral production.

56. The ERT noted that the chapters of the NIR on industrial processes and solvent and other product use have improved considerably since the 2010 annual submission and that almost all the recommendations of the previous ERT were taken into account in the 2011 annual submission. A lot of additional information, AD, EFs, and descriptions of the processes and methodologies used were included in the industrial processes and solvent and other product use chapters. The ERT commends Iceland for these efforts.

Sector-specific issues relating to completeness, transparency and recalculations

57. The ERT noted that Iceland has reported CO_2 emissions as "NE" for some categories in the industrial processes sector for which there are no estimation methodologies in the Revised 1996 IPCC Guidelines or in the IPCC good practice guidance, such as CO_2 emissions from road paving with asphalt, and from food and drink. However, the ERT also noted that NMVOC emissions from food and drink production were not estimated even though default EFs are provided in the Revised 1996 IPCC Guidelines. During the review week, Iceland explained that there were no AD available. Iceland also informed the ERT that production data were collected to estimate emissions from wastewater handling and that these data would be used to estimate NMVOC emissions from food and drink production. The ERT welcomes this decision and encourages Iceland to report thereon in its next annual submission.

58. The ERT noted that transparency has improved since the Party's previous annual submission. However, some explanations and data are still missing, for example the AD on the amount of electrodes used for metal production, and the AD and EFs for mineral wool production in the industrial processes chapter of the NIR, as well as the AD on paint and solvent production in the solvent and other product use chapter. The ERT recommends that Iceland include the missing data and explanations in the NIR of its next annual submission.

59. Iceland reported and justified minor recalculations undertaken for the industrial processes sector due to the refinement of AD, which resulted in the increase of the estimated SF_6 emissions from the industrial processes sector by 7.6 per cent and 5.3 per cent for 1990 and 2008, respectively. The estimate of CO_2 emissions from mineral wool production decreased by 0.02 per cent for 2008. Also, HFC emissions from foam blowing were estimated for the first time for the 2011 annual submission in response to a question raised by the ERT during the review week. The total increase in the estimate of HFC emissions from refrigeration and air conditioning equipment and foam blowing was 0.3 per cent for 2008. However, all these recalculations had no net impact on the estimated total national GHG emissions for 2008. Recalculations for the solvent and other product use sector led to a 5.6 per cent increase in the estimate of CO_2 emissions for 2008 and resulted in a 0.01 per cent increase in the estimate of total national GHG emissions for 2008.

2. Key categories

Ferroalloys production – CO_2

60. Only one plant produces ferroalloys in Iceland. CO_2 emissions from ferrosilicon (FeSi) production are calculated according to the IPCC tier 1a method, which is based on the consumption of reducing agents and electrodes. Although EA collects all the data directly from the plant, the CO_2 EFs are taken from the Revised 1996 IPCC Guidelines and the values for the NCV are taken from the IPCC good practice guidance. The ERT encourages Iceland to collect NCV and carbon content data from the single FeSi producer, and to estimate and apply plant-specific CO_2 EFs for its next annual submission.

61. During the previous review, the ERT raised a question regarding the emissions from the iron part of FeSi production. Iceland informed the current ERT that ready-to-use iron pellets for FeSi production are imported and that no additional emissions occur from the iron part of FeSi production. The ERT recommends that Iceland include this explanation in the NIR of its next annual submission.

Aluminium production – CO_2

62. Three plants produce aluminium in Iceland. Estimated CO_2 emissions were calculated using an IPCC tier 1a method based on the amount of electrodes used. Although EA collects all the data directly from the producers, the EFs are taken from the Revised 1996 IPCC Guidelines and the values for the NCV are taken from the IPCC good practice guidance. The ERT encourages Iceland to collect NCV and carbon content data from the producers, and to estimate and apply plant-specific CO_2 EFs for its next annual submission.

Consumption of HFCs and SF_6: foam blowing – HFCs

63. Iceland reported emissions from foam blowing as "NO", although in the NIR information is provided stating that Iceland imports closed-cell foams. During the review week, Iceland explained that since 2001 hard foams have been imported to the country in tanks for fish export. Emissions from these tanks were not included in the inventory, leading to an underestimation of HFC emissions for the period 2001–2009. Following the recommendation of the ERT, Iceland collected import data and estimated the HFC emissions from these tanks, using the default EFs from the Revised 1996 IPCC Guidelines, and it submitted the revised estimates at the end of the review week. Calculated HFC emissions from foam blowing amounted to 0.47 Gg CO_2 eq for 2008 and 0.39 Gg CO_2 eq for 2009 and resulted in a 0.02 per cent increase in the estimate of total sectoral emissions for 2009.

3. Areas for further improvement

Identified by the Party

64. Iceland has planned the following improvements for the industrial processes and solvent and other product use sectors: the improvement of the estimates of HFC emissions from foam blowing; moving to a tier 2 methodology to estimate SF_6 emissions electrical equipment; and the improvement of the methodologies used (consumption-based) to estimate emissions from the solvent and other product use sector.

Identified by the expert review team

65. The ERT recommends the following improvements for the industrial processes and solvent and other product use sectors: the collection of plant-specific data to estimate CO_2 EFs for FeSi and aluminium production and the provision of relevant explanations in the

NIR; the estimation of HFC emissions from the imported closed-cell foams; and the improvement of the transparency of the industrial processes and solvent and other product use chapters of the NIR by including the missing AD.

4. Information provided under decision 14/CP.7

66. Iceland provided information in the NIR on four projects (one on FeSi production and three on aluminium production) to fulfil the requirements of decision 14/CP.7 on the impact of single projects on emissions in the Kyoto Protocol first commitment period. Electricity produced from renewable energy resources is used in all heavy industry in Iceland and total industrial process CO_2 emissions from these projects amounted to 1,187.00 Gg in 2009. The average CO_2 emissions from electricity production in Iceland were 11.6 g/kWh in 2009. The total CO_2 emission savings from the projects are estimated by Iceland to be 10,100.00 Gg compared with using electricity from coal-fired power plants. The ERT noted that the demonstration of the emission reduction per unit of production is based on a hypothetical case of electricity production being entirely coal-based compared with energy production being entirely based on renewable energy resources. The ERT does not consider this to be a likely substitution and therefore recommends that Iceland estimate the emission reduction compared also with fuel oil and natural gas based electricity production.

