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**Report of the individual review of the annual submission of
Iceland submitted in 2012***

* In the symbol for this document, 2012 refers to the year in which the inventory was submitted, and not to the year of publication.

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I. Introduction and summary

1. This report covers the centralized review of the 2012 annual submission of Iceland, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 10 to 15 September 2012 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Suvi Monni (Finland) and Mr. Justin Goodwin (United Kingdom of Great Britain and Northern Ireland); energy – Mr. Peter Seizov (Bulgaria), Ms. Rianne Dröge (Netherlands) and Mr. Ali Can (Turkey); industrial processes – Mr. Mauro Meirelles de Oliveira Santos (Brazil) and Mr. Cheon-Hee Bang (Republic of Korea); agriculture – Mr. Sorin Deaconu (Romania) and Mr. Mahmood Medany (Egypt); land use, land-use change and forestry (LULUCF) – Mr. Kevin Black (Ireland), Mr. Atsushi Sato (Japan) and Mr. Erik Karlton (Sweden); and waste – Ms. Juliana Boateng (Ghana) and Mr. Qingxian Gao (China). Mr. Meirelles de Oliveira Santos and Mr. Goodwin were the lead reviewers. The review was coordinated by Mr. Matthew Dudley (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 2010, the main greenhouse gas (GHG) in Iceland was carbon dioxide (CO₂), accounting for 75.0 per cent of total GHG emissions¹ expressed in CO₂ eq, followed by nitrous oxide (N₂O) (10.1 per cent) and methane (CH₄) (10.1 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 4.8 per cent of the overall GHG emissions in the country. The energy sector accounted for 41.1 per cent of total GHG emissions, followed by industrial processes (39.8 per cent), agriculture (14.2 per cent), waste (4.7 per cent) and solvent and other product use (0.1 per cent). Total GHG emissions amounted to 4,542.05 Gg CO₂ eq and increased by 29.7 per cent between the base year² and 2010.

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, CO₂, CH₄ and N₂O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

5. Tables 3–5 provide 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 CO₂ 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^a to 2010

		Gg CO ₂ eq								Change (%)	
		Greenhouse gas	Base year ^a	1990	1995	2000	2005	2008	2009	2010	Base year –2010
Annex A sources		CO ₂	2 153.50	2 153.50	2 310.62	2 751.75	2 844.14	3 578.98	3 546.06	3 404.91	58.1
		CH ₄	409.36	409.36	427.06	448.76	457.74	468.88	467.81	460.40	12.5
		N ₂ O	517.74	517.74	475.91	495.23	451.67	506.96	472.43	457.16	–11.7
		HFCs	NA, NE, NO	NA, NE, NO	0.34	19.13	35.13	48.60	55.24	69.00	NA
		PFCs	419.63	419.63	58.84	127.16	26.10	349.00	152.75	145.63	–65.3
		SF ₆	1.13	1.13	1.46	3.05	4.23	6.26	5.94	4.95	339.6
KP-LULUCF	Article 3.3 ^b	CO ₂						–147.54	–158.85	–171.62	
		CH ₄						NA	NA	NA	
		N ₂ O						0.11	0.12	0.12	
	Article 3.4 ^c	CO ₂	–349.12				–501.53	–508.71	–515.98	47.8	
		CH ₄	NA				NA	NA	NA	NA	
		N ₂ O	NA				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 2010

		<i>Gg CO₂ eq</i>								<i>Change (%)</i>
		<i>Base year^a</i>	<i>1990</i>	<i>1995</i>	<i>2000</i>	<i>2005</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>Base year –2010</i>
<i>Sector</i>										
Annex A	Energy	1 778.29	1 778.29	1 915.68	2 041.00	2 075.05	2 071.91	2 018.03	1 866.30	4.9
	Industrial processes	862.99	862.99	531.03	937.72	904.19	1 974.46	1 797.87	1 809.63	109.7
	Solvent and other product use	9.07	9.07	7.51	8.31	6.88	7.18	6.31	6.15	–32.2
	Agriculture	703.12	703.12	635.57	652.88	609.96	678.96	654.43	646.17	–8.1
	Waste	147.89	147.89	184.45	205.17	222.92	226.18	223.59	213.80	44.6
LULUCF		NA	1 188.33	1 131.33	1 002.81	877.22	793.84	759.06	733.80	NA
Total (with LULUCF)		NA	4 689.69	4 405.57	4 847.89	4 696.22	5 752.52	5 459.28	5 275.85	NA
Total (without LULUCF)		3 501.36	3 501.36	3 274.23	3 845.09	3 819.00	4 958.68	4 700.22	4 542.05	29.7
Other ^b		NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3 ^c									
	Afforestation and reforestation						–147.43	–158.72	–171.88	
	Deforestation						NA	NA	0.38	
	Total (3.3)						–147.43	–158.72	–171.50	
	Article 3.4 ^d									
	Forest management						NA	NA	NA	
	Cropland management	NA					NA	NA	NA	NA
	Grazing land management	NA					NA	NA	NA	NA
	Revegetation	–349.12					–501.53	–508.71	–515.98	2.9
Total (3.4)		–349.12					–501.53	–508.71	–515.98	2.9

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, LULUCF = land use, land-use change and forestry, 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 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 CO₂ eq for
the year 2010, including the commitment period reserve

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Commitment period reserve	16 671 462			16 671 462
Annex A emissions for current inventory year				
CO ₂	3 404 909			3 404 909
CH ₄	460 402			460 402
N ₂ O	457 164			457 164
HFCs	69 003			69 003
PFCs	145 629			145 629
SF ₆	4 948			4 948
Total Annex A sources	4 542 054			4 542 054
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	-171 767	-171 881		-171 881
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	254	377		377
Activities under Article 3, paragraph 4, for current inventory year^c				
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	-515 981			-515 981
3.4 Revegetation in base year	-349 120			-349 120

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

Table 4
Information to be included in the compilation and accounting database in t CO₂ eq for the year 2009

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Annex A emissions for 2009				
CO ₂	3 546 057			3 546 057
CH ₄	467 813			467 813
N ₂ O	472 433			472 433
HFCs	55 238			55 238
PFCs	152 746			152 746
SF ₆	5 938			5 938
Total Annex A sources	4 700 224			4 700 224
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009 as reported	-158 611	-158 724		-158 724
3.3 Afforestation and reforestation on harvested land for 2009 as reported	NA			NA
3.3 Deforestation for 2009 as reported	NA			NA
Activities under Article 3, paragraph 4, for 2009^c				
3.4 Forest management for 2009				
3.4 Cropland management for 2009				
3.4 Cropland management for base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for base year				
3.4 Revegetation for 2009	-508 715			-508 715
3.4 Revegetation in base year	-349 120			-349 120

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

Table 5
Information to be included in the compilation and accounting database in t CO₂ eq for
the year 2008

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Annex A emissions for 2008				
CO ₂	3 578 980			3 578 980
CH ₄	468 881			468 881
N ₂ O	506 960			506 960
HFCs	48 599			48 599
PFCs	348 999			348 999
SF ₆	6 260			6 260
Total Annex A sources	4 958 679			4 958 679
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008 as reported	-147 321	-147 435		-147 435
3.3 Afforestation and reforestation on harvested land for 2008 as reported	NA			NA
3.3 Deforestation for 2008 as reported	NA			NA
Activities under Article 3, paragraph 4, for 2008^c				
3.4 Forest management for 2008				
3.4 Cropland management for 2008				
3.4 Cropland management for base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for base year				
3.4 Revegetation for 2008	-501 532			-501 532
3.4 Revegetation in base year	-349 120			-349 120

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

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2012 annual inventory submission was submitted on 14 April 2012; it contains a complete set of common reporting format (CRF) tables for the period 1990–2010 and a national inventory report (NIR). Iceland submitted its NIR on 15 April 2012. 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 in accordance with Article 3, paragraph 14, of the Kyoto Protocol, on 15 April 2012. The standard electronic format (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 (see para. 90 below). The annual submission was submitted in accordance with decision 15/CMP.1.

7. Iceland officially submitted revised emission estimates on 29 October 2012 in response to the list of potential problems and further questions raised by the expert review team (ERT) in the course of the review. The Party submitted revised information on KP-LULUCF activities, including revised KP-LULUCF estimates in relation to carbon pools. The figures contained in this report are those submitted by the Party on 29 October 2012.

8. 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

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

Completeness of inventory

10. The inventory covers all mandatory⁴ source and sink categories for the period 1990–2010 and is complete in terms of years and geographical coverage.

