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Climate Change

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Report on the individual review of the annual submission of Iceland submitted in 2019*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual inventory of emissions and removals of greenhouse gases for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2019 annual submission of Iceland, conducted by an expert review team in accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol”. The review took place from 16 to 21 September 2019.

* In the symbol for this document, 2019 refers to the year in which the inventory was submitted, not to the year of publication.

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Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
2016 EMEP/EEA guidebook	<i>EMEP/EEA air pollutant emission inventory guidebook 2016</i>
AAU	assigned amount unit
AD	activity data
Annex A source	source category included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
ARR	annual review report
Article 8 review guidelines	“Guidelines for review under Article 8 of the Kyoto Protocol”
C	carbon
CER	certified emission reduction
C_f	coefficient for calculating net energy for maintenance
CH ₄	methane
CM	cropland management
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
Convention reporting adherence	adherence to the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”
COPERT	software tool for estimating road transport emissions
CPR	commitment period reserve
CRF	common reporting format
CSC	carbon stock change
DOM	dead organic matter
EA	Environment Agency of Iceland
EF	emission factor
EMEP/EEA	European Monitoring and Evaluation Programme/European Environment Agency
ERT	expert review team
ERU	emission reduction unit
FAOSTAT	statistical database of the Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
$Frac_{leachMS}$	percentage of managed manure nitrogen losses for the livestock category due to run-off and leaching during solid and liquid storage of manure
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance	<i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i>
IPPU	industrial processes and product use

KP-LULUCF activities	activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
Kyoto Protocol Supplement	<i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i>
LULUCF	land use, land-use change and forestry
MCF	methane conversion factor
N	nitrogen
N ₂ O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
NEA	National Energy Authority of Iceland
NEU	non-energy use
Nex	nitrogen excretion
NF ₃	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
NO _x	nitrogen oxides
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
Revised 1996 IPCC Guidelines	<i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i>
RMU	removal unit
RV	revegetation
SF ₆	sulfur hexafluoride
SOC	soil organic carbon
SWDS	solid waste disposal site(s)
TOW	total organics in wastewater
UNFCCC Annex I inventory reporting guidelines	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”
UNFCCC review guidelines	“Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”
WDR	wetland drainage and rewetting
Wetlands Supplement	<i>2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands</i>

I. Introduction¹

1. This report covers the review of the 2019 annual submission of Iceland organized by the secretariat in accordance with the Article 8 review guidelines (adopted by decision 22/CMP.1 and revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the “UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention” (decision 13/CP.20). The review took place from 16 to 21 September 2019 and was coordinated by Sevdalina Todorova (secretariat). Table 1 provides information on the composition of the ERT that conducted the review of Iceland.

Table 1

Composition of the expert review team that conducted the review of Iceland

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Lea Kai	Lebanon
	Newton Paciornik	Brazil
Energy	Tomas Gustafsson	Sweden
	Constantin Harjeu	Romania
IPPU	Valentina Idrissova	Kazakhstan
	David Kuntze	Germany
Agriculture	Laura Cardenas	United Kingdom of Great Britain and Northern Ireland
	Miguel Angel Taboada	Argentina
LULUCF and KP-LULUCF activities	Bridget Fraser	New Zealand
	Markus Haakana	Finland
Waste	Phindile Mangwana	South Africa
	Ole-Kenneth Nielsen	Denmark
Lead reviewers	David Kuntze	
	Newton Paciornik	

2. The basis of the findings in this report is the assessment by the ERT of the Party’s 2019 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines. The ERT notes that the individual inventory review of Iceland’s 2018 annual submission did not take place in 2018 owing to insufficient funding for the review process.

3. The ERT has made recommendations that Iceland resolve the findings related to issues,² including issues designated as problems.³ Other findings, and, if applicable, the encouragements of the ERT to Iceland to resolve them, are also included.

4. A draft version of this report was communicated to the Government of Iceland, which provided comments that were considered, as appropriate, for this final version of the report.

5. Annex I shows annual GHG emissions for Iceland, including totals excluding and including the LULUCF sector, indirect CO₂ emissions, and emissions by gas and by sector.

¹ At the time of publication of this report, Iceland had submitted its instrument of ratification of the Doha Amendment; however, the Amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, para. 6, pending the entry into force of the Amendment.

² Issues are defined in decision 13/CP.20, annex, para. 81.

³ Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

Annex I also contains background data related to emissions and removals from KP-LULUCF activities, if elected by Iceland, by gas, sector and activity.

6. Information to be included in the compilation and accounting database can be found in annex II.

II. Summary and general assessment of the 2019 annual submission

7. In accordance with paragraph 76 of the UNFCCC review guidelines and paragraphs 47 and 65 of the Article 8 review guidelines, the ERT has prioritized the review of issues and/or problems identified in previous review reports or in the initial assessment; recalculations that have changed the emission or removal estimate for a category by more than 2 per cent and/or national total emissions by more than 0.5 per cent for any of the recalculated years; and supplementary information reported under the Kyoto Protocol. Table 2 provides the assessment by the ERT of the annual submission with respect to the tasks undertaken during the desk review. Further information on the issues identified, as well as additional findings, may be found in tables 3, 5 and 6.

Table 2
Summary of review results and general assessment of the inventory of Iceland

<i>Assessment</i>	<i>Issue or problem ID#(s) in table 3, 5 and/or 6^a</i>		
Dates of submission	Original submission: 14 April 2019 (NIR), 14 April 2019 (CRF tables) version 1, 11 April 2019 (standard electronic format tables) Revised submission: 1 November 2019 (CRF tables) version 2 Unless otherwise specified, the values from the latest submission are used in this report		
Review format	Desk review		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	No	
	(b) Selection and use of methodologies and assumptions?	Yes	A.22, A.23, A.35, L.11, L.14, L.38, KL.8
	(c) Development and selection of EFs?	Yes	E.10, E.12, E.34, A.14, A.30, A.35, L.17, L.28, L.29
	(d) Collection and selection of AD?	Yes	E.26, I.5, I.10, A.3, A.5, A.13, A.28, L.13, L.32, W.13, KL.11
	(e) Reporting of recalculations?	Yes	G.12, A.25, A.28, L.25, KL.13, KL.14
	(f) Reporting of a consistent time series?	Yes	E.14, E.23, E.29, A.31, A.39, A.40
	(g) Reporting of uncertainties, including methodologies?	Yes	E.4, L.1, L.2, KL.4
	(h) QA/QC?	QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below)	

<i>Assessment</i>	<i>Issue or problem ID#(s) in table 3, 5 and/or 6^a</i>		
	(i) Missing categories/completeness? ^b	Yes	I.3, I.9, I.10, I.11, I.12, L.8, L.15, L.16, L.20, L.23, L.41, W.11, KL.10, KL.18, KL.19
	(j) Application of corrections to the inventory?	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	No	E.18, A.18
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	No	E.21
Supplementary information under the Kyoto Protocol	Have any issues been identified related to the following aspects of the national system:		
	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	Yes	G.4
	(b) Performance of the national system functions?	Yes	G.5, G.6, G.8
	Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry?	Yes	G.2
	(b) Performance of the functions of the national registry and the technical standards for data exchange?	No	
	Have any issues been identified related to reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the standard independent assessment report?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	Yes	G.10
	Have any issues been identified related to the following reporting requirements for KP-LULUCF activities:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	Yes	KL.3, KL.10, KL.12
(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	Yes	KL.20, KL.21	
(c) Reporting requirements of decision 6/CMP.9?	Yes	KL.22	
(d) Country-specific information to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34?	Yes	KL.2, KL.5	
CPR	Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18?	Yes	

<i>Assessment</i>			<i>Issue or problem ID#(s) in table 3, 5 and/or 6^a</i>
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Did the Party submit a revised estimate to replace a previously applied adjustment?	NA	Iceland does not have a previously applied adjustment
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Yes	
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	No	
Questions of implementation	Did the ERT list any questions of implementation?	No	

^a The ERT identified additional issues and/or problems in the general, energy, IPPU, agriculture, LULUCF and waste sectors, as well as issues and/or problems related to reporting on KP-LULUCF activities, that are not listed in this table but are included in tables 5 and 6.

^b Missing categories for which methods are provided in the 2006 IPCC Guidelines may affect completeness and are listed in annex III.

III. Status of implementation of issues and/or problems raised in the previous review report

8. Table 3 compiles all the recommendations made in previous review reports that were included in the previous review report, published on 28 February 2018.⁴ For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2019 annual submission and provided the rationale for its determination, which takes into consideration the publication date of the previous review report and national circumstances.

Table 3

Status of implementation of issues and/or problems raised in the previous review report of Iceland

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	Inventory planning (G.2, 2017) (G.1, 2016) (G.1, 2015) (12, 2014) (12, 2013) Accuracy	Ensure that one organization has a full understanding of the complete energy balance and can compile a transparent and complete energy balance.	Resolved. In line with Icelandic regulation 520/2017, NEA provided the complete energy balance for the 2019 submission. The Party explained that, for the AD for 2016–2017, NEA subdivided fuel sales into IPCC sectors (NIR, section 3.1.1, p.36). During the review, the Party explained that the energy balance provided by NEA was used to generate the estimates for the reference approach. The energy balance for 2017 was provided in annex 3 to the NIR. The Party also referred to expected improvements in the energy sector as a result of closer collaboration with NEA on AD and energy balance use for the inventory (NIR, sections 3.1.5 and 10.4).

⁴ FCCC/ARR/2017/ISL. The ERT notes that the report on the individual inventory review of Iceland’s 2018 annual submission has not been published yet. As a result, the latest previously published annual review report reflects the findings of the review of the Party’s 2017 annual submission.