67. Iceland compared the CO_2 emissions from the four projects to the total CO_2 emissions excluding LULUCF in Iceland in the base year (1990) as included in document FCCC/CP/1997/7/Add.1 to prove that the projects meet the requirement of decision 14/CP.7 regarding the 5 per cent contribution to the total national CO_2 emissions in the base year. However, the ERT considers that the 5 per cent contribution requirement should be proven by comparison to the total CO_2 emissions in 1990 reported by Iceland, which amounted to 2,158.64 Gg (table 2 of Iceland's initial review report). The ERT recommends that Iceland change the numbers for the projects' contribution to the total CO_2 emissions in 1990 reported in the NIR by basing them on the total CO_2 emissions included in table 2 of Iceland's initial review report.

68. Following the recommendation made in the previous review report, Iceland reported the comparison of the actual project-specific EFs for PFCs with the world's average EF, in order to prove the use of the best available technology for the projects. However, Iceland used the IPCC default EFs to estimate CO_2 emissions from the projects, for both the process and energy parts of the production. The ERT recommends that Iceland collect plant-specific EFs for CO_2 emissions and compare the actual project-specific EFs with the world and/or European benchmarks.

D. Agriculture

1. Sector overview

69. In 2009, emissions from the agriculture sector amounted to 569.78 Gg CO_2 eq, or 12.3 per cent of total GHG emissions. Since the base year, emissions have decreased by 5.3 per cent. The key driver for the fall in emissions is a decrease in the livestock population, such as cattle and sheep. However, since 2006, the emission level has begun to increase, owing to a rise in synthetic fertilizer use. Within the sector, 47.0 per cent of the emissions were from agricultural soils, followed by 43.9 per cent from enteric fermentation. The remaining 9.0 per cent were from manure management.

70. For 2009, the emission estimates for the agriculture sector are complete in terms of geographical coverage, categories and gases, as recommended by the Revised 1996 IPCC Guidelines. To estimate emissions from the agriculture sector, the IPCC tier 1 method and

default EFs were applied for most of the categories, except for the key categories enteric fermentation for cattle and for sheep, for which EFs have been developed using the IPCC tier 2 method and country-specific parameters. The ERT considers that these categories are the most important for Iceland in the agriculture sector and commends the Party again for the recent improvements in the reporting thereof. The ERT encourages Iceland to continue its efforts by developing higher-tier estimation methods for the other key categories in the sector, such as N_2O emissions from agricultural soils, and by updating the current methods used, such as that for estimating CH_4 emissions from enteric fermentation.

71. The transparency of the reporting on the agriculture sector has significantly improved since the 2010 annual submission. In the 2011 NIR, Iceland has provided a significant amount of additional information, in particular on the revision of livestock population data, the equations used to implement a tier 2 methodology consistent with the IPCC good practice guidance, other crop residues and the EFs used for the estimation of emissions from histosols. The ERT commends Iceland for its efforts. However, some improvements are still necessary, and the recommendations of the previous ERT are reiterated with regard to the transparency of the reporting in the NIR of the AD, methodologies and EFs used.

72. Concerning its animal populations, Iceland is in a rather unusual situation, because the animal population data used for its inventory are very different from the official statistics. Iceland explained during the review week that the official statistics have to be corrected because the lifespan of young cattle is not taken into account and young animals for almost all other species (sheep, goats, horses and swine) are not included in the official statistics. The ERT agrees that the IPCC methodologies are based on annual average populations and that the official statistics have to be corrected according to the lifespan of the animals, in order to be fully consistent with the IPCC methodologies and EFs. During the review week, the ERT concluded that this correction was not done completely in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, as animals for replacement were not fully taken into account, which could lead to an underestimation of the populations of sheep, goats and horses.

73. During the review week, this issue was raised as a potential problem and a possible underestimation of emissions and the Party agreed that animals were missing from the inventory. In response to the issues raised, the Party submitted revised emission estimates for sheep, goats and horses before the end of the review week. The revised estimates were accepted by the ERT. The main change regarded the sheep population, which increased from 605,000 heads to 666,000 heads, while the horse and goat populations increased by smaller amounts. As EFs were not developed for animals for replacement, those animals were reported together with the mature animals and using the EFs for mature animals. This leads to an overestimation of emissions. The revised livestock numbers have affected the estimates of CH_4 and N_2O emissions for nearly all agricultural categories: enteric fermentation, manure management and agricultural soils. The ERT recommends that Iceland further improve the methodology used to estimate emissions from animals for replacement and the description of the calculation of its animal populations in its future NIRs. The ERT further recommends that Iceland provide a more detailed description of the method used to collect data (i.e. what information is provided by the annual census, statements from farmers, etc.) for each animal category, which would help the ERT to understand the corrections implemented. Finally, the ERT encourages the Party to reconcile the official statistics with the ones used for its inventory, as far as possible.

74. In its 2011 annual submission, Iceland has included information on QA/QC activities and planned improvements for the agriculture sector in the agriculture chapter of the NIR, as recommended in the previous review report. The ERT noted that the uncertainty estimates for the country-specific EFs have been revised for the 2011 annual

submission, as recommended in the previous review report. The ERT commends Iceland for following the requirements of the UNFCCC reporting guidelines regarding the structure of the NIR and the calculation of uncertainties consistent with the country-specific EFs.