11. The ERT noted that some categories reported as not estimated in CRF table 9 are presented elsewhere in the Party's 2012 annual submission (e.g. HFC emissions from

³ The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), and 6(c) and (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.

⁴ Mandatory source and sink categories under the Kyoto Protocol are all source and sink categories for which the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* 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) provide methodologies and/or emission factors to estimate GHG emissions.

refrigeration and air-conditioning equipment). The ERT recommends that Iceland improve the consistency between CRF tables in its next annual submission.

12. The ERT identified gaps in the reporting of emission data and associated information in the CRF tables, including in CRF table summary 3 (methods and emission factors (EFs)), CRF table 8(b) (recalculations) and CRF table 9(a) (completeness), where neither data nor notation keys were reported by Iceland in some cells. In response to a question raised by the ERT during the review, Iceland explained that extensive information on the coverage of and rationale for recalculations had been provided in the NIR, both in chapter 10 as well as in the respective sector chapters (3–8). The ERT recommends that Iceland provide complete information in the CRF tables in its next annual submission.

13. Iceland has not included in its NIR a number of annexes which are included in the NIR outline set out in the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC Reporting guidelines on annual inventories” (hereinafter referred to as the UNFCCC reporting guidelines). The missing annexes include: “Detailed discussion of methodology and data for estimating CO₂ emissions from fossil fuel combustion”; “CO₂ reference approach and comparison with sectoral approach, and relevant information on the national energy balance”; and “Assessment of completeness and (potential) sources and sinks of greenhouse gas emissions and removals excluded for the annual inventory submission and also for the KP-LULUCF inventory”. In response to a question raised by the ERT during the review, Iceland confirmed that these annexes are currently not available, but provided no indication as to when they will be included in the annual submission. The ERT recommends that Iceland include in the NIR of its next annual submission all of the annexes required by the UNFCCC reporting guidelines and encourages the Party to follow the annotated outline of the NIR.⁵

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

Overview

14. The ERT concluded that the national system continued to perform its required functions.

15. The Party has reported no changes in the national system since the previous annual submission.

Inventory planning

16. In its NIR and during the review, Iceland described the national system for the preparation of the inventory. The Environment Agency of Iceland (EA), an agency under the auspices 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 activity data (AD), selects methodologies and appropriate EFs, ensures the conduct of 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, comprising 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

⁵ Available at

<http://unfccc.int/national_reports/annex_i_ghg_inventories/reporting_requirements/items/2759.php>.

secretariat by EA. Other agencies, ministries and organizations, such as the National Energy Authority of Iceland (NEA), the Farmers Association of Iceland, 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 and EFs. The Party's NIR described the national system, the flow of information and the allocation of responsibilities.

17. In June 2012 a new law on climate issues (Act 70/2012), which will strengthen institutional arrangements and the flow of data to the EA from other organizations, was enacted by the Icelandic Parliament. The law states that NEA (among other institutions) is obligated to collect the data necessary for the compilation of the GHG inventory and report them to EA. This requirement will be further elaborated in regulations set by the Minister for the Environment and Natural Resources, which are currently in preparation. Iceland indicated that the new law will also facilitate the preparation of the national energy balance. The ERT commends Iceland for this improvement and recommends that it elaborate, in its future NIRs, on the relevant details of this and how it improves data flow.

18. During the review, Iceland provided additional information for each sector on the role of the different institutions in providing AD and EFs and in developing emission estimates. The ERT recommends that Iceland report this information in the NIR of its next annual submission.

19. During the review, the ERT noted that, according to the relevant formal agreement, NEA should provide an energy balance every year to EA; however, NEA has not yet fulfilled this provision (NIR, page 67) (see para. 40 below). The ERT strongly recommends that EA continue to pursue its agreements with NEA, in order to ensure that one organization has a full understanding of the complete energy balance and can compile a transparent and complete energy balance.

Inventory preparation

Key categories

20. Iceland has reported a tier 1 key category analysis, both level and trend assessment, as part of its 2012 annual submission. The key category analysis performed by the Party and that performed by the secretariat⁶ produced similar results, with any differences due to the different levels of aggregation used by the Party and the secretariat. For example, Iceland has aggregated the fuels used in road transportation, split the category other land converted to grassland into subcategories and aggregated the forest land subcategories into one forest land category. Iceland has included the LULUCF sector in its key category analysis, which was performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) 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). The ERT recommends that Iceland compile its key category analysis using a similar level of detail to that used by the secretariat.

⁶ 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.

21. Iceland has not compiled a tier 2 or qualitative key category analysis, as highlighted in the previous review reports. The ERT encourages Iceland to use a tier 2 method for its key category assessment and to use a qualitative approach to identify possible additional key categories, namely the categories for which the emission estimates have a high uncertainty or there is an increasing trend in the emissions (such as composting), for its next annual submission.

22. In its NIR Iceland has explained that it uses the results of the key category analysis to prioritize the development and improvement of the inventory.

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

Uncertainties

24. In annex II to the NIR, Iceland has reported a quantitative uncertainty analysis, including the LULUCF sector, performed using a tier 1 method in line with the IPCC good practice guidance. The analysis shows the trend uncertainty without LULUCF at 6.9 per cent, while the level uncertainty without LULUCF is 5.1 per cent. Uncertainties including LULUCF are 19.1 per cent and 12.1 per cent for the level and trend respectively as a result of the high uncertainty attributed to cropland remaining cropland and wetland drained for more than 20 years. Iceland has reported in the NIR that the uncertainty analysis is used to prioritize efforts to improve the accuracy of the inventory.

25. In response to a question raised by the ERT, Iceland explained the reasons for the changes in the estimated uncertainties between its 2011 and 2012 annual submissions. The small increase in the trend uncertainty, from 6.8 to 6.9 per cent, resulted from the disaggregation of the category solid waste disposal on land into two subcategories in the 2012 annual submission, namely managed and unmanaged solid waste disposal. The decrease in the level uncertainty from 7.1 per cent in 2009 (as reported in the 2011 annual submission) to 5.1 per cent in 2009 (as reported in the 2012 annual submission) arose from a revision of the AD uncertainties for CO₂ emissions from road transportation and from fisheries. The ERT recommends that Iceland include this explanation and supporting information in its next annual submission.

Recalculations and time-series consistency

26. 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 time series 1990 to 2009 have been undertaken to take into account changes and improvements in AD, EFs and methodologies and in order to rectify identified errors.

27. The major changes include large recalculations (increases) in the agriculture, LULUCF and waste sectors with smaller decreases to estimates for 2009 in the energy and industrial processes sectors. The magnitude of the impact, include the following: an increase in the estimated total GHG emissions for the base year (by 3.2 per cent) and an increase in the estimated total GHG emissions for 2008 and 2009 (by 2.3 and 2.5 per cent, respectively). The rationale for these recalculations has generally been provided in the NIR and in CRF table 8(b) (see para. 12 above). However, the ERT recommends that Iceland improve the transparency of the rationale for the following recalculations undertaken: the reallocation of the emissions from waste incineration for two plants from the energy to the waste sector; the revision of the AD, EFs and estimation methodology used to estimate emissions from road transportation (see para. 48 and 50 below); and information on manure management system fractions and solid storage of manure from goats (see para. 63 below).

Verification and quality assurance/quality control approaches

28. Iceland has elaborated a QA/QC plan. In response to a recommendation made in the previous review report, the Party has undertaken an in-depth review of the data and methodologies used for the estimation of emissions from the following: consumption of halocarbons and SF₆; solvent and other product use; the agriculture sector; and the waste sector.

29. Iceland's QA/QC plan describes the QA/QC programme and the quality objectives, including the responsibilities and time schedule for the performance of QA/QC procedures. The QA/QC manual contains an overall description of the QA/QC procedures, including the checklist for QC activities. The QA/QC plan includes all of the mandatory elements set out in the IPCC good practice guidance and the annex to decision 19/CMP.1. In addition, during the review, Iceland provided some examples of its QA/QC activities (including internal evaluations of the inventory preparation process, the internal review activities carried out annually to detect and rectify any anomalies in the estimates, and evidence of the implementation of specific QC procedures) and its reviews (QA) of the data and methodologies used for the estimation of emissions from consumption of halocarbons and SF₆, solvent and other product use, the agriculture sector and the waste sector.