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
G.2	National registry (G.3, 2017) (G.4, 2016) KP reporting adherence	Include in the national registry disaster recovery plan information on the roles and responsibilities of primary and alternate registry personnel in disaster recovery; a communication procedure for the contingency plan; documentation for registry operation in a crisis situation; a periodic testing strategy based on procedures agreed with the registry host; and the time frame in which the registry could resume operations following a disaster.	Not resolved. As explained in the standard independent assessment report, the Party did not provide an updated disaster recovery plan and the NIR does not include any information on a national registry disaster recovery plan. During the review, Iceland explained that the National Registry Administrator and the EA information technology manager are working on the disaster recovery plan.
G.3	National system (G.4, 2017) (G.2, 2016) (G.2, 2015) (98, 2014) KP reporting adherence	Report in the annual submission any changes in the national system in accordance with decision 15/CMP.1, annex, chapter I.F, and/or further relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.	Resolved. Iceland indicated that there have been no changes in the national system since the 2018 submission and provided a summary of regulation 520/2017 (regulation on data collection and information related to Iceland's inventory of GHG emissions and removal of carbon from the atmosphere), which was adopted in June 2017 (NIR, chap. 13). The reporting is in accordance with decision 15/CMP.1, annex, chapter I.F.
G.4	National system (G.5, 2017) KP reporting adherence	Report comprehensive information in the NIR on the status of implementation of regulation 520/2017, including how Iceland ensures that the institutional, legal and procedural arrangements between different government agencies, including the roles and responsibilities, are fully understood by all the institutions involved (e.g. Agricultural University of Iceland, Icelandic Forest Research and the Ministry for the Environment and Natural Resources), and the changes in the national system resulting from such implementation, if any.	Not resolved. Iceland provided a summary of regulation 520/2017 in the NIR (section 1.2.3, table 10.4 and chap. 13). The Party explained that work with relevant agencies to improve collaboration for the inventory is ongoing and that an update of the regulation is pending. Information on the status of implementation of the regulation was missing from the NIR. During the review, the Party provided a detailed update on the implementation of each article of the regulation.
G.5	National system (G.6, 2017) KP reporting adherence	Include in the NIR complete information on efforts made to continue supporting the enhancement of the technical competence of the new inventory team and report on any change in its capacity to ensure that the national system performs its functions (these efforts could include, for example, ensuring a sufficient number of competent national experts for each inventory sector and facilitating the participation of relevant institutions in the inventory process, as well as promoting continuous improvement via training and practical experience).	Addressing. Although the NIR contains a brief description of collaboration and assistance provided by a consulting company (section 1.5.1), information on training activities and other capacity-building initiatives for EA staff was not provided. During the review, the Party explained that in 2019 there had been attempts to improve communication among the various institutions involved in the inventory compilation process, such as NEA and the institutions responsible for the LULUCF sector, but there had not yet been any change in capacity. Iceland clarified that capacity-building activities include training delivered by a consulting company and participation in capacity-building activities proposed by the European Union (annual sector-specific webinars). The Party added that it is considering hiring more specialists for the inventory team

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
			and that the 2020 NIR will include additional information on changes to the team’s capacity and on the Party’s efforts to enhance the technical competence of the inventory team.
G.6	QA/QC and verification (G.7, 2017) Convention reporting adherence	Report in the NIR complete information on the tools and spreadsheets used for QA/QC and present a summary of the revised QA/QC plan and manual once they are finalized.	Not resolved. The Party did not report complete information on the tools and spreadsheets used for QA/QC in the NIR (section 1.5), nor did it present a summary of the revised QA/QC plan and manual. During the review, the Party explained that work on improving its QA/QC procedures is under way. Although the timeline had not yet been finalized, the Party indicated that the general QA/QC plan and the sector-specific energy QA/QC plan would be ready for the 2020 submission, along with the new QA/QC manual.
G.7	Uncertainty analysis (G.8, 2017) Convention reporting adherence	Present the results of the uncertainty analysis obtained through the use of the 2006 IPCC Guidelines in the next annual submission.	Resolved. The Party provided the uncertainty analysis results in the NIR (section 1.6), along with detailed tables containing uncertainty analysis including and excluding LULUCF in annex 2. The results are in line with the IPCC approach 1 calculations (2006 IPCC Guidelines, vol. 1, table 3.2), despite a reference to earlier IPCC guidelines (see ID# G.11 in table 6).
Energy			
E.1	1. General (energy sector) (E.2, 2017) (E.2, 2016) (E.2, 2015) (21, 2014) Transparency	Report information on electrode consumption, steam coal consumption and petroleum coke consumption that provides justification for significant inter-annual changes and gaps in the time series of fuel consumption and associated emissions.	Addressing. Iceland explained that work on implementing this recommendation is under way (NIR, table 10.5). During the review, the Party stated that the issues are being considered and that EA and NEA are working in collaboration to investigate the fluctuation in electrode, steam coal and petroleum coke consumption and gaps in the time series of fuel consumption and associated emissions. This work will be completed for the 2020 or 2021 submission.
E.2	1. General (energy sector) (E.3, 2017) (E.3, 2016) (E.3, 2015) (22, 2014) Transparency	Provide transparent information in cases where GHG emissions have been accounted for elsewhere and the notation key “IE” is used to report such emissions.	Resolved. In the 2019 submission, “IE” is not widely used in the CRF tables. AD that were reported as “IE” in previous submissions are now disaggregated between solid and liquid fuels in subcategories 1.A.1, 1.A.2 and 1.A.4. Furthermore, “IE” is reported under subcategory 1.A.2.g.v for liquid fuels (“NO” was used previously) and 1.A.3.e.ii for diesel oil (blank cells were reported in the 2017 submission) and the allocation of the AD and relevant emissions is explained transparently in CRF table 9.
E.3	1. General (energy sector) (E.4, 2017) (E.4, 2016) (E.4, 2015) (23, 2014) (21, 2013) Transparency	Provide more transparent information on the modification methodologies used when recategorizing the data received from NEA.	Addressing. Iceland explained the method developed by EA to attribute fuel consumption to subcategories 1.A.1, 1.A.2 and 1.A.4 (NIR, section 3.1.1, p.36, and annex 7). The fuel sales for electricity production in NEA nomenclature are compared and adjusted against the consumption of gas oil for subcategory 1.A.1 for electricity production, with an assumed efficiency of 34 per cent for diesel engines. The rest of the fuel is allocated to categories 1.A.2 and 1.A.4, following clearly explained rules. The ERT noted that, for 2016 and 2017, data

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
E.4	1. General (energy sector) (E.17, 2017) Convention reporting adherence	Reassess the uncertainty values for AD and EFs used to carry out the uncertainty analysis and archive the relevant supporting information in accordance with decision 19/CMP.1, and implement the provision from regulation 520/2017 on the joint work of EA and NEA regarding the uncertainty analysis.	provided by NEA were directly allocated according to IPCC categories. During the review, Iceland clarified that there is no information on how the 34 per cent efficiency was determined and explained that, for the next submission, information from NEA on all diesel oil sold for electricity production in the country would be used to replace the assumptions currently used for the years before 2016. Not resolved. Iceland provided category-specific uncertainty values for AD, EFs and emissions in the NIR (e.g. sections 3.3.3, 3.4.1.3, 3.4.2.3, 3.4.3.3, 3.5.1.3 and 3.7.2.4). However, in the category-specific sections of the NIR, there are no references for, or additional information on, the uncertainty values used, nor is there any information on the involvement of NEA in the uncertainty analysis as a result of the implementation of regulation 520/2017 or data archiving.
E.5	1. General (energy sector) (E.18, 2017) Convention reporting adherence	Correct the errors and omissions in the national inventory, such as: (a) The omission of oxidation factors from the emission estimates; (b) Incorrect allocation of fuels; (c) Incorrect use of EFs for diesel oil used in the transportation sector; (d) Inconsistent use of NCV and carbon content for steam coal; (e) Missing emissions and emission capture from geothermal power plants;	Resolved for items (a–e). Table 10.5 in the NIR indicates that the implementation of the recommendation is ongoing and that the errors were corrected as far as the available data permitted. With regard to (a) and (d), in all calculations, the oxidation factors and NCV and carbon content of steam coal have been replaced by the default values from the 2006 IPCC Guidelines (vol. 2, chap. 1, tables 1.2 and 1.4). With regard to (b), the incorrect allocation was corrected in the 2018 NIR (p.49). With regard to (c), all EFs for diesel oil in the transport sector have been changed to the default EFs from the 2006 IPCC Guidelines: CO ₂ , 74,100 kg/TJ; CH ₄ , 3.9 kg/TJ; and N ₂ O, 3.9 kg/TJ (vol. 2, chap. 3, tables 3.2.1–3.2.2). With regard to (e), estimates were added to CRF table 1.B for Þeistareykir (a geothermal site in northern Iceland) with an explanation in the 2018 NIR (p.55). Category-specific procedures for accuracy checks on data acquisition and calculation procedures are being developed. Not resolved for item (f). No specific information on charcoal use in other sectors was included in the NIR (see ID# E.18 below).
E.6	Fuel combustion – reference approach – liquid and solid fuels – CO ₂ (E.6, 2017) (E.16, 2016) (E.16, 2015) Accuracy	Correct the apparent consumption in units of energy for the entire time series by using an appropriate conversion factor, and report the corrected estimates in CRF table 1.A(c).	Resolved. Since its 2018 submission, Iceland has applied appropriate conversion factors to estimate the apparent consumption for the reference approach across the time series. The relevant correction has also been reflected in CRF table 1.A(c) as of the 2018 submission (see ID# E.8 below).
E.7	Fuel combustion – reference approach – liquid and solid fuels – CO ₂ (E.7, 2017) (E.17, 2016) (E.17, 2015)	Estimate and report stock changes of liquid (gasoline, jet kerosene, gas/diesel oil, residual fuel oil and liquefied petroleum gas) and solid (other bituminous coal) fuels in CRF table 1.A(b) for the entire time series.	Resolved. Iceland reported stock changes across the time series for most of the enumerated fuels or used notation keys (e.g. for other bituminous coal).

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
	Convention reporting adherence		
E.8	Fuel combustion – reference approach – liquid and solid fuels – CO ₂ (E.8, 2017) (E.18, 2016) (E.18, 2015) Convention reporting adherence	Report estimates for the apparent energy consumption (excluding NEU, reductants and feedstocks) of liquid and solid fuels for the entire time series in CRF table 1.A(c).	Resolved. Since its 2018 submission, Iceland has reported estimates for the apparent energy consumption (excluding NEU, reductants and feedstocks) of liquid fuels in CRF table 1.A(c), covering the entire time series. “NO” was used for solid fuels for 2012–2017, indicating that these fuels were not used for combustion in those years. This information is consistent with the information reported for the sectoral approach.
E.9	Fuel combustion – reference approach – solid fuels – CO ₂ (E.20, 2017) Comparability	Report the correct amount of carbon excluded from anthracite use in CRF table 1.A(d) for the calculation of CO ₂ emissions from fuel combustion activities under the reference approach.	Resolved. Iceland made a correction to CRF table 1.A(d) and excluded the amount of carbon from anthracite used in ferroalloys production from the reference approach.
E.10	1.A. Fuel combustion – sectoral approach – all fuels – CO ₂ (E.21, 2017) Accuracy	Develop country-specific fuel properties (NCVs and carbon content of fuels) that would allow the tier 2 approach for key categories to be used in line with the 2006 IPCC Guidelines.	Addressing. Iceland informed the ERT during the review that, as documented in the NIR (table 10.5), the implementation of tier 2 is among its planned improvements and that it is working with the team responsible for collecting information related to the European Union directive on fuel quality (directive 2009/30/EC). The team is investigating the possibility of obtaining information on carbon, oxygen and hydrogen content and NCVs from imported gasoline and diesel to derive country-specific CO ₂ EFs.
E.11	1.A. Fuel combustion – sectoral approach – liquid fuels and solid fuels – CO ₂ (E.22, 2017) Transparency	Update the oxidation factor values reported in the NIR in accordance with the oxidation factor values used to estimate CO ₂ emissions from fuel combustion activities of liquid and solid fuels.	Resolved. The estimates for fuel combustion have been updated using the oxidation factor values from the 2006 IPCC Guidelines (vol. 2, p.2.6), which replaced the values from the Revised 1996 IPCC Guidelines (NIR, section 3.1.1, p.37).
E.12	1.A.2 Manufacturing industries and construction – solid fuels and other fossil fuels – CO ₂ (E.23, 2017) Accuracy	Provide justification for the country-specific values or, if that is not possible, use the tier 1 IPCC default values of NCV and carbon content defined in the 2006 IPCC Guidelines for steam coal and wastes of electrodes, and archive all relevant information regarding the selection of AD, EFs and associated parameters (e.g. NCV) used to estimate the emissions.	Addressing. In the NIR, Iceland explained that the EFs for CO ₂ reflect the average carbon content of fossil fuels in line with the 2006 IPCC Guidelines (NIR, section 3.3.2, p.44). The NCV and carbon content from the 2006 IPCC Guidelines are presented in table 3.11 of the NIR, as indicated during the review. Steam coal is not included as a separate entry in the table and the default IPCC values for other bituminous coal are used (25.8 TJ/kt and 25.8 kg C/GJ) (see tables 1.2–1.3 in vol. 2 of the 2006 IPCC Guidelines). However, the NCV and carbon content of waste of electrodes (31.35 TJ/kt and 31.42 t C/TJ, respectively) used in the cement industry that are not defined in the 2006 IPCC Guidelines are still not justified in the NIR. During the previous review, Iceland explained that, as these values were reported by a cement factory that closed in 2011, it is no longer possible to trace the source of the values. No such information or further explanation justifying the use of the values for electrodes (residues) is included in the NIR. The emissions