2. Key categories

Enteric fermentation – CH_4

75. Following the recommendation made in previous review reports, Iceland developed country-specific EFs for cattle and sheep, based on the IPCC tier 2 method, reported for the first time in the 2009 annual submission. The Party has chosen to report on enteric fermentation for cattle following reporting option A (dairy cattle versus non-dairy cattle), but, given the information available, Iceland would also be capable of reporting using reporting option B (mature dairy cows, other mature and young animals). The ERT encourages Iceland to explore the possibility of reporting CH_4 emissions from cattle following reporting option B, which would increase the transparency of the reporting.

76. During the review week, the Party provided the ERT with the worksheet showing the calculations of the EFs for enteric fermentation. The ERT commends Iceland for answering with such complete transparency the request of the ERT. Having access to this worksheet provided an opportunity for the ERT to go through the calculations in depth. Overall, the IPCC tier 2 method is generally well implemented, with country-specific data in particular for animal weights, milk production and digestible energy, and the ERT commends the Party for this development. However, the ERT encourages the Party to further improve this method by using, as far as possible, time-dependent series for milk production and digestible energy in particular (milk production and digestible energy are currently estimated only for the most recent years). The ERT recommends that Iceland fill in the additional information tables of the CRF tables with the weighted average of the parameters used in the calculations and provide, in the NIR, a complete summary of the parameters used, together with the adequate references (e.g. expert judgement or statistics).

77. For dairy cattle, the Party used the total annual milk production and the number of days of lactation during the year to calculate the daily milk production (it is assumed that there are 10 months of lactation per year, which is common across the reporting Parties). However, in the IPCC good practice guidance, this parameter is already taken into account in the methodology and the daily milk production should be calculated by dividing the annual production by 365. The Party has agreed that this calculation was incorrect and that, therefore, the EF for enteric fermentation was overestimated. The ERT recommends that the Party correct this calculation for its next annual submission.

78. For other mature sheep (males) and young sheep, the IPCC good practice guidance states that the energy for maintenance is 15 per cent higher than for females. According to the ERT, this parameter was not correctly applied by the Party, because it was applied to the calculation of energy for maintenance instead of energy for activity. Moreover, for young sheep, the weight used in the calculation of the energy for activity is the mature weight instead of the actual weight of the young animal. During the review week, the Party agreed that these calculations were incorrect and had led to an overestimation of CH_4 emissions from sheep.

79. For fur animals, Iceland used the EF from the 2007 NIR of Norway. The previous ERT noted that the approach taken by the Party is not fully in line with the IPCC good practice guidance but is in accordance with the UNFCCC reporting guidelines, according to which Parties should ensure the completeness of their inventory. The current ERT reiterates the comments of the previous review report because no change was implemented in the 2011 NIR and encourages the Party to improve the transparency of its inventory by

providing more information on the CH_4 EF used for fur animals and on the rationale behind the choice of the EF.

Manure management – N_2O

80. Nitrogen (N) excretion rates are based on country-specific data. For high-producing dairy cattle, the N excretion rate increased from 1990 to 2000 and is thereafter assumed to be stable. The ERT encourages the Party to update, as far as possible, the N excretion rate for this category, in accordance with the estimates of food intake calculated using the enteric fermentation tier 2 method.

81. The trend in N excretion from high-producing dairy cows, from 1990 to 2000, is applied to all other cattle. As the N excretion rate strongly increases during this period for high-producing dairy cows, the value for N excretion for all cattle, except high-producing dairy cows, is very low for 1990. This method leads to an underestimation of N excretion for the years before 2000. The ERT recommends that Iceland revise the N excretion rates for cattle other than dairy cows, at least for the period 1990–2000.

Soil emissions – N_2O

82. In Iceland, N_2O emissions from crop residues include emissions from potatoes and barley only. In the previous review report, the ERT recommended that Iceland review the national information sources and demonstrate that indeed only potatoes and barley are cultivated in Iceland. This recommendation was taken into account by the Party and further descriptions have been provided in the 2011 NIR. According to the NIR, only potatoes and barley are growing outdoors in Iceland, because of climatic and soil conditions (from the crops listed in table 4.16 of the IPCC good practice guidance). These crops are on limited acreage and the productions are now provided in a diagram in the NIR. The ERT commends Iceland for this improvement.

83. Following the recommendation made in previous review reports, Iceland has reported emissions from the cultivation of drained organic soils on grassland under the agriculture sector. However, a large amount of N_2O emissions are still reported under wetlands converted to grassland under the LULUCF sector. The ERT noted that land converted from wetlands to grassland is drained land and that some of that land is subject to additional activities aimed at producing hay. The ERT therefore recommends that the Party provide, in its next annual submission, information to demonstrate that drainage and extensive agricultural activities performed on organic soils on unimproved grassland would not qualify as agricultural activities, which would cause N_2O emissions to be reported under the cultivation of histosols category under the agriculture sector.

84. In the 2011 annual submission, Iceland reported N_2O emissions due to the fertilization of revegetated areas under the LULUCF sector. However, according to the IPCC good practice guidance for LULUCF, the fertilization of revegetated areas should be reported under the agriculture sector. In the view of the ERT, this corresponds to an underestimation of N_2O emissions. During the review week, the Party agreed with this finding and submitted revised estimates, which were accepted by the ERT. The revised estimates had an impact on the estimates of both direct and indirect N_2O emissions and represented an overall increase of 16.6 t N_2O for 2009.

85. Following the recommendation made in previous review reports, Iceland has reported emissions from the cultivation of drained organic soils on grassland under the agriculture sector. To estimate N_2O direct soil emissions, Iceland uses a country-specific EF (0.97 kg N_2O-N/ha, although the IPCC default value is 8 kg N_2O-N/ha). The previous review report recommended that Iceland provide a more detailed explanation in the NIR for the use of this EF. Following this recommendation, Iceland has provided further

explanation in the 2011 NIR on the reference used for the organic soil EF. The low value used by Iceland is now more understandable insofar as the IPCC value is relevant to tilled drained soils, while in Iceland drained soils are on grassland without tillage. The current ERT commends Iceland for this improvement.