30. Notwithstanding the existence of an elaborate QA/QC plan, the ERT concluded that errors and inconsistencies in the NIR and the CRF tables remain; for example, CRF table 1.A(b) (see para. 42 below), the inconsistency in the reporting of data between the NIR and the CRF tables with regard to industrial processes (see para. 55 below), and the erroneous reported nitrogen excretion (Nex) values for N₂O emissions from manure management (see para. 67 below). The ERT reiterates the recommendation made in the previous review report that the Party's QA/QC programme be strengthened with a view to addressing anomalies and inconsistencies in the reporting of data and information in the NIR and the CRF tables.

Transparency

31. The ERT concluded that the annual submission is, in general, transparent, but it also identified areas for potential improvement:

(a) The inclusion of the annexes to the NIR that are currently missing, which detracts from the transparency of the annual submission (see para. 13 above);

(b) The provision of improved information on the methods and EFs used to estimate emissions from energy industries (liquid fuels) (see para. 47 below), domestic and international consumption of aviation and navigation fuel (see para. 44 below) and feedstocks and non-energy use of fuels (see para. 46 below);

(c) The provision of information on the methods and data used for the preparation of the estimates for the LULUCF sector (see para. 71 below);

(d) The improvement of the transparency of the NIR and the CRF tables and the use of the notation keys for the reporting on industrial wastewater handling (see para. 82 below) and composting (see para. 83 below).

Inventory management

32. Iceland has an archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these EFs and AD 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. During the review, Iceland provided information on its archiving system and indicated that

this information would be provided in its next annual submission. The ERT recommends that Iceland provide a full description of its archiving system in its next annual submission.

3. Follow-up to previous reviews

33. The ERT found that Iceland had not implemented some of the recommendations included in the previous review report. In response to a question raised by the ERT on this matter, Iceland provided a table outlining the status of implementation of those recommendations. In addition, the Party explained that it does not have a single comprehensive inventory improvement plan to manage and address recommendations, but that it intends to develop such a plan, in line with its “quality manual’s general system for process revision and procedures for improvement”. The ERT encourages Iceland to include the list of recommendations and their status of implementation, as well as its inventory improvement plan, in its next annual submission.

34. The ERT noted a number of improvements made by Iceland following the recommendations made in the previous review report, including:

- (a) In June 2012, the enactment of a new law on climate issues (Act 70/2012) to strengthen institutional arrangements for the preparation of the national energy balance (see para. 17 above);
- (b) Improving the key category analysis and the reporting thereon;
- (c) Completing the additional information tables of the CRF tables for the agriculture and waste sectors;
- (d) Providing estimates of CH₄ emissions from geothermal energy;
- (e) Applying higher-tier estimation methods for the road transportation and stationary combustion categories;
- (f) Improving the description of the methods, AD and EFs used to estimate emissions from mineral wool production (see para. 54 below);
- (g) Improving the accuracy of the estimates of HFC emissions from foam blowing;
- (h) Including estimates of non-methane volatile organic compound emissions from food and drink production;
- (i) Preparing new and improved animal population data and livestock population characterization data;
- (j) Reporting emissions from enteric fermentation and manure management for cattle using option B (see para. 65 below);
- (k) Using country-specific parameters and higher-tier methods to calculate the emission estimates for livestock, using animal population data and livestock population characterization;
- (l) Correcting the milk production factors for dairy cattle;
- (m) Improving the land representation for each land use;
- (n) Improving the information provided on land areas subject to KP-LULUCF activities in the land-transition matrix;
- (o) Including estimates for carbon pools on cropland not previously reported and in making changes to the land-use AD (see para. 69 below);
- (p) Revising the land-use transition time series to 20 years, (see para. 69 below);

- (q) Reporting estimates of removals from forest land (see para. 69 below);
- (r) Estimating emissions and removals for those categories for which estimation methods are available in the IPCC good practice guidance for LULUCF;
- (s) Developing country-specific EFs and parameters for the estimation of CH₄ emissions from solid waste disposal on land;
- (t) Revising the annual protein intake parameter used to estimate N₂O emissions from domestic wastewater handling;
- (u) Using country-specific parameters for the characterization of incinerated waste.

35. The ERT also noted the following outstanding recommendations from the 2011 annual review report (ARR) that Iceland has not addressed and recommends that they be implemented for the Party's 2013 annual submission:

- (a) To develop a national energy balance that enables the identification of relevant information to underpin the fuel combustion reference approach and the derivation of transport fuel splits (see paras. 16 and 39 in the 2011 review report);
- (b) To include a description of the methodology used to estimate CO₂ emissions from public electricity and heat production (waste fuel use) and provide the rationale for the choice of default EFs (see para. 41 below);
- (c) To collect plant-specific data to estimate CO₂ EFs for ferrosilicon and aluminium production and to provide relevant explanations in the NIR (see para. 57 below);
- (d) To improve the transparency of the reporting for a number of categories in all sectors by including transparent explanations of the estimation methodologies used, the trends in emission estimates and the choice of AD and EFs (see para. 31 above).

4. Areas for further improvement identified by the expert review team

36. During the review, the ERT identified a number of areas for improvement. These are listed in table 6 below.

37. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report and in table 6 below.

B. Energy

1. Sector overview

38. The energy sector is the main sector in the GHG inventory of Iceland. In 2010, emissions from the energy sector amounted to 1,866.30 Gg CO₂ eq, or 41.1 per cent of total GHG emissions. Since 1990, emissions have increased by 4.9 per cent. The key drivers for the rise in emissions are road transportation and geothermal energy. Within the sector, 48.2 per cent of the emissions were from transport, followed by 29.8 per cent from other sectors, 11.4 per cent from manufacturing industries and construction and 10.3 per cent fugitive emissions from fuels. The remaining 0.2 per cent were from energy industries.

39. The Party has performed recalculations for the energy sector between its 2011 and 2012 annual submissions following changes in AD, in order to rectify identified errors and owing to the reallocation of emissions from waste incineration to the waste sector. The impact of these recalculations on the energy sector is a decrease in the estimates of emissions for the base year, 2008 and 2009, respectively, of 0.3, 1.0 and 0.7 per cent. The main recalculations took place in the following categories:

- (a) CO₂ emissions from public electricity and heat production;
- (b) CO₂ and CH₄ emissions from geothermal energy;
- (c) CO₂ emissions from food processing, beverages and tobacco;
- (d) CO₂, CH₄ and N₂O emissions from waste incineration.

40. The ERT commends Iceland for continuing to improve its estimates for the energy sector thanks to new regulations, studies on EFs and methodological improvements. The ERT noted that some energy data are provided by NEA, which collects data from the oil companies on fuel sales by specific economic sector. However, according to the relevant formal agreement, NEA should provide an energy balance to EA every year, but has not yet fulfilled this provision (NIR, page 67). In addition, the division of fuel sales by activity sector does not reflect the IPCC categorization. Therefore, EA has to compile data on the import and export of fuels, split AD according to the IPCC categories, and make comparisons with sales statistics and assumptions regarding stock change for the reference approach. The ERT also noted that the energy balance has not been clearly presented in Iceland's 2012 annual submission. The ERT strongly recommends that EA continue to pursue its agreements with NEA, in order to ensure that one organization has a full understanding of the complete energy balance and can compile a complete and transparent energy balance, including the fuel split for the sectoral and reference approaches, for Iceland's NIR.

41. The ERT reiterates the recommendation made in the previous review report that Iceland include in the NIR a description of the methodology used to estimate CO₂ emissions from public electricity and heat production (waste fuel use) and the rationale for its choice of default EFs.

2. Reference and sectoral approaches

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

42. The estimate of total CO₂ emissions reported for 2010 in accordance with the reference approach is 0.8 per cent lower than the corresponding emission estimate calculated using the sectoral approach. The ERT noted that the overall difference in the estimates of CO₂ emissions between the sectoral and reference approaches is less than 2.0 per cent for the entire time series. The difference in solid fuels between the sectoral and reference approaches (excluding international bunkers) is 13.2 per cent. Iceland clarified during the review that this is due to an error in the reporting of data for the reference approach in CRF table 1.A(b). The ERT recommends that Iceland correct the data in the CRF table for its next annual submission and improve its QC procedures with a view to ensuring that errors are identified before the submission of the annual submission.

43. During the review, the ERT asked Iceland for further information on the significant differences (e.g. 52.6 per cent for gasoline and 14.3 per cent for residual oil in domestic and international navigation) between the AD used for the calculation of its emission estimates for the energy sector and those published by the International Energy Agency (IEA). Iceland indicated that the data from IEA are estimated by IEA (as Iceland does not report data) and are considered inaccurate by Iceland. Iceland was preparing to submit data to IEA by the end of September 2012.