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			from electrodes (residues) are reported as “NO” for 2012 onwards in the 2019 submission (see ID# E.22 below).
E.13	1.A.2 Manufacturing industries and construction – solid fuels and other fossil fuels – CH ₄ and N ₂ O (E.24, 2017) Accuracy	Assess the use of the CH ₄ and N ₂ O EFs that are reported as examples in the 2006 IPCC Guidelines, and use tier 1 IPCC default values if it is not possible to explain how the non-default CH ₄ and N ₂ O EFs defined in the 2006 IPCC Guidelines represent average conditions in Iceland.	Resolved. The NIR (section 3.3.2, p.44) indicated that CH ₄ and N ₂ O EFs are the default values for stationary combustion (see table 2.3 in vol. 2 of the 2006 IPCC Guidelines) and for mobile combustion in industry (see table 3.3.1 in vol. 2 of the 2006 IPCC Guidelines). The emissions were recalculated and correctly reported in CRF table 1.A(a).
E.14	1.A.3.b Road transportation – liquid fuels – CO ₂ , CH ₄ and N ₂ O (E.15, 2017) (E.14, 2016) (E.14, 2015) (36, 2014) Consistency	Use a consistent methodology for the division of vehicle groups and conduct recalculations for the earlier years of the time series (1990–2005).	Not resolved. As indicated in the NIR (section 3.4.2.5, p.49), COPERT model was available for estimating road transport emissions, but it was too late for the results to be included in the 2019 submission. The emissions from road transportation are currently estimated by multiplying the fuel use by type of fuel and vehicle with the specific EFs: for 1990–2005, NEA estimated the fuel consumption per vehicle group and for 2006–2017 the fuel consumption per vehicle was estimated using the database of the Road Traffic Directorate. The Party plans to use COPERT for its 2020 submission. During the review, Iceland reaffirmed that, with the use of COPERT, the methodology will be consistent for the time series from 2000 onwards in the next submission. The Party also plans to use the tool for 1990–1999 to ensure time-series consistency in future submissions.
E.15	1.A.3.b Road transportation – diesel oil – CH ₄ and N ₂ O (E.25, 2017) Transparency	Update the NIR with the CH ₄ and N ₂ O EFs used for estimating emissions from diesel oil in road transportation.	Addressing. The ERT noted that, according to the NIR (section 3.4.2.1, p.48), the CH ₄ and N ₂ O EFs used in the submission are mostly tier 1 default EFs taken from the 2006 IPCC Guidelines and are included in table 3.17 of the NIR. However, the EFs reported in the table are presented in g/kg and do not include references for their sources. During the review, the Party confirmed that the default EFs from the 2006 IPCC Guidelines (table 3.2.2, vol. 2) were used, which is confirmed by CRF table 1.A(a)s3. The ERT considers that adding references for the source of the EFs and expressing them in the units provided in the 2006 IPCC Guidelines would further improve the transparency of the reporting.
E.16	1.A.3.b Road transportation – other fuels – CO ₂ , CH ₄ and N ₂ O (E.26, 2017) Completeness	Undertake an evaluation of the use of CH ₄ collected from waste yards in road transportation and consider estimating and reporting the emissions associated with the use of CH ₄ in road transportation, avoiding potential double counting with the waste sector.	Resolved. As noted by the previous ERT, NEA reported that CH ₄ has been collected from waste yards since 2000 and utilized as fuel for transport since 2003, and that, according to the estimates, the production capacity of the waste yards that collect CH ₄ is enough to provide about 4,000 cars with fuel, although only a fraction of that number currently uses CH ₄ . The NIR (section 3.4.2.1, p.47) explains that, for the 2018 and 2019 submissions, Iceland included emissions from CH ₄ collected from landfill sites and sold as fuel for vehicles under the energy sector. Data on the split of CH ₄ between vehicle

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E.17	1.A.3.e Other transportation – liquid fuels – CO ₂ , CH ₄ and N ₂ O (E.16, 2017) (E.15, 2016) (E.15, 2015) (32, 2014) Transparency	Report transparent information on emissions from off-road and ground activities occurring in airports that have been accounted for elsewhere.	groups were not available, so all CH ₄ was attributed to passenger cars. Resolved. In the NIR (section 3.3.1, p.43), Iceland mentioned that all fuel sold for off-road vehicles for ground activities in airports and harbours (1.A.3.e.ii) and in agriculture and forestry (1.A.4.c.ii) is included under category 1.A.2.g.v.ii (manufacturing industries and construction). Although the allocation of the emissions is specified, it deviates from the 2006 IPCC Guidelines (see ID# E.35 in table 6).
E.18	1.A.4 Other sectors – other fuels – CO ₂ , CH ₄ and N ₂ O (E.27, 2017) Completeness	Collect AD on the consumption of charcoal, estimate emissions from charcoal consumption, report the corresponding CO ₂ emissions as a memo item and include the non-CO ₂ emissions in the corresponding CRF table and national totals.	Not resolved. Iceland explained in table 10.5 of the NIR and during the review that charcoal is used for grilling in the country and that the related emissions would be minor. The Party also explained that data on this activity have not yet been obtained and that it plans to update its inventory accordingly once the data become available. Until that time, the Party may provide in the NIR sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.
E.19	1.B.2.d Other (oil, natural gas and other emissions from energy production) – other fuels – CO ₂ and CH ₄ (E.29, 2017) Transparency	Improve the description provided in the NIR of the methodology used to estimate the emissions from geothermal power plants, as this is a key category accounting for 11.1 per cent of the GHG emissions of the energy sector, by providing the necessary details in order to facilitate the replication and assessment of the inventory.	Addressing. The NIR contains information on the methodology used to estimate emissions from geothermal power plants (NIR, section 3.7.2, pp.57–58). The information is limited to a reference that acknowledges the existence of a national report and indicates that direct measurements are used for both CO ₂ and CH ₄ emissions. For further details on the methodology for estimating these emissions, the Party referred to an Icelandic report on the emissions of geothermal power plants in Iceland in 1970–2009. The ERT considers that presenting other relevant information and up-to-date references (e.g. https://nea.is/the-national-energy-authority/energy-data/data-repository/) would improve the description of the methodology and facilitate replication and assessment of emissions.
E.20	1.B.2.d Other (oil, natural gas and other emissions from energy production) – other fuels – CO ₂ and CH ₄ (E.29, 2017) Transparency	Include in the NIR additional information regarding the use of geothermal fluids and associated emissions, making it explicit that all geothermal power plants are covered and that other uses of geothermal power are not considered.	Addressing. The NIR (section 3.7.2.1, p.58) summarizes the methodology for estimating emissions from geothermal power plants and notes that geothermal power plants produce both electricity and hot water for district heating. As it stands, emissions are not disaggregated between electricity production and district heating. However, this will be investigated in the future in collaboration with the geothermal power plant operators, and additional information on the use of geothermal fluids and the associated emissions will be reported in the NIR.
E.21	1.B.2.d Other (oil, natural gas and other emissions from energy production) – other fuels – CO ₂ and CH ₄ (E.29, 2017) Transparency	Identify the main drivers for the trend in CO ₂ and CH ₄ emissions (e.g. power plants, geothermal fields) and investigate why geothermal electricity is being	Not resolved. The trend in emissions from geothermal energy is not specifically discussed in the NIR. During the review, Iceland clarified that the emission drivers from geothermal sources are complex and vary from one

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	production) – other fuels – CO ₂ and CH ₄ (E.31, 2017) Transparency	produced with decreasing levels of CO ₂ emissions per GWh since 1993, and report the findings in the NIR.	geothermal field to the next. Processes such as steam cap formation can lead to greater concentrations of CO ₂ if geothermal production taps from the steam cap, whereas concentrations are lower in deeper parts of the reservoir. Furthermore, reinjection of fluids after heat extraction (which are poorer in dissolved gases) can lead to generally gas-poor systems (see chap. 2.1 of Fridriksson et al., 2016). The Party informed that a more detailed explanation of the main drivers for the trend in emissions would be reported in the 2020 or 2021 NIR.
IPPU			
I.1	2. General (IPPU) – CO ₂ , HFCs, PFCs, SF ₆ and NF ₃ (I.1, 2017) (I.3, 2016) Transparency	Report in the CRF tables emission estimates or the relevant notation keys, as appropriate, for the subcategories glass production (2.A.3), ammonia production (2.B.1), adipic acid production (2.B.3), soda ash production (2.B.7) and electronic industry (2.E), and for foam blowing agents (2.F.2), fire protection (2.F.3), solvents (2.F.5) and other applications (2.F.6).	Addressing. Notation keys were reported for the subcategories glass production (2.A.3), ammonia production (2.B.1), adipic acid production (2.B.3) and soda ash production (2.B.7). The appropriate notation keys for reporting F-gas emissions under most subcategories under electronics industry (2.E), foam blowing agents (2.F.2), fire protection (2.F.3), solvents (2.F.5) and other applications (2.F.6) were still missing owing to a technical problem with CRF Reporter, as explained by the Party during the review.
I.2	2.A.4 Other process uses of carbonates – CO ₂ (I.11, 2017) Completeness	Determine whether there are other uses of carbonates in the country that might not be reflected in the current official records, including the use of carbonates in, for example, the construction industry, ceramics, agriculture and environmental pollution control, and estimate the corresponding emissions if they occur.	Resolved. As in previous submissions, Iceland reported use of carbonates in mineral industry, specifically the use of soda ash in mineral wool production. The Party specified in the NIR (section 4.2) that no additional activities involving carbonates occur in the country. In table 10.6 of the NIR and during the review, the Party clarified that all imported goods are registered by the Directorate of Customs and subsequently by Statistics Iceland, which indicates that there is no other recorded use of carbonates. If carbonates are imported for manufacturing artistic ceramics, for example, the quantity is negligible.
I.3	2.F Product uses as substitutes for ozone-depleting substances – HFCs, PFCs and SF ₆ (I.13, 2017) Completeness	Regularly conduct F-gas and product use surveys in order to estimate F-gas emissions for all relevant subcategories on the basis of the latest possible information, with a frequency of at most three years, and include in the NIR information on the level of enforcement of the prohibition of F-gas fire extinguishers and other aerosol products, including personal care products (e.g. haircare products, deodorant, shaving cream), household products (e.g. air fresheners, oven and fabric cleaners), industrial products (e.g. special cleaning sprays such as those for operating electrical equipment, lubricants, pipe freezers).	Addressing. The NIR outlines national legislation banning the import and use of F-gases in the country (section 4.7.1, pp.81–82); however, it does not contain any further information on the level of enforcement of Icelandic regulation 834/2010 on F-gases, which prohibits the production, import and sale of aerosol products containing HFCs. The Party indicated that it is currently reviewing the F-gas inventory (see NIR overview and section 4.7), and table 10.6 of the NIR specifies that the revision of the F-gas inventory in collaboration with Aether Ltd includes a product use survey to obtain updated estimates and ensure the completeness of the inventory. During the review, the Party clarified that the ongoing thorough review of F-gas calculations involves a survey of importers and end users and its results are expected to be used for the 2020 submission. In addition, the NIR indicates that, according to the latest information, new refrigerants (R32