86. The same AD for the cultivation of histosols are reported for the years 1990–2008 (54,094 ha/year), with a decrease in the area reported for 2009 (52,914 ha/year). During the review week, the Party agreed that this was an error and submitted revised emission estimates (the revision represents an increase in emissions of 0.1 t N_2O for 2009), which were accepted by the ERT.

3. Non-key categories

Manure management – CH_4

87. Iceland estimated CH_4 emissions from manure management using the tier 1 method and default EFs for the Western European cool climate region taken from the Revised 1996 IPCC Guidelines. Iceland reported in the NIR that the use of these EFs may have led to an overestimation of emissions from native Icelandic livestock, in particular for cows, sheep and horses, which are smaller than the animals in Western Europe. Moreover, according to the ERT, it would be possible to use the manure management systems used for the calculation of N_2O emissions to estimate the EFs for CH_4 emissions. The ERT reiterates the encouragement made in the previous review report that the Party explore the possibility of applying higher-tier estimation methods for the most significant animal types in order to improve the accuracy of the corresponding emission estimates in its next annual submission.

4. Areas for further improvement

Identified by the Party

88. According to the 2011 NIR, the AD and EFs are constantly being revised by Iceland for each of its annual submissions. This is especially the case for the EFs for enteric fermentation for dairy cows, insofar as the EFs are dependent on milk yields. There are some planned revisions and improvements to the N excretion rates for livestock feed intake. The Party is planning to reconsider the shares of the different manure management systems in Iceland for sheep for the next annual submission, since lambs are mainly raised on Icelandic pastures.

Identified by the expert review team

89. The ERT identified that the main improvements to the agriculture sector of the inventory can be implemented by incorporating the times series into the calculation of the EFs for enteric fermentation for cattle and sheep, in particular for milk production and digestible energy. Ideally, this revision could be performed in accordance with the N excretion rates of the animals. Indeed, the EFs for enteric fermentation and N excretion rates are linked with animal performance and it is important to maintain consistency between these two parameters. The ERT encourages Iceland to improve the inventory by implementing a higher-tier methodology to estimate CH_4 emissions from manure management.

E. Land use, land-use change and forestry

1. Sector overview

90. In 2009, net emissions from the LULUCF sector amounted to 677.29 Gg CO_2 eq. Since the base year, net emissions have decreased by 38.6 per cent. The key drivers for the rise in removals are the increases in afforestation, reforestation and revegetation activities. Within the sector, net emissions were from wetlands converted to cropland (991.3 Gg CO_2 eq), wetlands converted to grassland (307.40 Gg CO_2 eq), land converted to wetlands (18.05 Gg CO_2 eq) and cropland remaining cropland (4.02 Gg CO_2 eq), while net removals were from other land converted to grassland (–439.38 Gg CO_2 eq), land converted to forest land (–158.41 Gg CO_2 eq), forest land remaining forest land (–100.49 Gg CO_2 eq) and grassland remaining grassland (–18.07 Gg CO_2 eq).

91. The Party has made recalculations for the LULUCF sector between the 2010 and 2011 annual submissions, in response to the recommendations made in the previous review report, owing to improvements in AD and EFs. The impact of these recalculations on the emission estimates for the LULUCF sector is a 64.3 per cent decrease in the estimated net emissions for 2008. The main recalculations took place in the following categories: grassland, forest land and wetlands.

92. The Party did not provide estimates for the following mandatory categories: carbon stock changes in soil organic matter in mineral soils for cropland remaining cropland, land converted to cropland, grassland remaining grassland and land converted to grassland; CO_2 emissions from biomass burning; and carbon stock changes in all carbon pools on land subject to deforestation since 1990.

93. The Party did not provide a consistent land representation for each land use and land-use change category. To achieve this goal, the ERT recommends that Iceland:

(a) Select a conversion period for each land-use conversion (it is noted that the conversion period for land uses converted to forest land is 50 years);

(b) Use available data applying available IPCC methods for gap-filling and ensuring the consistency of the time series;

(c) Produce a series of annual land-use and land-use change matrices to identify and track, according to selected conversion periods, all land uses and land-use changes;

(d) Ensure consistency in the AD for organic soils among land-use categories and between the LULUCF sector and the agriculture sector.

94. Furthermore, the ERT recommends that Iceland reconsider the current correspondence of the map layers of the Icelandic Geographic Land-Use Database (IGLUD) to the six IPCC land-use categories. In particular:

(a) Under the land-use category grassland, the IGLUD map layer “cultivated land” (see table 7.2 of the NIR) is included, although, according to the IPCC definitions, all cultivated land, excluding forest plantations, and all cropland should be reported under the cropland land-use category;

(b) The IGLUD map layer “cropland and pasture” should also be reported also under the cropland land-use category in NIR table 7.2;

(c) Under the land-use category wetlands, the IGLUD map layer “semi-wetland/wetland complex” is included, which encompasses lands, including drained land, where soil is generally wet but without standing water, although, according to the IPCC definitions, only land that is covered or saturated by water for all or part of the year should

be reported under wetlands. This map layer should be reported under the land-use category grassland in NIR table 7.2;

(d) Under the land-use category other land, the IGLUD map layers encompass areas with revegetation cover of less than 33 per cent and original vegetation cover of less than 20 per cent, although, according to the IPCC definitions, only land without carbon stocks (i.e. land with vegetation cover of less than X (a chosen value) per cent (maybe 10 per cent in analogy with the cover-threshold in the forest definition)), should be reported under the land-use category other land.

95. The information reported in the NIR does not allow for a complete assessment of the methods and data used for the preparation of estimates for the LULUCF sector. The ERT therefore recommends that the Party provide, in its next annual submission, all relevant information needed to allow the ERT to assess the reported estimates. The information should, for each estimated category, include:

(a) Definition (which areas/sources/carbon pools are included in the estimated category);

(b) Method applied (a methodological description or reference to the IPCC good practice guidance for LULUCF);

(c) Assumptions (not needed in the case of the use of an IPCC method);

(d) Equations (just reference to IPCC equations where an IPCC method is applied);

(e) Parameters (just reference to the relevant IPCC table where IPCC factors are applied);

(f) Input data (the time series of the relevant background data reported in the tables).