International bunker fuels

44. According to the NIR, an improved methodology to differentiate between fuel consumed in domestic and international bunkers (aviation) will be developed in the near future. Iceland's involvement in the European Union emissions trading scheme (EU ETS)

aviation scheme will also provide the necessary data and information to support this improvement for the Party's next annual submission. The ERT strongly recommends that Iceland improve the differentiation of AD between domestic and international bunkers and report thereon in its next annual submission.

45. The ERT found that the description of the method and data sources used to differentiate between fuel consumed in domestic and international bunkers (marine) was not clear in the NIR. The ERT reiterates the recommendation made in the previous review report that Iceland improve the transparency of the method and data sources used to differentiate between the domestic and international consumption of aviation and navigation fuel in its next annual submission.

Feedstocks and non-energy use of fuels

46. The ERT identified inconsistencies in the carbon stored factors (e.g. for coking coal) reported by Iceland when compared to those in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) (table 1-5 on page 1.28 of the NIR). In addition, data on coke oven/gas coke, coking coal and electrodes are provided in CRF table 1.A(d) for the years 1990–2009 but not for 2010, which Iceland indicated are reported under metal production (industrial processes). The ERT recommends that Iceland improve the transparency of the information provided on feedstocks and non-energy use of fuels for 2010 and clarify the source of its carbon stored factors for the entire time series in its next annual submission.

3. Key categories

Stationary combustion: liquid fuels – CO₂

47. The implied emission factors (IEFs) for public electricity and heat production, manufacturing industries and construction and commercial/institutional are lower than the median of those IEFs of other reporting Parties included in Annex I to the Convention (Annex I Parties) for 2010, with respective values of 73.33, 74.11 and 69.10 t/TJ compared with the respective medians of 76.41, 74.99 and 72.11 t/TJ. Moreover, throughout the time series, the IEFs show considerable variation. For public electricity and heat production the IEFs range between 73.53 and 76.03 t/TJ, for manufacturing industries and construction the IEFs range between 73.92 and 74.43 t/TJ and for commercial/institutional the IEFs range between 66.14 and 78.46 t/TJ. During the review, Iceland explained that different fuel compositions (gas/diesel oil and residual fuel oil) resulted in different IEFs. The ERT recommends that Iceland explain these fluctuations in the IEFs in a transparent manner in its next annual submission.

Road transportation: liquid fuels – CO₂

48. The ERT noted from the NIR (pages 61 and 62) that Iceland has recalculated its estimates of emissions from road transportation for the years 2006–2009. However, these recalculations are not transparently described in the NIR, which does not indicate how the recalculations have improved the estimates or addressed the entire time series. The present ERT also noted that the previous ERT recommended that Iceland implement its plan to use higher-tier methods to allocate fuel use by vehicle type and to estimate emissions on that basis. The ERT reiterates the recommendations made in the previous review report that Iceland implement its plan to use higher-tier methods and report the data, methods and assumptions used clearly in its next annual submission.

4. Non-key categories

Stationary combustion: other fuels – CO₂

49. In response to a question raised by the ERT during the review, Iceland explained that other fuels used in the categories commercial/institutional and in public electricity and heat production only incorporates fuels used in waste incineration, that the corresponding CO₂ emission estimates are based on estimates of the carbon content of the waste, and that in its next annual submission it will report a revised calculation of the energy content of waste based on data on waste composition and energy content. The ERT recommends that Iceland implement its plan to improve its estimates using country-specific waste composition data and provide revised estimates in its next annual submission.

Road transportation: gasoline – N₂O

50. The ERT found that the gasoline N₂O IEF for road transportation is high (15.37 kg/TJ) when compared with the default tier 2 value from the Revised 1996 IPCC Guidelines (1–2 kg/TJ) and the corresponding IEFs reported by most other Parties ranging between 1.14 and 7.30 kg/TJ. In response to a question raised by the ERT during the review, Iceland explained that it is aware that the N₂O IEFs for road transportation are inaccurate due to an overly simplified assumption regarding control technology in new vehicles and that their use is likely to have resulted in an overestimation of the corresponding emissions. Iceland also explained that it plans to revise the N₂O estimates for its next annual submission. The ERT recommends that Iceland implement this improvement and report thereon in its next annual submission.

C. Industrial processes and solvent and other product use

1. Sector overview

51. In 2010, emissions from the industrial processes sector amounted to 1,809.63 Gg CO₂ eq, or 39.8 per cent of total GHG emissions. Emissions from the solvent and other product use sector amounted to 6.15 Gg CO₂ eq, or 0.1 per cent of total GHG emissions. Since 1990, emissions have increased by 109.7 per cent in the industrial processes sector and decreased by 32.2 per cent in the solvent and other product use sector. The key drivers for the rise in emissions in the industrial processes sector are the increases in CO₂ emissions from aluminium production and CO₂ emissions from ferrosilicon production, which were partially offset by the decrease in PFC emissions from aluminium production. Within the industrial processes sector, 95.3 per cent of the emissions were from metal production and 4.1 per cent were from consumption of halocarbons and SF₆. The remaining 0.6 per cent were from mineral products. The large increase in metal production since the latter years of the 1990s is the driver for the increase in the corresponding emissions; while the increase in metal production has been due to a greater availability of geothermal energy, which is used, in particular, by energy-intensive aluminium plants.

52. The Party has undertaken recalculations for the industrial processes sector between its 2011 and 2012 annual submissions as a result of changes in AD and EFs and in order to rectify identified errors. The impact of these recalculations on the industrial processes sector is a decrease in the estimated emissions for 2009 and 2008 of 1.7 and 0.9 per cent, respectively, with no change in the estimate for the base year. The main recalculations took place in the following categories:

- (a) HFC and PFC emissions from consumption of halocarbons and SF₆;
- (b) CO₂ emissions from mineral products.

53. The Party has undertaken recalculations for the solvent and other product use sector between its 2011 and 2012 annual submissions as a result of changes in AD and EFs and in order to rectify identified errors. The impact of these recalculations on the solvent and other product use sector is an increase in the estimate of emissions for 2009 of 7.5 per cent, a decrease in the estimate for 2008 of 22.4 per cent and a decrease in the estimate for the base year of 34.9 per cent. The main recalculations took place in the following categories:

- (a) N₂O emissions from the use of N₂O for anaesthesia;
- (b) CO₂ emissions from paint application;
- (c) CO₂ emissions from degreasing and dry cleaning;
- (d) CO₂ emissions from chemical products, manufacture and processing;
- (e) CO₂ emissions from other.

54. The ERT noted improvements made in the Party's 2012 annual submission as a result of implementing recommendations made in the previous review report with regard to the transparency of the AD and EFs used to estimate emissions from mineral wool production. The ERT commends Iceland for these improvements.

55. The ERT identified QC problems in the Party's 2012 annual submission (e.g. inconsistencies between the NIR and the CRF tables, such as the annual emission rate for domestic refrigeration being reported as 0.3 per cent in NIR table 4.8, while in the CRF tables this was reported as 0.15 per cent). In addition, the ERT found that some web links listed in the NIR were not working; however, new links were provided by the Party during the review. Furthermore, some information in the NIR has not been updated since the previous annual submission (e.g. NIR table 4.9, while in NIR table 4.7 a miscalculated CO₂ IEF was found). The ERT recommends that Iceland improve its QC activities for its next annual submission in order to ensure that the CRF tables and the NIR present consistent and accurate information.

2. Key categories

Aluminum production – CO₂

56. CO₂ emissions from aluminium production accounted for 67.4 per cent of the Party's total emissions from industrial processes in 2010, with emissions having increased by 793.2 per cent since the base year. The emissions were estimated using a tier 1 approach, an EF for electrodes based on net calorific values (NCVs) and a carbon EF and oxidization factor from the Revised 1996 IPCC Guidelines. However, the NIR did not include information and/or references that would enable the ERT to clarify the assumptions and AD used. For example, the ERT used the NCV and carbon EF for petroleum coke (usually used in aluminium production plants) from the Revised 1996 IPCC Guidelines and calculated an EF that was 13.5 per cent lower than the corresponding EF used by Iceland. This may be linked to the use of different materials for the electrodes. The ERT concluded that this indicates a possible overestimation of the related CO₂ emissions for this category. In response to a question raised by the ERT during the review, Iceland informed the ERT that the EF for electrodes has been used since the early 1990s with no references provided, but that plant-specific CO₂ EFs will be developed for the next annual submission, and that the Party has already collected data for the period 2005–2010 for all aluminium production plants (under the EU ETS). The present ERT reiterates the recommendation made in the previous review report that Iceland improve its methodology for estimating emissions from aluminium production, update the EF for electrodes using plant-specific data and present AD (especially for the consumption of electrodes) and other information on assumptions and data sources clearly in the NIR of its next annual submission.