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			and R452A) were imported in small quantities (p.91) in 2017. Their estimated contribution to the emissions for category 2.F.1 is around 0.05 kt CO ₂ eq, but the emissions were not included in the inventory. The ERT considered that the overall outcome of a recalculation including these additional emissions would not meet the requirements for initiating an adjustment procedure in accordance with decision 22/CMP.1, annex, paragraph 80(b), and therefore this issue was not included in the list of potential problems and further questions raised by the ERT. These emissions will be included in the next submission.
I.4	2.F.1 Refrigeration and air conditioning – HFCs and PFCs (I.14, 2017) Accuracy	Revise the estimates of HFC-23 emissions from manufacturing of commercial refrigeration.	Resolved. The HFC-23 IEFs reported in CRF table 2(II).B-H for product manufacturing and disposal of commercial refrigeration have changed and values of 2.0 and 20.0 per cent, respectively, are used (as opposed to 2,198.4 and 120.0 per cent, respectively, for 2015 reported in CRF table 2(II)B-Hs2 of the 2017 submission), which are comparable with the IEFs for other gases and uses.
I.5	2.G.1 Electrical equipment – SF ₆ (I.15, 2017) Accuracy	Obtain clear information about the recovery of SF ₆ emissions from electrical equipment and revise the emission estimates as necessary.	Addressing. Iceland reported disposal and recovery of SF ₆ from electrical equipment as “NE”. During the review, Iceland clarified that the country first used SF ₆ equipment (220 V) in 1981, at one power station. At the same time, some 66 kV equipment was imported. These installations are still in use, which explains why there are no disposal emissions. The lifetime suggested by the 2006 IPCC Guidelines (vol. 3, table 8.2) is >35 years, and circuit breakers have an expected lifetime of 40–50 years, which is supported by the fact that none of the installed equipment has been decommissioned yet. This information was obtained from an expert at Lota, an Icelandic consulting company that assists in power plant design and specializes in transmission and distribution. Iceland plans to include this information in the 2020 NIR and, on the basis thereof, plans to replace the “NE” notation key reported for the disposal and recovery of SF ₆ emissions with “NO” for all years.
Agriculture			
A.1	3. General (agriculture) – CO ₂ , CH ₄ and N ₂ O (A.1, 2017) (A.1, 2016) (A.1, 2015) (56, 2014) Transparency	Include detailed explanations of the AD, EFs and emission trends for all categories, including for young cattle population and for N ₂ O emissions from synthetic N fertilizer applied to agricultural soils.	Addressing. AD were included for the cattle population, including for the young cattle subcategory (NIR, p.101). The amount of synthetic N fertilizer applied to agricultural soils can be derived from figure 5.3 (NIR, p.118), but the amount is not explicitly stated. No additional explanation was included on EFs or emission trends in the NIR. During the review, the Party stated that it plans to include additional information on AD, EFs and emission trends in the next submission.
A.2	3. General (agriculture)	Include in the NIR additional tables with the animal numbers	Not resolved. Section 5.2.1 of the NIR does not provide additional information on animal

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	(A.8, 2017) Transparency	from Statistics Iceland (or other data sources) combined with the background estimations of animal numbers reported in the CRF tables for the agriculture sector for the whole time series and, in cases where the 2006 IPCC Guidelines prescribe the use of average animal populations, include additional information on how the animal numbers from Statistics Iceland have been converted to average animal populations.	population numbers compared with the 2017 NIR. According to table 10.7 of the NIR, the Party is working on restructuring the NIR such that it will include more detailed explanations of AD, EFs and emissions for the whole time series.
A.3	3. General (agriculture) – CH ₄ and N ₂ O (A.9, 2017) Accuracy	Update productivity data, in particular the weight categories for cattle, poultry productivity (live weight and living age) and swine productivity (piglets per sow), and include in the improvement plan activities to update the productivity data at regular intervals.	Not resolved. Data were reported for net energy for maintenance, activity, growth, lactation, wool and pregnancy, as well as animal performance data used to calculate gross energy intake for cattle in 2017, but it is not clear whether the source of these data was updated and no data on the time series were provided (NIR, tables 5.3–5.4, pp.101–102). There are no changes in the data provided compared with the 2017 NIR (p.102). Section 5.2.4 of the NIR indicates that one of the priorities of the improvement plan for the sector is to establish a system to ensure that productivity data, such as the digestible energy content of feed and gross energy intake, are updated on a regular basis.
A.4	3. General (agriculture) – CH ₄ and N ₂ O (A.10, 2017) Transparency	Report weighted average AD for feed intake, typical animal mass, volatile solid excretion rates and Nex rates in the CRF tables and in the NIR, as used in the calculations.	Not resolved. The 2019 NIR does not contain additional information on feed characteristics and gross energy intake (section 5.2.3). During the review, the Party indicated that missing parameters would be added in future submissions. Iceland is working on an improvement plan that includes the provision of more detailed explanations of AD and EFs.
A.5	3. General (agriculture) – CH ₄ and N ₂ O (A.16, 2017) Accuracy	Correct the CH ₄ and N ₂ O emission estimates for other livestock on the basis of the correct number of horses for 2013–2015 and avoid any underestimation of emissions for this subcategory.	Addressing. The horse numbers reported in the NIR are 3.2 and 1.8 per cent above the values reported for 2013 and 2014–2015, respectively, in the 2017 submission. The values (population numbers) reported in CRF table 3.As1 are 76,837 for 2013, 75,450 for 2014–2016 and 73,837 for 2017. However, in the NIR, the Party reports horse numbers of approximately 72,000 (p.100), an estimate based on expert opinion. During the review, the Party explained that the yearly estimates for the 2019 submission were approved by an expert in this sector. The Party clarified that it is trying to improve the information on the horse population for future submissions.
A.6	3.A.1 Cattle – CH ₄ (A.11, 2017) Transparency	Update the CH ₄ EF reported in the NIR to the CH ₄ EF used to estimate CH ₄ emissions from enteric fermentation of cattle.	Resolved. The updated CH ₄ EF and MCF values are reported in the NIR (p.105, tables 5.7 and 5.8). The previous MCF of 6.0 from the IPCC good practice guidance has been replaced with an MCF of 6.5 for cattle in accordance with the default factors from the 2006 IPCC Guidelines (vol. 4, chap. 10.3.2), as already implemented in the 2017 resubmission.

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A.7	3.A.1 Cattle – CH ₄ and N ₂ O (A.12, 2017) Comparability	Report information on and emissions from growing cattle under the subcategory “growing cattle” instead of the subcategory “other mature cattle”.	Resolved. The ERT noted that, in the 2019 submission, an enhanced livestock population characterization was applied to cattle. In accordance with the latest national census, five subcategories were used for cattle in the livestock population characterization: mature dairy cows, cows used for producing meat, heifers, steers used for producing meat and young cattle. The subcategories heifers, steers used for producing meat and young cattle were aggregated in the category growing cattle in the CRF tables (NIR, p.101).
A.8	3.A.2 Sheep – CH ₄ (A.13, 2017) Transparency	Update the CH ₄ EF reported in the NIR to the CH ₄ EF used to estimate CH ₄ emissions from enteric fermentation of sheep.	Resolved. The ERT noted that the CH ₄ EF has been updated and can be found in table 5.8 of the NIR (section 5.3.1). The ERT also noted that the previous MCFs, which ranged between 5.0 and 7.0 per cent, were replaced in the NIR by MCFs of 4.5 per cent for lambs (under one year old) and 6.5 per cent for mature sheep (NIR, table 5.8, p.105) in accordance with the 2006 IPCC Guidelines (vol. 4, table 10.13).
A.9	3.A.3 Swine – CH ₄ (A.14, 2017) Accuracy	Include in the NIR information to support the use of an MCF based on the Revised 1996 IPCC Guidelines or apply the default factor from the 2006 IPCC Guidelines for estimating CH ₄ emissions from enteric fermentation of swine.	Resolved. CH ₄ EFs for pseudo-ruminant and monogastric animal species were taken from the 2006 IPCC Guidelines (vol. 4, table 10.10) (NIR, section 5.3.1, pp.104–105). The value for swine used by the Party was changed to 1.5 kg CH ₄ /head/year in line with the default value provided in the 2006 IPCC Guidelines.
A.10	3.A.4 Other livestock – CH ₄ (A.15, 2017) Accuracy	Include information in the NIR to support the use of an MCF based on the Revised 1996 IPCC Guidelines or apply the default factors from the 2006 IPCC Guidelines for estimating CH ₄ emissions from enteric fermentation of horses and poultry.	Resolved. The NIR (section 5.3.1, pp.104–105) indicates that the CH ₄ EFs for pseudo-ruminant and monogastric animal species were taken from the 2006 IPCC Guidelines (vol. 4, table 10.10), including for horses. Values from the Norwegian NIR were used for poultry and fur animals, as the agricultural practices and climate are similar and most Icelandic farmers are educated in Norway (NIR, p.105).
A.11	3.B Manure management – N ₂ O (A.2, 2017) (A.3, 2016) (A.3, 2015) (61, 2014) (57, 2013) Transparency	Include in the NIR information on the circumstances under which the country-specific Nex rates have been estimated.	Addressing. According to table 10.7 of the NIR, the available information on the circumstances under which the country-specific Nex rates were estimated will be included in the next submission. Iceland has included some information in the NIR to show how country-specific Nex rates have been estimated, including references not provided in the reference list of the NIR (section 5.5.2, table 5.14 and pp.112–113).
A.12	3.B Manure management – N ₂ O (A.18, 2017) Transparency	Provide additional information in the NIR to allow for a better understanding of the N mass flow approach, in particular the correlation between the volatilization of N-containing compounds reported under the United Nations Economic Commission for Europe and under the Convention.	Not resolved. The overview of the N-flow methodology provided in the NIR (section 5.5.1, pp.111–112) has not changed since the 2017 NIR. The ERT noted that the correlation between the volatilization of N-containing compounds reported under the United Nations Economic Commission for Europe and under the Convention remains unclear in the NIR. During the review, the Party indicated that it plans to improve its explanation of the approach in future submissions.