2. Key categories

Forest land remaining forest land – CO_2

96. Carbon stock changes in living biomass on forest land remaining forest land increased by 6,865.7 per cent from 1990 to 2009. The reported trend is the consequence of incompleteness in the time series of data, as natural birch forests have been reported from 2000 onwards only. The ERT recommends that the Party apply available methods from the IPCC good practice guidance for LULUCF to fill in the missing data from 1990 to 2000, in order to provide, in its next annual submission, consistent estimates.

Land converted to cropland – CO_2

97. Carbon stock changes in soil organic matter in mineral soils have not been included in the inventory but are reported as “NE” and “NO”. The ERT recommends that the Party select a conversion period, if the IPCC default period of 20 years is not considered appropriate, and apply the default IPCC method to provide estimates of carbon stock changes in soil organic matter in mineral soils in its next annual submission.

98. Former wetlands with drained organic soils are assumed to have all been drained before 1990 and to be in conversion as far as the organic soils emit CO_2. This approach is not consistent with the IPCC good practice guidance for LULUCF. The ERT recommends that the Party select a conversion period and report converted areas under the cropland remaining cropland category at the end of the conversion period, while continuing to apply the relevant EFs for estimating carbon losses as far as the soils are classified as organic.

Land converted to grassland – CO_2

99. Carbon stock changes in soil organic matter in mineral soils have not been included in the inventory but are reported as "NE" and "NO", except for other land converted to grassland. The ERT recommends that the Party select a conversion period, if the IPCC default period of 20 years is not considered appropriate, and apply the default IPCC method to provide estimates of carbon stock changes in soil organic matter in mineral soils in its next annual submission.

100. Former wetlands with drained organic soils are assumed to have all been drained before 1990 and to be in conversion as far as the organic soils emit CO_2. This approach is not consistent with the IPCC good practice guidance for LULUCF. The ERT recommends that Iceland select a conversion period and report converted areas under the grassland remaining grassland category at the end of the conversion period, while continuing to apply the relevant EFs for estimating carbon losses as far as the soils are classified as organic.

3. Non-key categories

Cropland remaining cropland – CO_2

101. Carbon stock changes in soil organic matter on cropland remaining cropland have not been estimated, assuming no changes in management practices since 1990. However, in the NIR the Party reported that in 2009 the agricultural statistics from FAI on cultivated land added up to an amount that is three quarters of the amount reported for the same year in the CRF tables. This inconsistency indicates the presence of cropland set aside or left uncultivated in the year in which soil organic matter is expected to increase, as also stated on page 160 of the NIR. Therefore, the ERT recommends that the Party use all available information to prepare a consistent time series of estimates of soil organic matter carbon stock changes in mineral soils, to be included in its next annual submission.

Grassland remaining grassland – CO_2

102. Carbon stock changes in soil organic matter on grassland remaining grassland have not been estimated, assuming no changes in management practices since 1990. The ERT encourages the Party to either provide information supporting the given assumption or use all available information to prepare a consistent time series of estimates of soil organic matter carbon stock changes in mineral soils, to be included in its next annual submission.

Biomass burning – CO_2

103. According to answers provided by Iceland during the review week, some additional sources of data on areas burnt by fires are available in Iceland, although the Party reported emissions from biomass burning for 2006 only. Moreover, CO_2 emissions from forest fires have not been reported, although the gain-loss method is applied by Iceland for estimating carbon stock changes in living biomass on forest land. The ERT encourages the Party to collect additional available data on burnt areas and recommends that Iceland provide complete estimates, including of CO_2 emissions, for each year for which AD are available.

4. Areas for further improvement

Identified by the Party

104. The main improvements identified by the Party are:

(a) For forest land, soil, litter and vegetation other than trees are included as part of the National Forest Inventory sampling, so more accurate estimates are expected when new data from permanent sample plots are available;

(b) For cropland, the subdivision of cropland into soil classes and cultivated crops, and the development of country-specific EFs for organic soils, stratified by variability in soil classes;

(c) For grassland, the estimation of carbon stock changes in mineral soils due to changes in management practices and the extension of drained soils.

Identified by the expert review team

105. The ERT recommends that Iceland complete the time series of annual burnt areas and report estimates of CO_2 emissions from as well as of carbon stock changes in soil organic matter on grassland remaining grassland, which have not currently been estimated on the assumption that there have been no changes in management practices since 1990. The ERT encourages the Party to either provide information supporting the given assumption or use all available information to prepare a consistent time series of estimates of soil organic matter carbon stock changes in mineral soils, to be submitted in its next annual submission.

F. Waste

1. Sector overview

106. In 2009, emissions from the waste sector amounted to 212.09 Gg CO_2 eq, or 4.6 per cent of total GHG emissions. Since the base year, emissions have increased by 18.1 per cent. The key driver for the rise in emissions is the increase in CH_4 emissions from solid waste disposal on land (by 37.9 per cent), followed by the increase in N_2O and CH_4 emissions from wastewater handling (with increases of 24.2 per cent for N_2O and 19.1 per cent for CH_4, totalling a 20.8 per cent increase). Within the sector, 87.0 per cent of the emissions were from solid waste disposal on land, followed by 11.5 per cent from wastewater handling, 1.1 per cent from waste composting and 0.4 per cent from waste incineration. Waste composting is a fast-growing category; emissions from waste composting began in 1995 and have increased since then by 545.7 per cent. Conversely, emissions from waste incineration began decreasing when Iceland began incinerating the biogenic part of the waste for energy purposes. By 2009, total emissions from waste incineration had decreased by 96.6 per cent compared with the base year level.