Ferrosilicon production – CO₂

57. CO₂ emissions from ferrosilicon production accounted for 19.9 per cent of the sectoral emissions in Iceland in 2010, with emissions having increased by 76.1 per cent since the base year. The emissions were estimated using a tier 1 approach, an EF for electrodes based on NCVs and a carbon EF and oxidization factor from the Revised 1996 IPCC Guidelines. During the review, the ERT was informed that a plant-specific CO₂ EF will be developed for the next annual submission, and that the Party has already collected data for the period 2005–2010 for all ferrosilicon production plants (under the EU ETS). The present ERT reiterates the recommendation in the previous review report that Iceland improve its methodology for estimating emissions from ferrosilicon production, update the EF for electrodes using plant-specific data and present AD (especially for the consumption of electrodes) and other information on assumptions and data sources clearly in the NIR of its next annual submission.

3. Decision 14/CP.7

58. Iceland provided information in the NIR on four projects (one on ferrosilicon 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 first commitment period of the Kyoto Protocol. Electricity produced from renewable energy resources is used in all heavy industry in Iceland and total industrial process CO₂ emissions from the four projects amounted to 1,219.09 Gg in 2010 (according to the CRF tables, but reported as 1,216 Gg in the NIR). The estimated average CO₂ emissions from electricity production in Iceland in 2010 were reported in the NIR as 12.4 g/kWh. The total CO₂ emission savings, as presented in the NIR, as a result of the projects were estimated by Iceland at 6,367 Gg, compared with using electricity from natural gas fired power plants, which typically emit 600 g CO₂/kWh. The ERT commends Iceland for making this comparison with natural gas fired power plants instead of coal-fired power plants, following recommendations contained in previous review reports.

59. Iceland compared the estimated CO₂ emissions from the four projects referred to in paragraph 58 above to the total estimated CO₂ emissions excluding LULUCF of Iceland in the base year (1990), as presented in table 2 of its initial review report. The comparisons showed that the projects meet the requirement of decision 14/CP.7 regarding the 5 per cent contribution to the total national CO₂ emissions in the base year. The ERT commends Iceland for following a previous recommendation.

60. Iceland has still used the IPCC default EFs from the Revised 1996 IPCC Guidelines to estimate CO₂ emissions from the projects, for both the process and energy parts of the production. The ERT reiterates the recommendation made in the previous review report that Iceland collect plant-specific EFs for CO₂ emissions and compare the actual project-specific EFs with the world and/or European benchmarks in order to show the use of best available technology for the projects.

D. Agriculture**1. Sector overview**

61. In 2010, emissions from the agriculture sector amounted to 646.17 Gg CO₂ eq, or 14.2 per cent of total GHG emissions. Since 1990, emissions have decreased by 8.1 per cent. The key drivers for the fall in emissions are the decrease in the sheep population and the reduction in the use of synthetic fertilizer. Within the sector, 53.6 per cent of the emissions were from agricultural soils, followed by 35.2 per cent from enteric fermentation. The remaining 11.2 per cent were from manure management.

62. The Party has undertaken recalculations for the agriculture sector between its 2011 and 2012 annual submissions in response to recommendations made by the previous ERT with regard to AD. The impact of these recalculations on the agriculture sector is an increase in the estimates of emissions for the base year, 2008 and 2009, respectively, of 16.9, 14.0 and 14.9 per cent. The main recalculations took place in the following categories:

- (a) CH₄ emissions from enteric fermentation;
- (b) CH₄ and N₂O emissions from manure management;
- (c) Direct N₂O emissions from agricultural soils.

63. The inventory for the agriculture sector is complete with regard to the coverage of categories, gases and years and is generally transparent. Uncertainties, recalculations, QA/QC procedures and planned improvements are sufficiently described in the NIR at the category level, and the sources of AD and EFs, methodological issues and AD and emission trends are clearly explained in the NIR. However, the ERT identified areas for improvement with regard to the consistency of the information presented between the CRF tables and the NIR. The ERT noted, for example, that in NIR table 6.10 (page 122), in relation to CH₄ emissions from manure management, the manure management system fractions for goats have been reported as 55 per cent for solid storage and 45 per cent for pasture, while in the corresponding CRF table the allocation has been reported as the opposite. During the review, Iceland indicated to the ERT that the values reported in the CRF table were not correct and that they will be rectified in the next annual submission. The ERT was satisfied that the error had not affected the corresponding emission estimates and recommends that Iceland improve its QC of the CRF tables and the NIR for its next annual submission.

64. The ERT noted that Iceland has presented the same values for its area of cultivated organic soils under the agriculture sector as under the LULUCF sector, but that these values are in reverse time series order in CRF table 5.B, which shows a decline in the area of organic soils. During the review, the Party confirmed that the time series of the area of cultivated organic soils reported for the LULUCF sector was correct and that the time series reported for the agriculture sector had been erroneously reversed, resulting in an overestimation of the corresponding emissions for the later years of the time series. The ERT recommends that Iceland correct the time series for its area of agricultural soils and report thereon in its next annual submission.

2. Key categories

Enteric fermentation – CH₄

65. In response to an encouragement made in the previous review report, Iceland has reported emissions from enteric fermentation using option B (mature dairy cows, other mature and young animals), reported information in the additional information table to the relevant CRF table and included in the NIR a comprehensive summary of the EFs used to estimate the emissions.

66. To estimate emissions for fur animals, Iceland used the EF from the 2010 NIR of Norway. During the review, Iceland indicated that it does not plan to develop its own country-specific EF. The present ERT reiterates the comments in the previous review report and encourages Iceland to provide, in its next annual submission, the rationale for the use of that EF.

Manure management – N₂O

67. The ERT noted that there are differences in the calculation of N₂O emissions from manure management (CRF table 4.B(b)) for sheep and horses. The differences are evident when comparing the sum of the Nex per animal waste management system with values obtained by multiplying the animal population sizes by Nex (kg nitrogen/head/year). In response to a question raised by the ERT during the review, Iceland confirmed that it had reported an erroneous value for Nex in the NIR for sheep and horses. The Nex for sheep should have been calculated by weighting the different Nex value for mature ewes, other mature sheep, animals for replacement and lambs with their population size. This was done for the value for 2009, which was erroneously allocated to all years from 1990 to 2010. Corrected Nex values were provided to the ERT by the Party during the review. The ERT recommends that Iceland improve its QC procedures with a view to minimizing such errors as those mentioned above in its next annual submission.

E. Land use, land-use change and forestry**1. Sector overview**

68. In 2010, net emissions from the LULUCF sector amounted to 733.80 Gg CO₂ eq. Since 1990, net emissions have decreased by 38.2 per cent. The key driver for the fall in emissions is the increase in removals due to afforestation and revegetation activities on grassland. Within the sector, 1,078.95 Gg CO₂ eq were from cropland, 18.05 Gg CO₂ eq were from wetlands, 77.93 Gg CO₂ eq were from other and 0.22 Gg CO₂ eq were from settlements. Forest land and grassland accounted for net removals of 270.81 and 170.55 Gg CO₂ eq, respectively.

69. Iceland has undertaken recalculations for the LULUCF sector between its 2011 and 2012 annual submissions in response to the 2011 review report and following changes to AD and the development of a new estimation methodology. The impact of these recalculations on the LULUCF sector is an increase in the estimate of emissions for 2009 of 12.1 per cent. The main recalculations took place in the following categories:

(a) An increase in the estimate of emissions from cropland for 2009 owing to the estimation of emissions from some pools not previously reported (living biomass and soil carbon for land converted to cropland) and changes in the land-use AD (revised area of organic soils). This represented the largest absolute change (91.83 Gg CO₂ eq) in estimated emissions/removals across the LULUCF sector;

(b) The revision of the land-use transition time series to 20 years resulted in an increase in the estimate of removals from grassland for 2009;

(c) The development of new methodologies to account for factors not previously included in the estimates resulted in a small increase in the estimate of removals from forest land.

70. As noted in the previous review report, Iceland has not provided annual land-use and land-use change matrices. However, the ERT noted that Iceland in the CRF tables has improved the completeness of land-use and land-use change reporting and that the definition of the conversion periods for various land uses has been improved. The ERT reiterates the recommendation made in the previous review report that Iceland, in its NIR present annual land-use and land-use change matrices to identify and track, according to selected conversion periods, all land uses and land-use changes.