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A.13	3.B Manure management – N ₂ O (A.19, 2017) Accuracy	Correct the N ₂ O emission estimates by using the total amount of N excreted in the different manure management systems.	Not resolved. The Party reported in the NIR (section 5.5, p.111) and confirmed during the review that the methodology provided in the 2016 EMEP/EEA guidebook (European Environment Agency, 2016) was applied at the disaggregated livestock category level (e.g. mature ewes, rams, animals for replacement, and lambs instead of just sheep). The resulting emissions were then aggregated into the respective CRF reporting categories. There were no corrections of N ₂ O estimates using the amount of N excreted instead of total ammoniacal N.
A.14	3.B Manure management – N ₂ O (A.20, 2017) Accuracy	Correct the N ₂ O emission estimates from manure management systems by using the default N ₂ O EFs from the 2006 IPCC Guidelines or provide additional information that supports the use of other N ₂ O EFs that may be more representative of manure management systems in Iceland.	Addressing. In the NIR (section 5.5.3, pp.113–114), the Party reported that N ₂ O EFs for the storage of cattle and sheep manure as liquid slurry are based on table 10.21 of the 2006 IPCC Guidelines but incorporate a degree of local expert judgment to account for conditions and farming practices in the country. Recalculations were carried out for all livestock categories, resulting in lower N ₂ O emissions from manure management (NIR, section 5.5.6, p.115). The Party specified that a value of 0.001 kg N ₂ O-N is emitted per kg N excreted. However, the IPCC default EF for liquid slurry varies from 0 kg N ₂ O-N/kg N excreted (with natural crust cover) to 0.005 N ₂ O-N/kg N excreted (without natural crust cover) (see table 10.21 in vol. 4 of the 2006 IPCC Guidelines) and the Party did not include an explanation of the local circumstances to justify its choice of EF. The EFs used for manure managed in solid storage are based on the default values of N ₂ O-N emitted per kg N excreted in table 3.8 of the 2016 EMEP/EEA guidebook, but they incorporate local expert judgment to account for conditions and farming practices in Iceland (NIR, section 5.5.3, pp.113–114). The value (0.0052 N ₂ O-N/kg N excreted) is within the range of the IPCC default value (0.005 N ₂ O-N/kg N excreted). Emissions from swine are assumed to be zero (NIR, section 5.5.3, p.114), as indicated in both the 2006 IPCC Guidelines and the 2016 EMEP/EEA guidebook.
A.15	3.B.1 Cattle – N ₂ O (A.21, 2017) Accuracy	Update the Nex rate for mature dairy cattle, in particular for 2000 onward, in accordance with the best available knowledge and current production rates.	Resolved. The ERT noted that the Nex rate used for 2000 onward (94.79 kg/head/year) in the original 2019 submission was the same as that used in the previous submission. The issue was resolved in the course of the review and the CRF tables were resubmitted with the corrected values (see ID# A.34 in table 6).
A.16	3.B.1 Non-dairy cattle – N ₂ O (A.17, 2017) Transparency	Correct the average Nex rates reported in CRF table 3.B(b) so that they reflect the actual Nex rates used for estimating N ₂ O emissions from manure management.	Resolved. According to table 5.14 of the NIR, the Party used the default Nex value from the 2006 IPCC Guidelines (0.33 kg N/1,000 kg animal mass/day) for Western Europe for other cattle (see table 10.19 in vol. 4 in the 2006 IPCC Guidelines). The value in CRF table 3.B(b) is 60.23 kg N/head/year (compared with 42.24 kg

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A.17	3.B.5 Indirect N ₂ O emissions – N ₂ O (A.3, 2017) (A.9, 2016) (A.9, 2015) Transparency	Estimate indirect N ₂ O emissions from manure management (3.B.5), including N ₂ O emissions from N volatilized as ammonia and NO _x and from N lost through leaching and run-off, and report the relevant background data, or, if the Party considers these emissions as insignificant, provide in the NIR sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	N/head/year in the 2017 submission) and is for an average animal weight of 500 kg. Resolved. The Party included in its inventory indirect N ₂ O emissions from N volatilized as ammonia and NO _x . Regarding leaching and run-off the Party reported in the NIR (section 5.5.5, p.115) that the approach that was used assumes that there is no N loss to leaching and run-off from stored manure. This is because instead of assigning N to leaching and run-off, the N is retained in the stored N, which is then applied to land, giving rise to emissions of N ₂ O. The Party reported that the issue is in the improvement plan for the next submission (NIR, table 10.7) (see ID# A.36 in table 6). The ERT noted that the approach used by the Party is in accordance with the 2006 IPCC Guidelines (vol. 4, p.10.56), which state that equation 10.28 (N losses due to leaching from manure management systems) should only be used where there is country-specific information on the fraction of N loss due to leaching and run-off from the manure management systems available.
A.18	3.D.a.2 Organic N fertilizers – N ₂ O (A.4, 2017) (A.10, 2016) (A.10, 2015) Completeness	Collect information on sewage sludge and other organic fertilizers applied to soils and estimate the related emissions, or, if the Party considers these emissions to be insignificant, provide in the NIR sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Addressing. In the NIR (section 5.6.3, p.117), the Party reported that all cases of sewage sludge application are municipally controlled and strictly regulated; application has been very limited and is only allowed in non-agricultural soil if untreated. Work to ensure proper channels for accurate data is ongoing and emission estimates will be included in next year's submission. During the review, Iceland calculated emissions from the use of sewage sludge for land reclamation in 2012–2014, when experiments on using sewage sludge for land reclamation were carried out. The resulting N ₂ O emissions were in the range 4.5 to 9.0 t CO ₂ eq, well below the threshold of significance.
A.19	3.D.a.2.a Animal manure applied to soils – N ₂ O (A.22, 2017) Accuracy	Correct the estimates of animal manure applied to soils and the corresponding emissions for the subcategory 3.D.a.2.a reported in CRF table 3.D, taking into account any updates to the population of horses and the Nex rates for mature dairy cattle, as well as updates to the total amount of N excreted in different manure management systems.	Resolved. Recalculations were made for the subcategory on the basis of the revised value for the N input from manure applied to soils across the time series and updated horse population. In addition, the correction of the estimated N ₂ O emissions resulting from the revised Nex rates for mature dairy cattle (see ID# A.34 in table 6) affected the estimate of emissions from manure applied to soils.
A.20	3.D.a.5 Mineralization/immobilization associated with loss/gain of soil organic matter – N ₂ O (A.5, 2017) (A.11, 2016) (A.11, 2015) Transparency	Estimate N ₂ O emissions from mineral soils, or, if the Party considers these emissions as insignificant, provide in the NIR sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Addressing. Iceland did not include estimates of the N ₂ O emissions from mineral soils in CRF table 3.D, and there is no information in the NIR showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. According to table 10.7 of the NIR, the issue is included in the improvement plan for the next submission. During the review, the Party changed the notation key to “NO” in CRF table 3.D, but an explanation is still missing from the

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			NIR. The ERT noted that the Party reported gains on mineral soils in the category cropland remaining cropland in the LULUCF sector (see ID# L.40 in table 6).
A.21	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N ₂ O (A.6, 2017) (A.4, 2016) (A.4, 2015) (63, 2014) (59, 2013) Transparency	Include in the NIR a comparison of the country-specific N ₂ O EF for the cultivation of histosols with peer-reviewed studies.	Not resolved. Iceland did not provide a comparison of the country-specific N ₂ O EF for the cultivation of histosols with peer-reviewed studies in the NIR. During the review, the Party provided the necessary information for the EF and explained that the inclusion of a comparison of the country-specific EF with others from peer-reviewed studies is among the planned improvements (see ID# A.38 in table 6).
A.22	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N ₂ O (A.23, 2017) Accuracy	Correct the misallocation of N ₂ O emissions by moving the N ₂ O emissions under the subcategory other (4.II.H) in CRF table 4(II) to the subcategory cultivation of organic soils (3.D.a.6) in CRF table 3.D.	Not resolved. There was no change in the estimates for the category, except for a slight change in the AD values of less than 0.01 per cent for the time series. Although the Party reported that the area estimated for cultivated organic soils in 1990 was 65.1 kha, and that this area has decreased steadily since then and was estimated to be less than 56.0 kha in 2017 (NIR, section 5.6.6, p.119), no information was provided on the drained organic soils that should be reported under this category. During the review, Iceland indicated that the emissions reported under category 4.II.H would be moved to category 3.D.a.6 in the next submission. The ERT believes that future ERTs should consider this issue further to ensure that there is no underestimation of emissions.
A.23	3.D.b.1 Atmospheric deposition – N ₂ O (A.24, 2017) Accuracy	Make a thorough examination of N flow to estimate emissions from N volatilized from atmospheric deposition reported in CRF table 3.D and consider including in the NIR a table with the overall mass balance of N, including information on N volatilized as NO _x , nitric oxide and N ₂ O.	Not resolved. There is no table with the overall mass balance of N containing information on N volatilized as NO _x , nitric oxide and N ₂ O and there is no information on the examination of N flow in the NIR (section 5.7.2). During the review, the Party indicated that improvements are planned for future submissions.
A.24	3.F Field burning of agricultural residues – CH ₄ and N ₂ O (A.7, 2017) (A.5, 2016) (A.5, 2015) (54, 2014) Transparency	Include in the NIR additional information on the non-occurrence of the field burning of agricultural crop residues.	Not resolved. In the NIR (section 5.1.4, p.99), the Party reported that it aims to include information on the non-occurrence of the field burning of agricultural crop residues in future submissions. This was reaffirmed during the review.
LULUCF			
L.1	4. General (LULUCF) (L.1, 2017) (L.2, 2016) (L.2, 2015) (67, 2014) Transparency	Enhance the transparency of the information in the NIR on the uncertainty analysis.	Not resolved. The LULUCF chapter of the NIR (chap. 6) includes information on uncertainties; however, underlying methods and expert judgments used were not reported. During the review, Iceland stated that it would take this issue into consideration for future submissions. The ERT suggests that Iceland provide transparent information on uncertainty under each category, including uncertainty calculation procedures, values and the sources that the uncertainty is based on. The transparency can be further enhanced by providing estimates for AD,