107. The Party has made recalculations for the waste sector between the 2010 and 2011 annual submissions, owing to identified errors in the allocation of AD to different portions of waste and incorrect calculations identified for waste incineration. The main recalculations were in the following categories: waste incineration and solid waste disposal on land. The impact of these recalculations on the emission estimates for the waste sector is negligible for waste incineration and amounts to a 0.02 per cent increase in the emission estimate for solid waste disposal on land for 2008.

108. The ERT identified some inconsistencies between the figures reported in the NIR and those in the CRF tables, and found the description of the sector not to be transparent. The ERT recommends that the Party improve the transparency of the NIR by providing a more detailed description of the sector and enhance its QA/QC procedures for the sector.

2. Key categories

Solid waste disposal on land – CH_4

109. Iceland uses the method from the 2006 IPCC Guidelines for this category and its waste model (the so-called IPCC waste model) for estimating CH_4 emissions from solid waste disposal on land. The first order decay method implied in the model is fully consistent with the IPCC good practice guidance. All the EFs and parameters used are

default values from the 2006 IPCC Guidelines. The AD are based on real figures and extrapolated estimates. Solid waste is divided by management practices (managed, unmanaged and uncategorized) and into municipal and industrial solid waste. Construction and demolition industrial waste is excluded from the calculations. Landfilled waste is divided into various components according to the model. The composition and distribution/percentage of the waste is based on a national survey conducted for the years 1999–2004, which is used for the estimations (using gross domestic product as a proxy) for the other years.

110. The category shows a significant decrease in CH_4 emissions for the last years of the time series, owing to the growing incineration of waste for energy purposes, and the beginning of recycling (in 1994), CH_4 recovery (in 1997) and waste composting (in 1995). As a result, only 33 per cent of all solid waste generated in the country is landfilled. The ERT recommends that Iceland clearly describe the process of solid waste treatment in the country and provide figures for the portions of the total generated waste distributed among the different treatment practices.

111. Iceland checked the classification of industrial solid waste and made recalculations for the waste generation rate (per capita/per year) to ensure a better allocation of the components of solid waste to recycled or industrial waste. The ERT encourages the Party to further explore the components of the solid waste landfilled and to make appropriate reclassifications if necessary.

112. The ERT reiterates the recommendation made in the previous review report that Iceland explore the possibility of updating the composition of solid waste so that it reflects the changeable economic conditions in the country. The ERT encourages Iceland to explore the possibility of establishing country-specific EFs, to the extent possible.

Waste incineration – CO_2

113. This category refers to waste incineration without energy recovery; the part of the waste incinerated with energy recovery is reported under the energy sector. The methodology for estimating emissions for the category (tier 1) and the parameters chosen are consistent with the IPCC good practice guidance and the 2006 IPCC Guidelines. The emissions show a drastic decrease as more and more of the waste is incinerated for energy purposes. The total waste incinerated includes municipal, medical and hazardous waste portions, and waste used for bonfires (open burning) during New Year festivals. The ERT recommends that Iceland provide shares/percentages and a description of the medical and hazardous waste fractions in the waste incinerated in its next annual submission. The ERT encourages Iceland to further improve the quality of the AD and to explore the possibility of establishing country-specific EFs.

114. Recalculations performed due to incorrect calculations identified in the previous annual submission resulted in an insignificant increase in the estimated total sectoral emissions. Iceland included information in the NIR on the AD used for the category, as recommended in the previous review report.

115. The ERT reiterates a part of the recommendation made in the previous review report that the Party provide an explanation of the reasons behind the fluctuating trend in the time series waste incineration in its next annual submission.

3. Non-key categories

Wastewater handling – CH_4 and N_2O

116. The estimation methods used for this category are in line with the IPCC good practice guidance. CH_4 emissions from industrial as well as from domestic and commercial

wastewater are estimated using a model; wastewater and sludge are estimated together. The industries selected are fisheries, beer production, dairy, meat and poultry, and vegetables. Most EFs are default values from the IPCC good practice guidance, while some EFs are taken from a Scandinavian study. CH_4 emissions are low and show a slow increase throughout the period 1990–2009. The ERT recommends that Iceland fill in the documentation and additional information boxes of CRF table 6.B and provide information about the destination of the wastewater sludge after its removal. The ERT encourages the Party to improve the data collection process and the reporting of the AD for its next annual submission.

117. N_2O emissions from human sewage are estimated in line with the IPCC good practice guidance. The data for protein intake are taken from a national survey for the years 2003–2004, not reflecting changes in the country's economic conditions. The ERT reiterates the recommendation made in the previous review report that the Party study the possibility of updating its annual protein intake value from the nutrition statistics of the Food and Agriculture Organization of the United Nations if no country-specific data are available.

Other (composting) – CH_4 and N_2O

118. Waste composting began in Iceland in 1995 and has shown a steady increase since then. The methodology used to estimate CH_4 and N_2O emissions from composting is in line with the 2006 IPCC Guidelines. The AD are collected by NEA (real AD directly from the composting facilities have been available since 1999, while other AD are estimates, based on expert judgement) and include mainly waste from slaughterhouses, and garden and park waste. The EFs used are default values from the 2006 IPCC Guidelines. The ERT recommends that the Party explore ways of further improving the AD and emission estimates, as the category shows an increasing trend in emissions.

4. Areas for further improvement

Identified by the Party

119. Iceland has planned the following improvements for the waste sector: to improve the quality of the AD for waste composting by revising new data as they are received; to revise data collected from Grimsey Island on incinerated waste; and to establish an updated value for annual protein intake.

Identified by the expert review team

120. The ERT recommends the following improvements for the waste sector: to improve the reporting (description) on the total amount of waste and its portions for recycling, incineration (for energy purposes), CH_4 recovery and composting; to update the municipal solid waste composition; to identify the allocation of wastewater sludge (solid waste disposal on land/composting/incineration); and to establish country-specific EFs where possible.