71. As noted in the previous review report, the information reported in the NIR does not allow for a complete assessment of the methods and data used for the preparation of the estimates for the LULUCF sector. For example, the NIR does not provide a clear

description of changes in biomass. There is no information on biomass functions or biomass expansion factors, rather only a reference stating that the data come from the National Forest Inventory. The ERT reiterates the recommendation made in the previous review report that Iceland, in its next annual submission provide all relevant information needed to assess the reported estimates. Such information should include, for each estimated category:

- (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 used (not needed in the case of the use of an IPCC method);
- (d) Equations (reference to IPCC equations, where an IPCC method has been applied);
- (e) Parameters (reference to the relevant IPCC table, where IPCC factors have been applied);
- (f) Input data (the time series of the relevant background data reported in the CRF tables).

2. Key categories

Cropland remaining cropland – CO₂

72. The largest contributor to emissions from the LULUCF sector, and a key category, is CO₂ emissions from organic soils in the category cropland remaining cropland. The emissions have been estimated using a tier 1 method and default parameters. In response to a question raised by the ERT during the review, Iceland stated that no country-specific EFs or AD exist which could be used to improve the reporting of this category. The ERT recommends that Iceland develop country-specific EFs and AD for reporting CO₂ emissions from organic soils for cropland remaining cropland in its next annual submission.

Land converted to grassland – CO₂

73. The ERT noted that Iceland has defined in its 2012 annual submission a conversion period for land converted to grassland and has estimated emissions from soil organic carbon in mineral soils for land converted to grassland. The ERT understood from the NIR that there is unpublished information that could be used to develop country-specific EFs for land converted to grassland and recommends that the Party make efforts to develop estimates based on country-specific data (tier 2) and report on the improvements made in its next annual submission.

F. Waste

1. Sector overview

74. In 2010, emissions from the waste sector amounted to 213.80 Gg CO₂ eq, or 4.7 per cent of total GHG emissions. Since 1990, emissions have increased by 44.6 per cent. The key driver for the rise in emissions is the increase in managed anaerobic landfills in recent years. Within the sector, 89.2 per cent of the emissions were from solid waste disposal on land, followed by 5.4 per cent from wastewater handling, 4.2 per cent from waste incineration and 1.3 per cent from other (waste). Emissions from the waste sector have steadily increased due to the increase in emissions from solid waste disposal on land, the

result of the accumulation of degradable organic carbon in recently established managed, anaerobic solid waste disposal sites. The total increase in the estimated emissions from solid waste disposal on land between 1990 and 2010 amounted to 55.3 per cent.

75. The Party has undertaken recalculations for the waste sector between its 2011 and 2012 annual submissions in response to the previous review report, following changes in AD, EFs, the methane correction factor (MCF), methane gas recovery data and in order to rectify identified errors. The impact of these recalculations on the waste sector is a decrease in the estimates of emissions for the base year and 2008 by 17.6 and 2.3 per cent, respectively, and an increase in the estimate for 2009 of 5.4 per cent. The main recalculations took place in the following categories:

- (a) CH₄ emissions from solid waste disposal on land;
- (b) CH₄ and N₂O emissions from wastewater handling;
- (c) CO₂, CH₄ and N₂O emissions from waste incineration.

76. The ERT noted a lack of transparency in the NIR. There is no description of the methods used for estimating emissions from medical and hazardous waste. Furthermore, errors in the cross-referencing to figure 8.12 on page 222 of the NIR and in CRF table 6.C, where figures are aggregated and do not reflect different sources (medical waste, hazardous waste, municipal solid waste (MSW) and bonfires (open burning)), also create a lack of transparency. The ERT also noted that the breakdown of waste into biogenic and non-biogenic amounts as specified in CRF table 6.C is complicated by the fact that many waste categories contain both biogenic and non-biogenic carbon as well as non-carbon matter and water. Only reporting carbon fractions would lead to inconsistencies between these amounts and otherwise reported total waste amounts incinerated. The ERT recommends that the transparency of the CRF tables and the NIR be improved for the waste sector for the Party's next annual submission, particularly in relation to the biogenic and non-biogenic carbon fractions in medical and hazardous waste.

2. Key categories

Solid waste disposal on land – CH₄

77. Iceland has used a tier 2 method (first order decay model) from the IPCC good practice guidance to estimate CH₄ emissions from solid waste disposal on land. This is consistent with the IPCC good practice guidance. Regression analysis of the gross domestic product was used to derive historical AD in lieu of statistical data. The ERT noted that Iceland applies an average of its 2005–2010 waste composition data to the years 1990–2004. The ERT recommends that Iceland explores the possibility of updating the data on the composition of solid waste for 1990–2004 using any available proxies and/or expert judgement reflect any changes in composition over that period, and develop its own country-specific EFs, MCF and degradable organic carbon values for the 1990–2004 period.

78. The ERT also noted that slaughterhouse waste was included with food waste, which will alter the composition of that waste and cause additional uncertainty in the calculation. The ERT further noted that Iceland plans to re-estimate emissions from slaughterhouse waste using lower methane generation rates for its next annual submission. The ERT recommends that Iceland ensure that the parameters used for estimating such emissions reflect the fraction of slaughterhouse waste in the total waste going to solid waste disposal sites, and provide more information about the inclusion of slaughterhouse waste with food waste in its next annual submission.

79. Iceland no longer makes a distinction between the composition of industrial waste and MSW, as separate data are not available. In the 2012 annual submission, all waste classified as industrial waste has been allocated to one of the 10 waste categories, assuming its composition is the same as for municipal solid waste. However, from the 2012 NIR (page 211), it is not clear whether Iceland has included the construction and demolition component of industrial waste in its estimates for solid waste disposal on land. The ERT recommends that Iceland provide, in its next annual submission, a transparent explanation of the assumptions used for the amount, type and origin of the waste included in its estimates. The ERT also recommends that Iceland exclude, where necessary and in order to improve accuracy, the inert component of industrial waste from its estimates of CH₄ emissions from solid waste disposal on land.

3. Non-key categories

Wastewater handling – CH₄ and N₂O

80. The ERT noted that CH₄ emissions from wastewater handling have been estimated using a tier 1 method and default EFs and MCF. In addition, the method used to estimate CH₄ emissions from domestic wastewater handling is based on the method from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (hereinafter referred to as the 2006 IPCC Guidelines) (equation 6.1), but the equation presented in the NIR is different from that in the 2006 IPCC Guidelines. The ERT recommends that Iceland develop a country-specific MCF and EFs for the estimation of emissions from wastewater handling, in order to enhance accuracy, and recommends that Iceland to provide clearer description and the correct equation in its future annual submissions.

81. The ERT noted that the survey used to estimate the average protein consumption of the population, conducted by the Icelandic Directorate of Health, did not take children into consideration. Only the weighted averages for adults and adolescents were used. The ERT pointed out that this does not correctly represent the population and could result in an overestimation of emissions. The ERT recommends that Iceland use per capita protein consumption for the entire population (including children) to estimate a weighted average for the estimation of N₂O emissions from domestic wastewater handling for its next annual submission.

Waste incineration – CO₂

82. This category has been subdivided into waste incineration with energy recovery and waste incineration without energy recovery. For its 2012 annual submission, Iceland has moved from the tier 1 to the tier 2a method from the 2006 IPCC Guidelines for the estimation of CO₂ emissions. The emissions from two waste incineration plants have been moved from the energy to the waste sector on the basis of new information that showed that the plants do not recover energy from the waste burned. The ERT commends Iceland for using a tier 2a estimation method and for developing country-specific carbon fraction parameters from the analysis of the composition of incinerated waste.

Other (waste) – CH₄ and N₂O

83. A tier 1 method has been used to estimate emissions from composting, which is in accordance with the Revised 1996 IPCC Guidelines. The ERT noted that the description of the methodology and AD used and the inclusion in or exclusion from the estimates of sludge from wastewater is not transparent in the NIR. The ERT reiterates the recommendation made in the previous review report that Iceland explore ways of improving the method used to estimate emissions from composting through improved AD collection. In addition, the ERT encourages Iceland to improve the transparency of the NIR

by including in its next annual submission improved information on the methodology and AD used to estimate emissions from composting, the data collection process and the inclusion in or exclusion from the estimates of sludge from wastewater.

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

84. Iceland has provided estimates of emissions and removals from activities under Article 3, paragraph 3 (afforestation, reforestation and deforestation) and from revegetation under Article 3, paragraph 4, of the Kyoto Protocol in accordance with the paragraphs 5 to 9 of the annex to decision 15/CMP.1. The Party has elected to account for activities under the Kyoto Protocol at the end of the first commitment period.