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			EFs and other parameters, for example in tabular format.
L.2	4. General (LULUCF) – CO ₂ , CH ₄ and N ₂ O (L.14, 2017) Convention reporting adherence	Conduct an uncertainty assessment of all carbon pools and gases in the LULUCF sector in accordance with decision 24/CP.19, annex I, paragraph 15.	Not resolved. Iceland did not provide an uncertainty assessment for some carbon pools, such as DOM and soil for certain land-use categories. In accordance with decision 24/CP.19, annex I, paragraph 15, Iceland is to quantitatively estimate the uncertainty of the data used for all source and sink categories using at least approach 1 from the 2006 IPCC Guidelines and report uncertainties for at least the base year and the latest inventory year and the trend uncertainty between these two years. During the review, Iceland indicated that a high-priority process is under way in order to conduct uncertainty assessments for all carbon pools and gases in the LULUCF sector as part of the improvement plan.
L.3	4. General (LULUCF) – CO ₂ , CH ₄ and N ₂ O (L.15, 2017) Comparability	Review and, as appropriate, revise the use of notation keys under the LULUCF sector for categories estimated using a tier 1 method, in line with decision 24/CP.19, annex I, paragraph 37, and provide additional information to justify why the notation keys used are appropriate.	Addressing. The ERT noted that the Party has improved the use of appropriate notation keys, such as reporting “NA” instead of “NE” for mineral soils under forest land. However, the Party used “NE” incorrectly, for example when using a tier 1 method where it could be assumed that there was no CSC, for example for litter under forest land remaining forest land. During the review, Iceland indicated that work is ongoing as part of planned improvements to review and revise the use of notation keys under the LULUCF sector for categories estimated using a tier 1 method. The ERT notes that, in cases of a tier 1 method and zero CSC assumed, “NA” would be the appropriate notation key.
L.4	Land representation (L.2, 2017) (L.3, 2016) (L.3, 2015) (68, 2014) Transparency	Select the required information and organize it in a manner that enables the reader to clearly understand the data sources and their quality and the methodology used to derive the land representation.	Not resolved. The discussion of land representation in the 2019 NIR (section 6.1) was not reorganized compared with the 2017 NIR. During the review, Iceland stated that it would consider the recommendation for future submissions. The ERT considers that Iceland could improve the transparency of its reporting by providing the following information on land representation in an appropriate format (such as tabular) for each category: (1) the data sources; (2) the time series of raw data; (3) the methodology applied for filling in gaps in the raw data, if any; (4) the methodology applied, including assumptions and inferences, to derive the land category areas from the raw data; (5) the methodology applied for filling in gaps in the time series of areas, if any; (6) the transition time of the land category (for land in conversion categories); and (7) any other relevant information.
L.5	Land representation (L.16, 2017) Transparency	Improve the land representation data used to report LULUCF emissions and removals under the Convention by reconciling all data on areas contained in databases and land-use maps, as well as data collected from observations,	Addressing. The land transition matrix reported by Iceland (CRF table 4.1) was based on data for 1990–2017. The Party improved the reporting by updating CRF table 4.1 with yearly changes instead of cumulative change areas during the conversion period. In addition, table 6.6 of the NIR provides information on

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		including an estimation of uncertainties related to AD once land matrices are improved and updated.	estimates other than land-use map data. The ERT noted inconsistencies between CRF table 4.1 and the corresponding CRF tables on carbon stocks (4.A–4.D and 4.F) for several years across the time series, such as the final cropland area in CRF table 4.1 and the total cropland area in CRF table 4.B. The ERT considers that the information provided by Iceland in sections 6.3 (p.138) and 11.2.2 (p.246) of the NIR on reconciling all data sources is still not adequate in explaining the inconsistencies observed in the land areas reported in the CRF tables across the time series.
L.6	Land representation (L.16, 2017) Transparency	Continue to update land use cover maps and revise the land representation time series and, if appropriate, create land-use subcategories that could better reflect the actual land cover and use to ensure adequate and consistent data over time, including specifying which IPCC approach is used for land representation by providing explanations in the NIR.	Resolved. The Party revised the land representation time series for land-use categories with major changes for grassland, wetlands and other land. The most important revision, as reported by the Party in the NIR (section 6.1.1), is the inclusion of the first habitat map of Iceland, which provides data for more detailed stratification of land cover with 64 terrestrial land cover types, instead of the 6 or 12 classes of the Icelandic Farmland Database. Moreover, Iceland improved the reporting of land areas by providing information on the IPCC approaches used in the NIR (section 6.4, p.138), where it is stated that the reporting is mostly in accordance with approach 1, although approaches 2 and 3 are used for some categories.
L.7	4.A Forest land – CO ₂ (L.3, 2017) (L.4, 2016) (L.4, 2015) (69, 2014) Transparency	Provide an additional description of the processes by which CSC and associated emissions and removals are estimated, including tables with raw data and intermediate outputs stratified by year and forest type.	Addressing. The Party reorganized the structure of section 6.5 of the NIR on forest land. However, the NIR does not contain an additional description or related information to explain estimation processes and large inter-annual variations in gains in cultivated forests. During the review, Iceland referred to the explanation in the NIR (section 6.5.1.2, pp.141–144) and stated that the raw data are too numerous to be presented in tables. The ERT considers that Iceland could improve the transparency of the NIR by, for example, including summary tables of average carbon stocks with relevant data on forest areas and intermediate outputs stratified by year and forest type, which could clearly show the reasons for inter-annual variations in EFs related to CSC on both forest land remaining forest land and land converted to forest land.
L.8	4.A Forest land – CO ₂ (L.17, 2017) Completeness	Improve the estimates of CSC under forest land, particularly by including estimates for the deadwood and litter carbon pools, or provide an explanation in the NIR and in CRF table 9 of why these pools could not be estimated.	Addressing. Iceland reported net CSC of litter as “NE” in CRF table 4.A without providing a relevant explanation in CRF table 9. However, Iceland improved the reporting of the deadwood pool by reporting “NO” for losses from the pool that were not occurring, referring in the NIR to research papers stating that the pool is likely a sink (section 6.5.1, pp.143–144). The Party indicated in the NIR (section 6.5.1) that deadwood is measured on sample plots and estimated, and that future improvement is

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			needed in order to include deadwood in stumps, root stock of cut trees and standing dead trees as losses of biomass, as well as continuous decomposition of all deadwood. During the review, Iceland confirmed planned improvements to address this issue.
L.9	4.A.1 Forest land remaining forest land – CO ₂ (L.4, 2017) (L.9, 2016) (L.9, 2015) Comparability	Estimate and report CSC in mineral soils under forest land remaining forest land.	Resolved. In the NIR and CRF table 4.A, Iceland replaced “NE” with “NA” for CSC in mineral soils under forest land remaining forest land. During the review, Iceland explained that the tier 1 approach is used for the pool and that the CSC is assumed to be zero, as noted in the NIR (section 6.5.1.1, p.144).
L.10	4.A.2 Land converted to forest land – CO ₂ (L.18, 2017) Transparency	Include transparent information in the NIR on carbon stock for the land-use categories occurring in Iceland.	Not resolved. In CRF table 4.A, carbon losses of living biomass for other land and areas of grassland converted to forest land (such as afforestation: natural birch forest 1–0 years old) were reported as “IE”. However, the ERT considers that it is not clear where these losses are included (see NIR section 6.5.1.2, pp.141–144). The ERT noted, as reported in the 2017 ARR, that the above-ground biomass up to 200 m above sea level, including litter and standing dead biomass, is more than 10 times higher than the IPCC default values for grasslands. Moreover, the measured value of 12.7 t C/ha is used for land-use conversion to cropland (NIR, section 6.6.2.2, p.150) but the default carbon stock for cropland is 5 t C/ha (see table 5.9 in vol. 4 of the 2006 IPCC Guidelines). There is no information in the NIR on the reasons for the high carbon content in these pools compared with the IPCC default values.
L.11	4.A.2 Land converted to forest land – CO ₂ (L.18, 2017) Accuracy	Implement the calculation methods in line with equations 2.15 and 2.16 of volume 4 of the 2006 IPCC Guidelines with instant oxidation of all amounts of living biomass and litter when making land-use conversions, unless Iceland can document that the carbon stock before land-use conversion is maintained in the land converted.	Not resolved. Iceland has not implemented the calculation methods in line with equations 2.15 and 2.16 of volume 4 of the 2006 IPCC Guidelines. The ERT considers that living biomass in the land that is converted should be assumed to be a loss of carbon. It is unclear to the ERT how much of the measured biomass in grassland converted to forest land will disappear after conversion and how it is included in the national forest inventory. The Party did not document that the carbon stock before land-use conversion is maintained in the converted land (see ID# L.10 above).
L.12	4.B.1 Cropland remaining cropland – CO ₂ (L.5, 2017) (L.10, 2016) (L.10, 2015) Completeness	Estimate and report CSC in mineral soils under cropland remaining cropland.	Resolved. Iceland estimated the annual change of SOC for mineral soils for the first time in the 2018 submission (2018 NIR, section 6.5.1.2, p.140). During the review, Iceland explained that, for the 2018 submission, the estimates were recalculated back to 1990 using a tier 2 method.
L.13	4.B.2 Land converted to cropland (L.7, 2017) (L.11, 2016) (L.11, 2015) Accuracy	Estimate the area of forest land and other land that was converted to cropland before 1990 and report these values under the appropriate categories.	Addressing. During the review, Iceland explained that no data are available to support such an estimate. The decision to report forest land converted to cropland as “NO” for 1990–2014 in CRF table 4.B was based on expert judgment. With regard to other land converted

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L.14	4.B.2.2 Grassland converted to cropland – CO ₂ (L.8, 2017) (L.6, 2016) (L.6, 2015) (71, 2014) Accuracy	Ensure the equivalence of climatic, historical and edaphic conditions when analysing pairs of samples (i.e. in cropland and grassland) to determine the dynamic of the soil carbon stocks associated with conversion among the two land uses.	<p>to cropland, the Party explained that organic soils were reported as “NO” because other land does not contain organic soil; and mineral soils were reported as “IE” because the emissions are reported under grassland converted to cropland in table 4.B. Iceland indicated that it would improve the information on the notation key “IE” in the documentation box of CRF table 4.B in future submissions. The ERT welcomes the planned improvement and suggests that the Party present explanations of the use of “NO” and “IE” transparently in the NIR, as it did during the review.</p> <p>Not resolved. The NIR specifies that the underlying data will be explored to ensure greater equivalence of the pairs of samples with a view to determining the dynamic of the soil carbon stocks associated with conversion between cropland and grassland (NIR table 10.8). Information on the EF of mineral soils was reported in CRF table 4.B (0.1 t C/ha) for grassland converted to cropland but an explanation of how the EF is derived is missing from the NIR. The corresponding EF of mineral soils for cropland converted to grassland was reported as –0.10 t C/ha. The ERT is of the view that this can be the case for linear changes. However, the ERT notes that cropland is usually cultivated on better soils and that the grassland category also covers degraded areas, including those that are revegetated, and that the NIR contains no information on how this is taken into account (see sections 6.6.1.2–6.6.2.6, pp.148–151, and section 6.7.2.2, p.159). During the review Iceland explained that the recommendation would be considered for future submissions.</p>
L.15	4.C Grassland – CO ₂ (L.9, 2017) (L.7, 2016) (L.7, 2015) (72, 2014) (67, 2013) Completeness	Prepare estimates for the emissions from degraded areas of grassland.	Addressing. According to table 10.8 of the NIR, this estimate is under preparation, but the methodology needs further development for which funding must be secured. During the review, Iceland explained the ongoing process for estimating emissions from degraded areas of grassland and clarified that the issue would be addressed as part of planned improvements.
L.16	4.C.1 Grassland remaining grassland – CO ₂ (L.10, 2017) (L.12, 2016) (L.12, 2015) Completeness	Estimate and report CSC in mineral soils under grassland remaining grassland for “Natural birch shrubland – old” and “Revegetated land older than 60 years”.	Addressing. In the NIR Iceland indicated that it lacks the financial and human resources needed to perform an analysis of the collected soil samples in order to produce an estimate of CSC in mineral soils for grassland remaining grassland (NIR table 10.8, p.235). During the review, Iceland clarified that the subcategory natural birch shrubland – old is currently reported as “NA” and the Party will revise the estimate in the future submissions. Revegetated land older than 60 years emerges as a small area (4.14 kha in 2017) for this category. This area is not at present recognized as a separate mapping unit but is assumed to be included in the mapping unit RV before 1990, despite the