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

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

Overview

121. The ERT noted that the information reported in the NIR does not allow a complete assessment of the method and data used for preparing the estimates for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT therefore recommends that the Party provide, in its next annual submission, all relevant information needed to allow the ERT to assess the reported estimates. The information should, for each estimated category, include:

(a) Definition (which areas/sources/carbon pools are included in the estimated category);

(b) Method applied (a methodological description or reference to the IPCC good practice guidance for LULUCF);

(c) Assumptions (not needed in the case of the use of an IPCC method);

(d) Equations (just reference to IPCC equations where an IPCC method is applied);

(e) Parameters (just reference to the relevant IPCC table where IPCC factors are applied);

(f) Input data (the time series of the relevant background data reported in the tables).

122. The ERT also noted that complete and transparent information on data collection and archiving and the registration procedures for areas subject to afforestation and reforestation, deforestation and revegetation has not been reported. Considering that the information provided during the review week is evidence of the capacity of the national system to identify and track land and units of land subject to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, the ERT recommends that the Party provide, in its next annual submission, complete and transparent information on:

(a) How areas subject to afforestation and reforestation, and deforestation are identified;

(b) Registration procedures for areas subject to afforestation and reforestation or deforestation;

(c) Control/monitoring procedures for registered areas;

(d) The archiving of information and access to that information;

(e) The liability of the administrative bodies for each of the above-listed elements.

123. The Party reported for 2008 and 2009 estimates for afforestation and reforestation and for the elected activity revegetation, for which estimates for 1990 have been reported as well. Iceland reported deforestation as not applicable.

124. The Party has made recalculations for the KP-LULUCF activities between the 2010 and 2011 annual submissions, owing to changes in AD and EFs. The impact of these recalculations on the estimated removals from each KP-LULUCF activity for 2008 is as follows:

(a) Estimated removals from afforestation and reforestation increased by 10.9 per cent, owing to an increase in the reported net removals;

(b) Estimated removals from revegetation decreased by 27.3 per cent, owing to a decrease in the reported net removals.

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

Afforestation and reforestation – CO_2

125. The ERT noted that carbon losses due to mortality and other disturbances have not been estimated. This incompleteness results in a potential overestimation of net removals; therefore, the ERT recommends that Iceland complete its estimates for afforestation and reforestation activities by including emissions due to forest disturbances.

Deforestation – CO_2

126. The Party did not report estimates under deforestation; however, during the review week, preliminary estimates were provided that show the capability of the national system to identify and track units of land subject to deforestation. The ERT recommends that the Party report, in its next annual submission, estimates for deforestation for 2008, 2009 and 2010.

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

Revegetation – CO_2

127. Iceland reported carbon stock changes in litter in the soil organic matter pool together with carbon stock changes in soil carbon. The ERT noted that this is not consistent with the IPCC good practice guidance for LULUCF and recommends that the Party report carbon stock changes in litter under the proper litter pool in its next annual submission.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

128. Iceland has not reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. This is because Iceland has not yet transferred or acquired any Kyoto Protocol units. The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10.

129. It was noted in the SIAR that the national registry continues to fulfil the requirements related to its reporting and accounting of information on Kyoto Protocol units, transaction procedures, conformance to technical standards, and security, data integrity and recovery measures.

National registry

130. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its findings that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. However, the SIAR identified that the national registry has not fulfilled the requirements regarding the public

availability of information in accordance with section II.E of the annex to decision 13/CMP.1. The SIAR assessor recommended that Iceland make available or provide information on the public website regarding the required public information in accordance with paragraphs 44–48 in section II.E of the annex to decision 13/CMP.1. The ERT recommends that Iceland address this problem and report the results in its next annual submission.

Calculation of the commitment period reserve

131. Iceland has reported its commitment period reserve in its 2011 annual submission. The Party reported that its commitment period reserve has not changed since the initial report review (16,671,462 t CO_2 eq), as it is based on the assigned amount and not on the most recently reviewed inventory. The ERT agrees with this figure.

3. Changes to the national system

132. Iceland reported that there have been no changes to its national system since its previous annual submission. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

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

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

134. Iceland has reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1, in its 2011 annual submission. The information is contained in the relevant chapter of the NIR.

135. The reported information is considered complete and transparent and was submitted on time.

136. Iceland did not provide information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, in its 2011 annual submission. However, in response to questions raised by the ERT during the review week, the Party acknowledged that no changes had occurred in its reporting under Article 3, paragraph 14. The ERT recommends that Iceland verify, in its next annual submission, whether there are changes in the reported information relating to the minimization of adverse impacts in accordance with Article 3, paragraph 14, and either report on those changes, in accordance with chapter I.H of the annex to decision 15/CMP.1, or, if there are no changes, report that no changes have occurred.

III. Conclusions and recommendations

137. Iceland submitted its CRF tables on 16 April 2011 and the NIR was submitted on 13 May 2011. In response to questions raised by the ERT during the review week, a complete set of CRF tables was resubmitted on 27 August 2011, including revised emission

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

138. The ERT concludes that the inventory submission of Iceland has been prepared and the information therein reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and the Party has submitted a complete set of CRF tables for the years 1990–2009 and an NIR; these are complete in terms of geographical coverage, years and sectors, but only generally complete in terms of categories and gases. Some of the categories, particularly in the LULUCF sector (carbon stock changes in soil organic matter in mineral soils for cropland remaining cropland, land converted to cropland, grassland remaining grassland, land converted to grassland; CO_2 emissions from biomass burning; and carbon stock changes in all carbon pools on land subject to deforestation since 1990), were reported as "NE" and "NO".

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

140. The Party's inventory is in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. Improving on last year's annual submission, in its 2011 annual submission Iceland provided full explanations of the recalculations performed and the notation keys used in CRF tables 8(b) and 9(a), respectively. The ERT commends Iceland for this improvement in transparency.