85. Iceland has used the same methodology, definitions and AD as used for its reporting on the LULUCF sector under the Convention. The ERT noted that Iceland has provided in the NIR of its 2012 annual submission all of the supplementary information required under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT welcomes this improvement. However, the ERT reiterates the recommendation made in the previous review report that Iceland provide more transparent information, which should include, for each estimated category:

- (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 (reference to IPCC equations, where an IPCC method has been applied);
- (e) Parameters (reference to the relevant IPCC table, where IPCC factors have been applied);
- (f) Input data (the time series of the relevant background data reported in the CRF tables).

86. Iceland has performed recalculations for the KP-LULUCF activities between its 2011 and 2012 annual submissions following changes in AD and EFs resulting in an increase in the estimated removals of 18.9 per cent for 2008 and 13.8 per cent for 2009. Estimates of removals were recalculated for deforestation, afforestation and revegetation.

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

Afforestation and reforestation – CO₂

87. Iceland has not estimated carbon stock change for dead wood in afforested areas for its 2012 annual submission for 2008, 2009 and 2010. The ERT noted that Annex I Parties should account for all changes in the following carbon pools: above-, below-ground biomass, litter, dead wood and soil organic carbon for activities under Article 3, paragraph 3, of the Kyoto Protocol. However, a Party may choose not to account for a given pool in a commitment period if transparent and verifiable information is provided that demonstrates

that such a pool is not a net source of emissions, in accordance with decision 15/CMP.1, annex, paragraph 6(e). In response to the list of potential problems and further questions raised by the ERT during the review week, Iceland officially submitted revised information, including the country-specific data used to calculate carbon stock change in dead wood. The ERT accepted the revised estimates and supporting information and recommends that Iceland include a full description of this revision in its next annual submission.

Deforestation – CO₂

88. Iceland has not estimated for its 2012 annual submission carbon stock change for dead wood, litter or soil organic carbon related to reported deforestation activities in 2010. Each Annex I Party should account for all changes in the following carbon pools: above-ground biomass, below-ground biomass, litter, dead wood and soil organic carbon for activities under Article 3, paragraph 3, and for elected activities under Article 3, paragraph 4, of the Kyoto Protocol. However, a Party may choose not to account for a given pool in a commitment period if transparent and verifiable information is provided that demonstrates that such a pool is not a net source of emissions (decision 15/CMP.1, annex, paragraph 6(e)). In response to the list of potential problems and further questions raised by the ERT during the review week, Iceland provided an explanation for not reporting on the above-mentioned carbon stock change and described the method used to estimate the amount of litter and soil organic carbon on deforested land. Iceland also provided information to show that dead wood is not a net source of emissions on deforested land. In addition, Iceland submitted revised data for the activities under Article 3, paragraph 3, of the Kyoto Protocol, including the new data on carbon stock change in litter and soil organic carbon. The ERT accepted the explanation and methodological revision provided and recommends that Iceland include a full description of this revision in its next annual submission.

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

Revegetation – CO₂

89. The ERT noted that there is evidence in the NIR (page 248) to suggest that the land-use change of elected areas subject to revegetation has not been specifically tracked. The NIR highlights that Iceland could not establish whether elected areas for revegetation since the beginning of the commitment period have been converted to other land uses. The ERT also noted that there is a problem with the tracking system currently in use and that KP-LULUCF table NIR-2 clearly shows that there has been no conversion to forest land of land subject to afforestation and reforestation. However, the ERT further noted that Iceland has developed an acceptable solution to the problem with the tracking system The National Inventory on Revegetation Area (NIRA). The ERT recommends that Iceland implement a suitable tracking system for land subject to revegetation from 2008 onward, in order to meet the requirements set out in decision 15/CMP.1, annex, paragraph 6(b) and decision 16/CMP.1, annex, paragraph 20. The ERT also recommends that, if changes in activity on land subject to revegetation occur, Iceland should ensure that once land is accounted then the reporting on such land continues throughout the commitment period, as outlined in related supplementary methodological guidance arising from the Kyoto Protocol in the IPCC good practice guidance for LULUCF and in accordance with decision 15/CMP.1, annex, paragraphs 5 and 6(d).

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

90. The information on Kyoto Protocol units has been reported in accordance with decision 15/CMP.1, annex, section I.E and is accurate. No issuances or transactions of Kyoto Protocol units have occurred in the national registry of Iceland; therefore, information on the accounting of Kyoto Protocol units is not required to be reported in accordance with decision 15/CMP.1, annex, section I.E and decision 14/CMP.1 in the SEF tables.

National registry

91. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate.

92. The ERT took note of the findings and recommendations included in the SIAR. The present ERT noted that the SIAR reiterated the recommendation in the previous review report that Iceland reference the public information pursuant to decision 13/CMP.1, annex, paragraphs 44–48. During the review, the Party informed the ERT that, as at 30 June 2012, Iceland's national registry became a separate registry entity within the consolidated registries of the European Union (EU) registry. The website of the European Union Translation LogAnnex title⁷ allows for the general public to access information, as referred to in decision 13/CMP.1, annex, paragraphs 44–48, about Iceland's national registry, as relevant. Furthermore, information on the Party's national registry and guidance on accessing registry accounts has been set up on the homepage of EA.⁸ The ERT considered that the recommendation included in the SIAR had been followed.

Calculation of the commitment period reserve

93. Iceland has reported its commitment period reserve in its 2012 annual submission. The Party reported its commitment period reserve to be 16,671,462 t CO₂ eq, which 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

94. Iceland reported that there have been no changes in its national system since the 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

95. Iceland reported that there have been no changes in its national registry since the previous annual submission. During the review, the Party informed the ERT that, as at

⁷ <<http://ec.europa.eu/environment/ets/>>.

⁸ See <<http://www.ust.is/atvinnulif/vidskiptakerfi-esb/skraningarkerfi>> for the Icelandic page and <<http://www.ust.is/the-environment-agency-of-iceland/eu-ets/registry/>> for the English.

30 June 2012, Iceland's national registry became a separate registry entity within the consolidated registries of the EU registry. The ERT concluded that the Party's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

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

96. Iceland has provided information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its 2012 annual submission. Iceland provided a summary of its implementation of actions in line with requirements set out in decision 15/CMP.1. The ERT concluded that the information provided is complete and transparent. The ERT noted that Iceland did not provide any information on whether there had been any changes to its activities in relation to the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The ERT recommends that the Party, in its next annual submission, report any changes in the information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I.H.

III. Conclusions and recommendations

A. Conclusions

97. Iceland made its annual submission on 14 April 2012. The annual submission contains the GHG inventory (comprising the CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes 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.

98. The ERT concludes that the inventory submission of Iceland has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is generally complete and the Party has submitted a complete set of CRF tables for the years 1990–2010 and an NIR; these are complete in terms of geographical coverage, years, sectors, categories and gases. However, Iceland has not included a number of annexes to the NIR which are included in the NIR outline set out in the UNFCCC reporting guidelines. Furthermore, the ERT identified gaps in the reporting of emission data and associated information in the CRF tables.

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

100. 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.

101. The Party has made recalculations for the inventory between its 2011 and 2012 annual submissions in response to the 2011 ARR, following changes in AD and EFs and in order to rectify identified errors. The impact of these recalculations on the national totals is an increase in the estimate of emissions for 2009 of 2.5 per cent. The main recalculations took place in the following sectors/categories:

- (a) Energy: reallocation of emissions from waste incineration from the energy sector to the waste sector and the use of updated AD for geothermal energy;
- (b) Industrial processes; changes in AD and EFs in order to rectify identified errors;
- (c) Agriculture: revised parameters used for estimating emissions from enteric fermentation and manure management and N₂O emissions from agricultural soils;
- (d) LULUCF: changes in AD and the development of a new estimation methodology;
- (e) Waste: changes made to AD, EFs, the MCF and methane gas recovery data in order to rectify identified errors.

102. Iceland has reported on activities under Article 3, paragraph 3 (afforestation, reforestation and deforestation) and from revegetation under Article 3, paragraph 4, of the Kyoto Protocol in line with reporting requirements set out in paragraphs 5 to 9 of the annex to decision 15/CMP.1.

103. The Party has made recalculations for the KP-LULUCF activities between its 2011 and 2012 annual submissions in response to the 2011 ARR, following changes in AD and EFs and in order to rectify identified errors. This has resulted in an increase in the estimated removals of 13.8 per cent for 2009.