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L.17	4.C.2 Land converted to grassland – CO ₂ (L.19, 2017) Accuracy	Revise the CO ₂ estimates for land converted to grassland using updated data on carbon sequestration in soils, especially for other land converted to grassland, and include in the NIR, in tabular format, the total estimates of CSC in living biomass, litter and soil, and the average CSC per area for the whole time series, in land converted to grassland and land converted to forest land.	limited area of that mapping unit. CSC in mineral soils on revegetated land older than 60 years is reported as “NE” for 1990–2015 owing to a lack of sufficient data and as “NO” for 2016–2017 in line with the tier 1 method, where equilibrium is assumed on mineral soils since there is no change in land use, management or input. The ERT notes that, according to the UNFCCC Annex I inventory reporting guidelines, “NA” should be reported in the CRF tables under the Convention for zero CSC (see decision 24/CP.19, annex I, para. 37(c)). Not resolved. The CO ₂ estimates for carbon sequestration on land converted to grassland, especially for other land converted to grassland, have not been revised. During the review, Iceland informed the ERT that it is working on an improvement plan for future submissions.
L.18	4.D.2.3 Land converted to wetlands – CO ₂ (L.11, 2017) (L.13, 2016) (L.13, 2015) Transparency	Estimate and report CSC in mineral soils under land converted to wetlands.	Addressing. Iceland reported CSC in mineral soils as “NE” under land converted to other wetlands – refilled lakes and ponds. With regard to the subcategory rewetted wetland soils, during the review Iceland indicated that it reported the CSC in mineral soils under land converted to other wetlands in CRF table 4.D for 2016 and 2017 where data on the area were available and reported the associated emissions under the mineral soils pool. For other years, the rewetted areas are assumed to be organic. The ERT welcomes the clarification and considers that including this information in the NIR would improve its transparency. The ERT noted that “NO” for 1996–2015 rather than “IE” would be more appropriate for mineral soils if the activity occurs under organic soils. The ERT also noted that the Party indicated that the issue is to be included in planned improvements for future submissions (NIR table 10.8, p.236). The ERT further noted that the 2006 IPCC Guidelines (vol. 4, chap.7, p.7.20) do not provide any methodology for estimating CSC in soils due to land conversion to flooded land.
L.19	4.D.2.3 Land converted to wetlands – CO ₂ (L.20, 2017) Transparency	Correct the statement in section 6.7.3.2 of the NIR referring to the reporting of aggregate CSC for mineral and organic soils so as to clarify that the value reported in CRF table 4.D as loss from mineral soils on land converted to wetlands consists of two subcategories (grassland converted to flooded land and other land converted to flooded land) and that	Not resolved. There has been no change in the text compared with the 2017 NIR (section 6.7.3.2). Iceland had not updated section 6.8.1.2 of the NIR (p.162). During the review, Iceland explained that CSC is reported separately for mineral soils for grassland and other land converted to flooded land and for organic soils for mires converted to reservoirs. The Party explained that the discrepancies in the reporting will be checked and corrected for the next annual submission.

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		CSC in mineral and organic soils are reported separately in the CRF tables.	
L.20	4.E.2 Land converted to settlements – CO ₂ (L.12, 2017) (L.14, 2016) (L.14, 2015) Completeness	Estimate and report CSC in mineral soils under land converted to settlements.	Not resolved. Iceland reported CSC in mineral soils as “NE” under land converted to settlements except for conversion from forest land and grassland (natural birch shrubland). During the review, Iceland indicated that it has not started estimating CSC in mineral soils for the category land converted to settlements. According to the NIR (table 10.8), Iceland has noted the recommendation and will address it in the category-specific planned improvements.
L.21	4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – N ₂ O (L.21, 2017) Accuracy	Correct the N ₂ O emission estimates by using the default N ₂ O EFs from the Wetlands Supplement or provide additional information that supports the use of other N ₂ O EFs that may be more representative of the country’s specific conditions.	Resolved. Iceland used a tier 2 method and country-specific EF to estimate N ₂ O emissions from drained organic grassland soils converted to forest land, and the same EF (0.44 kg N ₂ O-N/ha) was used for the drained organic soils in forest land remaining forest land. The methodology is described in the NIR (section 6.14.1.2, p.173).
L.22	4(III) Direct N ₂ O emissions from N mineralization/ immobilization – N ₂ O (L.13, 2017) (L.15, 2016) (L.15, 2015) Completeness	Estimate direct N ₂ O emissions from N mineralization associated with the loss of soil carbon resulting from land converted to settlements for the entire time series of the GHG inventory or, if the Party considers these emissions as insignificant, provide in the NIR sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Resolved. Iceland estimated direct N ₂ O emissions from N mineralization associated with the loss of soil carbon resulting from land converted to settlements from forest land for the first time in the 2018 submission for 2004 onward and reported “NO” for AD and emissions for 1990–2003.
L.23	4(IV) Indirect N ₂ O emissions from managed soils – N ₂ O (L.22, 2017) Completeness	Estimate and report indirect N ₂ O emissions from managed soils, excluding those from agricultural lands that are reported in CRF table 3.D, and, where the notation key “IE” is used, indicate in the NIR and in the documentation box of the corresponding CRF table where in the inventory the emissions have been included and report information on the use of this notation key in CRF table 9.	Not resolved. Iceland reported indirect N ₂ O emissions from managed soils as “IE” in CRF table 4(IV) and no quantitative data were reported for the whole time series. During the review, Iceland indicated that emissions related to atmospheric deposition and N leaching and run-off are reported under the agriculture sector (category 3.D.b). The corresponding explanation is provided in the NIR (section 6.16.1.1). However, an explanation of the use of “IE” is not provided in the documentation box of CRF table 4(IV) or in table 9. The ERT noted that, according to section 5.6.2 (p.117) of the NIR, the AD in CRF table 3.D do not include the amount of fertilizer applied in forestry. Based on the information in the NIR, the ERT is of the view that indirect N ₂ O emissions from managed forest soils are not included in the reporting in CRF table 3.D and should consequently be included in CRF table 4(IV) regarding forest land.
L.24	4(V) Biomass burning – CO ₂ , CH ₄ and N ₂ O (L.23, 2017) Transparency	Correct the use of notation keys to report on emissions from biomass burning in CRF table 4(V).	Not resolved. Iceland reported values for biomass burning but also reported “NA”, “NE” or “NO” in CRF table 4(V) for several categories and gases. The Party continues to

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			<p>report “NE” for controlled burning for grassland, wetlands and settlements although, according to the 2017 ARR, controlled biomass burning does not occur in the country. During the review, Iceland stated that a description of controlled biomass burning is provided in section 6.17.1.1 of the NIR and explained that controlled burning of forest land is considered to be “NO”. Controlled burning on grazing land near farms used to be common practice in sheep farming, while on grassland and wetlands it is becoming less common and is now subject to licensing. Recording of the activity is minimal, although formal approval is needed from the local police for safety and birdlife protection purposes. Controlled burning was reported as “NE” in CRF table 4(V) for land converted to grassland, land converted to wetlands, and settlements, as it is considered to be minimal. The ERT is of the view that providing further information in the NIR on why “NE” is reported for some categories instead of “NO”, with relevant justification of the notation key used, will improve the transparency of the reporting (see ID# L.41 in table 5).</p>
Waste			
W.1	5. General (waste) (W.12, 2017) Comparability	Use the notation key “NA” in the NIR when reporting information on the following GHGs and subcategories: N ₂ O emissions from managed waste disposal sites (5.A.1); N ₂ O emissions from unmanaged waste disposal sites (5.A.2); CO ₂ emissions from biological treatment of solid waste (5.B); CO ₂ emissions from domestic wastewater (5.D.1); and CO ₂ emissions from industrial wastewater (5.D.2).	Resolved. In table 7.2 of the NIR (p.178), the Party provided information on the completeness of the reporting on the waste sector. For both managed and unmanaged waste disposal sites (categories 5.A.1 and 5.A.2, respectively), N ₂ O emissions were reported as “NA”. CO ₂ emissions from the biological treatment of solid waste (5.B), domestic wastewater (5.D.1) and industrial wastewater (5.D.2) were also reported as “NA” in table 7.2 of the NIR.
W.2	5.A Solid waste disposal on land – CH ₄ (W.1, 2017) (W.1, 2016) (W.1, 2015) (78, 2014) Transparency	Include information in the NIR on the AD used.	Resolved. Information on the amount of waste deposited in SWDS, categorized by type of waste, has been collected and is presented in the waste chapter of the NIR in tables 7.3–7.4 (see ID# W.14 in table 6).
W.3	5.A Solid waste disposal on land – CH ₄ (W.3, 2017) (W.7, 2016) (W.7, 2015) Transparency	Present in the NIR information on how the CH ₄ generation rate and half-life for construction and demolition waste were chosen.	Resolved. The Party clarified in NIR table 10.9 (p.242) that since there was insufficient justification for the use of country-specific CH ₄ generation rate and half-life values for construction and demolition waste, the IPCC default values for industrial waste were used for construction and demolition waste in the IPCC first-order decay model in the recalculated estimates for the category (see ID# W.13 in table 6).
W.4	5.A Solid waste disposal on land – CO ₂ (W.5, 2017) (W.9,	Report CO ₂ emissions from the subcategories anaerobic managed waste disposal sites (5.A.1.a), unmanaged waste disposal sites	Resolved. The Party consistently reported “NO” in table 7.2 of the NIR and in CRF table 5.A. Justification was provided for the use of the notation key as the Party explained that the