141. The Party has performed recalculations for the inventory between the 2010 and 2011 annual submissions, owing mainly to changes in AD, resulting in an increase in the estimate of total GHG emissions of 0.001 per cent for 2008. In response to questions raised by the ERT during the review, Iceland submitted revised emission estimates. The impact of these revised estimates on the national totals was an increase in estimated GHG emissions of 0.61 per cent for 2008. The revised emission estimates were submitted for the following sectors/categories:

(a) HFC emissions from foam blowing;

(b) CH_4 and N_2O emissions from the agriculture sector.

142. Iceland selected commitment period accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The reporting is mostly in line with the requirements outlined in paragraphs 5–9 of the annex to decision 15/CMP.1, with the exception of the information on land areas subject to KP-LULUCF activities in the land-transition matrix (see para. 121 above).

143. Iceland has not reported information on its accounting of Kyoto Protocol units in accordance with chapter I.E of the annex to decision 15/CMP.1, as it has not yet transferred any Kyoto Protocol units.

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

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

146. Iceland has reported information under chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14",

as part of its 2011 annual submission. The information provided is considered complete and transparent.

147. Iceland provided information in the NIR to fulfil the requirement of decision 14/CP.7 on the impact of single projects on emissions in the Kyoto Protocol first commitment period. Four projects on ferroalloys production and aluminium production are reported by Iceland in order to fulfil the relevant provision of decision 14/CP.7 in 2008 and 2009. Electricity produced from renewable energy resources is used in all four plants and total industrial processes CO_2 emissions from these projects amounted to 1,163 Gg in 2008 and 1,187 Gg in 2009. Iceland will undertake the accounting with respect to decision 14/CP.7 at the end of the commitment period.

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

(a) Improve the institutional arrangements with NEA and AUI and explore improved cooperation with Statistics Iceland;

(b) Revise the key category analysis, providing a list of all the categories in the relevant table in the NIR, in order to enhance the transparency of the reporting (see para. 29 above);

(c) Improve the documentation and description of QA/QC and verification activities in the NIR (see para. 36 above);

(d) Improve the QA/QC activities (some errors and inconsistencies have been detected for different sectors) (see para. 37 above);

(e) Improve the transparency of the reporting by including transparent explanations of the methodologies used, the trends in emission estimates, and the choice of AD and EFs (see para. 38 above);

(f) Improve the transparency of the information on the KP-LULUCF estimates (see paras. 121 and 122 above);

(g) Improve the calculation and reporting of the KP-LULUCF emission estimates (see paras. 125 and 127 above);

(h) Provide the the required public information in accordance with paragraphs 44–48 in section II.E of the annex to decision 13/CMP.1 on the public national registry website (see para. 130 above).

149. In the course of the review, the ERT formulated a number of recommendations relating to the completeness of the annual submission and the transparency of the information presented in Iceland's annual submission. The key recommendations are that Iceland:

(a) Estimate emissions and removals for those categories for which estimation methods are available in the IPCC good practice guidance for LULUCF (see para. 22 above);

(b) Develop the national energy balance and obtain the relevant fuel-related information (see para. 45 above);

(c) Apply higher-tier estimation methods for the road transportation and stationary combustion categories in the energy sector (see paras.50, 51 and 54 above);

(d) Collect plant-specific data to estimate CO_2 EFs for FeSi and aluminium production and provide relevant explanations in the NIR (see para. 65 above);

(e) Apply higher-tier estimation methods in the agriculture sector, introducing country-specific parameters (see para. 89 above);

(f) Fill in the additional information tables of the CRF tables for the agriculture and waste sectors (see paras. 76 and 116 above);

(g) Improve the land representation for each land use (see para. 93 above);

(h) Improve the information on land areas subject to KP-LULUCF activities in the land-transition matrix (see para. 121 above);

(i) Establish country-specific EFs and parameters, where possible, for the estimation of CH_4 emissions from solid waste disposal on land (see para. 112 above).

IV. Questions of implementation

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

Annex I

Documents and information used during the review

A. Reference documents

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

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

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

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*.
Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>.

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

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

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

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

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

Status report for Iceland 2011.
Available at <http://unfccc.int/resource/docs/2011/asr/isl.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2011.
Available at <http://unfccc.int/resource/webdocs/sai/2011.pdf>.

FCCC/ARR/2010/ISL. Report of the individual review of the annual submission of Iceland submitted in 2010.
Available at <http://unfccc.int/resource/docs/2011/arr/isl.pdf>.

UNFCCC. *Standard independent assessment report*, parts I and II. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Birna Sigrún Hallsdóttir and Ms. Ragnhildur Guðrún Finnbjörnsdóttir (Environment Agency of Iceland), including additional material on the methodologies and assumptions used. The following documents[1] were also provided by Iceland:

Arnor Snorasson et al, *Carbon sequestration in forest plantations in Iceland*, in Buvisindi, Iceland Agriculture Science, 15, 2002: 81-93.

Brynhildur Bjarnadottir, *Carbon stock and fluxes in a young Siberian larch (Larix sibirica) plantation in Iceland*, doctoral dissertation in the Lund University (Sweden), June 2009, ISBN 978-91-85793-07-5

[1] Reproduced as received from the Party.

Annex II

Acronyms and abbreviations

AD	activity data
AUI	Agricultural University of Iceland
C	carbon
CH_4	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EA	Environment Agency of Iceland
EF	emission factor
ERT	expert review team
FAI	Farmers Association of Iceland
FeSi	ferrosilicon
Gg	gigagram
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IEA	International Energy Agency
IGLUD	Icelandic Geographic Land-Use Database
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1,000 grams)
kt	kilotonne
LULUCF	land use, land-use change and forestry
MFE	Ministry for the Environment
N	nitrogen
NA	not applicable
N_2O	nitrous oxide
NCV	net calorific value
NE	not estimated
NEA	National Energy Authority
NIR	national inventory report
NMVOC	non-methane volatile organic compound
NO	not occurring
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change