104. Iceland has not reported information on its accounting of Kyoto Protocol units in accordance with decision 15/CMP.1, annex, chapter I.E, as no issuances or transactions of such units have occurred in the national registry of Iceland.

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

106. 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.

107. Iceland has reported information under decision 15/CMP.1, annex, chapter I.H, "Minimization of adverse impacts in accordance with Article 3, paragraph 14", as part of its 2012 annual submission. However, the ERT noted that Iceland did not provide any information on whether there had been any changes to its activities for the minimization of adverse impacts. The information provided is complete and transparent.

B. Recommendations

108. The ERT identifies issues for improvement as listed in table 6 below.

Table 6
Recommendations identified by the expert review team

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
General	Completeness	Complete CRF table 8(b) and the data gaps in CRF tables 9(a) and summary 3 for the next annual submission	12
		Provide the currently missing annexes to the NIR in the next annual submission	13
	National system	Elaborate, in the next NIR, on the relevant details of the regulations for Act 70/2012 and show how it will improve data flow	17
		Report information for each sector on the role of the different institutions in providing AD and EFs and in developing emission estimates in the NIR of its next annual submission.	18
		EA should continue to pursue its agreements with National Energy Authority (NEA), in order to ensure that one organization has a full understanding of the complete energy balance and can compile a transparent and complete energy balance.	19
	Key category analysis	Compile the key category analysis using a similar level of detail to that used by the secretariat and present the results in future annual submissions	20
	Uncertainties	The ERT recommends that Iceland include this explanation and supporting information in its next annual submission	25
		However, the ERT recommends that Iceland improve the transparency of the rationale for the following recalculations undertaken: the reallocation of the emissions from waste incineration for two plants from the energy to the waste sector; the revision of the AD, EFs and estimation methodology used to estimate emissions from road transportation; and information on manure management system fractions and solid storage of manure from goats.	27
	QA/QC	Further strengthen the general and sector-specific QA/QC efforts, in order to avoid errors in the CRF tables and the NIR in the future	30
	Transparency	Further improve transparency	31
	Archiving	Provide a full description of the archiving system in the next annual submission	32
Energy	Previous recommendations	Implement the outstanding recommendations made in previous review reports	35
Energy	Transparency	Make efforts to improve the transparency of: the national energy balance; the methods and EFs used to estimate emissions from energy industries (liquid fuels), domestic and international consumption of aviation and navigation fuel and feedstocks and non-energy use of fuels; and describe transparently in the NIR the recalculations made and the methods, EFs and assumptions used to estimate CH ₄ and N ₂ O emissions from energy industries and manufacturing industries and construction	40 and 45–47

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
	QA/QC	Correct the reference approach for the next annual submission and improve QA/QC to ensure that errors in the CRF tables are avoided	42
	International bunkers fuels	Implement the plan to obtain better data on international aviation, adopt a more transparent method for splitting fuel use between domestic and international navigation, implement the planned higher-tier method for estimating emissions from aviation and report transparently on the methods, data sources and assumptions used in the next annual submission	44
	Road transportation: liquid fuels – CO ₂	The ERT reiterates the recommendations made in the previous review report that Iceland implement its plan to use higher-tier methods and report the data, methods and assumptions used clearly in its next annual submission.	48
	Stationary combustion: other fuels – CO ₂	Implement the plan to calculate the energy content of waste on the basis of data on waste composition for the estimation of emissions from waste incineration	49
	Road transportation: gasoline – N ₂ O	Update the N ₂ O EF and improve the time-series consistency for the entire time series for the next annual submission	50
Industrial processes	QA/QC	Improve the QC activities for the next annual submission in order to ensure that the CRF tables and the NIR present consistent and accurate information	55
	Aluminium production – CO ₂	Improve the methodology for estimating emissions from aluminium production, update the EF for electrodes using plant-specific data and present AD (especially for the consumption of electrodes) and other information on assumptions and data sources clearly in the NIR of the next annual submission	56
	Ferrosilicon production – CO ₂	Improve the methodology for estimating emissions from ferrosilicon production, update the EF for electrodes using plant-specific data and present AD (especially for the consumption of electrodes) and other information on assumptions and data sources clearly in the NIR of the next annual submission	57
	Decision 14/CP.7	Collect plant-specific EFs for estimating CO ₂ emissions and compare the actual project-specific EFs with the world and/or European benchmarks in order to show the use of best available technology for the projects	60
Agriculture	QA/QC	Improve the QC of the CRF tables and the NIR for the next annual submission.	63, 64
	Manure management – N ₂ O	Improve the QC of the CRF tables in relation to N ₂ O emissions from manure Management for the next annual submission	67
LULUCF	Consistent land representation	The ERT reiterates the recommendations made in the previous review report that Iceland ensures consistent land representation.	70
	Transparency	Provide all relevant information needed for the assessment of the	71

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
		methods and data used for the preparation of the estimates for the LULUCF sector	
	Organic soils on cropland remaining cropland	Develop country-specific EFs and AD for estimating CO ₂ emissions from organic soils for cropland remaining cropland	72
	Land converted to grassland – CO ₂	Develop and report on the estimates of emissions from abandoned cropland in the next annual submission	73
Waste	Transparency	Improve the transparency of the CRF tables and the NIR in relation to the waste sector for the next annual submission, particularly for medical and hazardous waste	76
	Solid waste disposal on land – CH ₄	The ERT reiterates the recommendation made in the previous review report that Iceland explore the possibility of updating the data on the composition of solid waste, with a view to ensuring that such data reflect the country's changing economic conditions, and develop its own country-specific EFs, Methane Correction Factor (MCF) and degradable organic carbon values based on its new waste composition data.	77
		Ensure that the parameters used for estimating solid waste disposal emissions reflect the fraction of slaughterhouse waste in the total waste going to solid waste disposal sites, and provide more information about the inclusion of slaughterhouse waste with food waste in its next annual submission.	78
		Provide a transparent explanation of the assumptions used for the amount, type and origin of the waste included in the emission estimates. Where necessary, in order to improve accuracy, exclude the inert component of industrial waste from the estimates of CH ₄ emissions from solid waste disposal on land	79
	wastewater handling – CH ₄ and N ₂ O	Develop a country-specific MCF and EFs for the estimation of CH ₄ emissions, in order to enhance accuracy provide clearer description and the correct equation in its future annual submissions.	80
		Use the new value for per capita protein consumption to estimate a weighted average, including children, for the estimation of N ₂ O emissions from domestic wastewater handling for the next annual submission.	81
	Other (composting) – CH ₄ and N ₂ O	Improve the method used to estimate emissions from composting through improved AD collection	83
KP-LULUCF	Transparency	Provide additional information to improve transparency	85
	Afforestation and reforestation – CO ₂	Either provide quantitative estimates for the dead wood pool for the afforestation and reforestation category, or provide transparent and verifiable information that demonstrates that the pool is not a	87

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
		net source of emissions in the next annual submission	
	Deforestation – CO ₂	Either provide quantitative estimates for the dead wood, litter and soil organic carbon pools for the deforestation category, or provide transparent and verifiable information that demonstrates that such pools are not net sources of emissions in the next annual submission	88
	Revegetation – CO ₂	Implement a suitable tracking system for land subject to revegetation within the commitment period, in order to meet the requirements set out in decision 15/CMP.1, annex, paragraph 6(b) and decision 16/CMP.1, annex, paragraph 20	89
		If changes in activity on revegetation land occur, ensure that once land is accounted for under Article 3, paragraphs 3 and 4, then the reporting on such land continues throughout the commitment period, as outlined in related supplementary methodological guidance arising from the Kyoto Protocol in the IPCC good practice guidance for LULUCF and in accordance with decision 15/CMP.1, annex, paragraphs 5 and 6	89
Minimization of adverse impacts		Report in the NIR on whether there have been any changes or any progress has been made in accordance with decision 15/CMP.1	96

IV. Questions of implementation

109. 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>>.

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<<http://unfccc.int/resource/docs/2012/asr/isl.pdf>>.

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FCCC/ARR/2011/ISL. Report of the individual review of the annual submission of Iceland submitted in 2011. Available at <<http://unfccc.int/resource/docs/2012/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 Mr. Christoph Wöll (Environment Agency of Iceland), including additional material on the methodologies and assumptions used.

Annex II

Acronyms and abbreviations

AD	activity data
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
EU	European Union
EU ETS	European Union emissions trading scheme
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆ without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
MCF	methane correction factor
MSW	municipal solid waste
N ₂ O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
NIR	national inventory report
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