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
2016) (W.8, 2015) Transparency		(5.A.2) and uncategorized waste disposal sites (5.A.3) or, if the Party considers these emissions as insignificant, provide in the NIR sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	practice of open burning in SWDS does not occur in Iceland (NIR, table 10.9).
W.5	5.B.1 Composting – N ₂ O (W.13, 2017) Accuracy	Estimate N ₂ O emissions from composting using the default N ₂ O EF for composting given in the 9 th corrigenda for the 2006 IPCC Guidelines.	Resolved. As noted in section 7.3.3 of the NIR and CRF table 5.B, the Party uses the default IPCC EF to estimate N ₂ O emissions from composting with a value of 0.24 g N ₂ O/kg (on wet-weight basis) in line with the 9 th corrigenda for the 2006 IPCC Guidelines (see www.ipcc-nggip.iges.or.jp/public/2006gl/corrigenda9.html).
W.6	5.D Wastewater treatment and discharge – CH ₄ and N ₂ O (W.8, 2017) (W.5, 2016) (W.5, 2015) (81, 2014) (74, 2013) Transparency	Include in the NIR more background data on sludge removal (e.g. amount and N content), clearly indicating in which category the resulting emissions are accounted for.	Addressing. The Party explained in the NIR that emissions from sludge removal are accounted for under waste disposal sites (category 5.A.1.a) (section 7.5.4.2, p.207) and provided the amount of sludge removed and N in effluent in table 7.15. However, CRF table 5.C reports sewage sludge incineration. The ERT noted that the removed sludge is sent to SWDS and incinerated, as the figures for sludge disposal in SWDS and the volume of sludge incinerated equal the amount of sludge removed. Further, the NIR (section 7.5.7) states that Iceland plans to add further background information on sludge removal (e.g. amount and N content) to improve transparency in terms of where the resulting emissions are accounted for (see ID# A.18 above).
W.7	5.D Wastewater treatment and discharge – N ₂ O (W.9, 2017) (W.6, 2016) (W.6, 2015) (82, 2014) (75, 2013) Transparency	Investigate the issue of the protein intake further and report on any new results for N ₂ O emissions from human sewage based on the yearly per capita protein intake.	Resolved. In its 2019 submission, the Party used the average protein consumption values of 37.23 kg/capita/year for 1990–2001 and 32.85 kg/capita/year for 2002–2017. The values were updated in the 2018 submission, in line with three dietary survey reports by the Icelandic Nutrition Council for 1990, 2002 and 2010–2011. The figures used by the Party remain lower than those reported in FAOSTAT (see http://www.fao.org/faostat/en/#home). During the review, the Party provided sufficient documentation on the national surveys conducted supporting the values (see ID# W.15 in table 6), in addition to the information provided in section 7.5.2.2 of the NIR. The Party also explained that a new survey is planned for 2019, the results of which will be considered when they are available.
W.8	5.D Wastewater treatment and discharge – N ₂ O (W.10, 2017) (W.12, 2016) (W.11, 2015) Transparency	Provide in the NIR the information used to estimate emissions from wastewater treatment and discharge, that is population of the country, protein consumption and total organic matter in the wastewater, for the entire time series, and ensure this information	Resolved. In its NIR, the Party provided information on population, protein consumption and TOW (table 7.12, p.203) for the entire time series and the information is consistent between the NIR and CRF table 5.D.

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
		is consistent between the NIR and the CRF tables.	
W.9	5.D.2 Industrial wastewater – CH ₄ (W.11, 2017) (W.13, 2016) (W.12, 2015) Transparency	Correct the use of notation keys in the NIR to report CH ₄ emissions from industrial wastewater.	Resolved. The Party consistently reported industrial wastewater as “IE” in both CRF table 5.D (total organic product, N in effluent, CH ₄ and N ₂ O emissions) and table 7.2 of the NIR. Supporting information was also reported in the NIR (section 7.5.2.1) and in CRF table 9.
KP-LULUCF activities			
KL.1	General (KP-LULUCF activities) (KL.1, 2017) (KL.3, 2016) (KL.3, 2015) Transparency	Provide information on how harvesting or forest disturbance that is followed by the re-establishment of a forest is distinguished from deforestation.	Resolved. Relevant information on harvesting and forest disturbance versus deforestation is provided in the NIR (section 11.4.2, p.250, and section 11.5.4, p.251). In table 10.8 of the NIR, Iceland explained that all permanent deforestation has to be reported to the forest authority, which makes it distinct from clear-cut fields. Iceland clarified that no reportable natural disturbance events have been detected in forests under afforestation or FM.
KL.2	General (KP-LULUCF activities) – CO ₂ , CH ₄ and N ₂ O (KL.2, 2017) (KL.4, 2016) (KL.4, 2015) Transparency	Include in the NIR country-specific information on the associated FM and AR and background levels of emissions associated with annual disturbances, as well as information on a margin and how to avoid the expectation of net credits or net debits during the commitment period, including through the use of a margin.	Addressing. The NIR indicates that no historical data on natural disturbance events of forests under AR and FM exist, so a calculation of background level and margin as described in the Kyoto Protocol Supplement (pp.2.45–2.54) is not possible and should be reported as zero or “NO” (NIR, sections 11.4.4 and 11.5.4). Iceland reported “NE” for background level and margin under FM in CRF table 4(KP-I)B.1.3 and “NO” in table 4(KP-I)A.1.1 under AR. However, the Party did not provide sufficient information on the data and methods used in the NIR to show what these estimates are based on (see ID# KL.5 below). The ERT noted that the Party provided estimates of background level and margin for FM in its 2016 submission. During the review, Iceland stated that the recommendation is included under planned improvements.
KL.3	General (KP-LULUCF activities) – CO ₂ , CH ₄ and N ₂ O (KL.3, 2017) (KL.5, 2016) (KL.5, 2015) Transparency	Report information clearly demonstrating that emissions by sources and removals by sinks resulting from FM under Article 3, paragraph 4, and any elected activities under Article 3, paragraph 4, are not accounted for under activities under Article 3, paragraph 3.	Addressing. Iceland has added a section to the NIR (section 11.5.5) on information that demonstrates that emissions and removals resulting from elected Article 3, paragraph 4, activities are not accounted for under activities under Article 3, paragraph 3, but the section does not include any information. However, section 11.1.3 provides information on afforestation and FM definitions. Iceland also reported the hierarchy between afforestation and FM in section 11.1.4 (p.245). The ERT is of the view that the Party should include additional information under section 11.5.5 on Article 3, paragraphs 3 and 4, activities to improve the transparency of the reporting regarding the recommendation. During the review, the Party indicated that the recommendation would be taken into consideration for future submissions.
KL.4	General (KP-LULUCF activities) – CO ₂ , CH ₄ and N ₂ O	Provide in the NIR a description of the methodologies used for conducting an uncertainty analysis for KP-LULUCF activities (AR,	Not resolved. Iceland reported AD-related uncertainties in the NIR (section 11.3.2.5, p.249). However, the ERT noted that the information provided on uncertainties related to

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
	(KL.7, 2017) Transparency	deforestation, FM and HWP), including the methodology used in the uncertainty analysis of AD, EFs and emissions for each carbon pool.	EFs and AD and associated with KP-LULUCF activities was not in accordance with the 2006 IPCC Guidelines in that the Party did not provide information on the uncertainty assessment in a sufficiently transparent manner (e.g. information on methods used for conducting the uncertainty assessment, underlying assumptions, data sources and documentation of expert judgment used to calculate uncertainties) for KP-LULUCF activities, namely AR, deforestation, FM and HWP. During the review, Iceland stated that it would consider this recommendation for future submissions.
KL.5	General (KP-LULUCF activities) – CO ₂ , CH ₄ and N ₂ O (KL.8, 2017) Transparency	Provide information in the NIR on the approach used to develop background level and margin values for FM and AR and demonstrate how the approach taken avoids the expectation of net credits or net debits, in accordance with decision 2/CMP.7, annex, paragraph 33.	Addressing. Iceland reported in the NIR that it intends to apply zero values to background level and margin under AR and FM, respectively (sections 11.4.4 and 11.5.4, pp.250–251). Iceland also reported that no historical natural disturbances were detected in afforestation or FM forests. In accordance with decision 2/CMP.7, annex, paragraph 33, if the background level is defined using a country-specific approach or the Party's reference level is zero, the Party must describe how a margin is established, where a margin is needed (see also ID# KL.2 above).
KL.6	AR – CO ₂ , CH ₄ and N ₂ O (KL.4, 2017) (KL.1, 2016) (KL.1, 2015) (86, 2014) Transparency	Provide an additional description of the process by which CSC and associated emissions and removals are estimated, including tables with raw data and intermediate outputs stratified by year and forest type.	Not resolved. See ID# L.7 above. During the review, Iceland referred to NIR section 6.5.1.2 (pp.141–144), which provides an explanation of the methods used in the reporting, and indicated that raw data tables would be extensive, complicated and unsuited to explaining the CSC calculation process. The Party indicated, however, that the recommendation would be taken into consideration for future submissions. The ERT considers that information explaining the observed inter-annual variation in CSC, in addition to variations related to changes in land area or harvesting, would improve the transparency of the reporting.
KL.7	AR – CO ₂ (KL.9, 2017) Transparency	Correct the use of notation keys by reporting CSC in the HWP pool under AR using the notation key “NO” for the whole time series and provide an explanation in the NIR that harvesting from afforestation lands has not yet occurred.	Addressing. The ERT noted that Iceland reported “NA” and “NO” for CSC in the HWP pool under AR in CRF table 4(KP-I)C. During the review, Iceland stated that the removals under FM and AR are explained in the NIR (section 11.3.1.1, p.247), noting that wood removal after commercial thinning or clear-cutting has not been detected in the national forest inventory in afforestation areas since 1990. Carbon stock losses in living woody biomass are therefore reported as “NO”. All wood removals, on the other hand, are reported under FM. The ERT notes that, as stated in the 2017 ARR, the notation key “NO” would be appropriate for reporting CSC in the HWP pool under AR.
KL.8	Deforestation – CO ₂ , CH ₄ and N ₂ O (KL.5, 2017) (KL.2,	Recalculate CSC in soil organic matter by ensuring symmetry among the pairs of land-use	Not resolved. CSC in soil organic matter was not recalculated and there is no transparent information in the NIR to explain the reasons

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
2016) (KL.2, 2015) (87, 2014) Accuracy	conversions (e.g. grassland converted to forest land, and forest land converted to grassland).	for different EFs being used for soil organic matter. The ERT concludes that these changes are linear according to the NIR. When grassland is converted to cultivated forest land, the reported EF on mineral soils is a gain of 0.37 t C/ha/year (CRF table 4(KP-I)A.1). On the other hand, the opposite change – of cultivated forest land to grassland – leads to a loss of carbon amounting to 0.62 t C/year on mineral soils (CRF table 4(KP-I)A.2). Iceland clarified during the review that it would recalculate SOC emissions from deforestation to ensure symmetry between afforestation on grassland and deforestation on grassland for the next submission.	
KL.9 FM – CO ₂ (KL.6, 2017) (KL.6, 2016) (KL.6, 2015) Accuracy	Provide the technical correction to the FMRL in the next GHG inventory submission.	Resolved. Iceland provided a technical correction to the FMRL and reported it in the 2018 NIR (section 11.5.3, pp.233–234).	
KL.10 FM – CO ₂ (KL.10, 2017) Completeness	Report information on CSC in below-ground biomass for FM or provide justification that the carbon pool is not a net source in accordance with decision 2/CMP.8, annex II, paragraph 2(e).	Not resolved. Iceland reported gains for below-ground biomass under FM on cultivated forest land for 2013–2017 but reported corresponding losses as “NE” for 2013–2017. Otherwise, “NA” was reported. Iceland did not provide a justification for reporting “NE” or explain why this carbon pool is not a net source. During the review, Iceland explained that it would take this issue into consideration for future submissions.	
KL.11 RV – CO ₂ (KL.11, 2017) Accuracy	Revise estimates of carbon stock in living and dead biomass as well as carbon stock in soils in revegetated areas and revise estimates of carbon sequestration in revegetated land for the whole time series.	Addressing. The carbon stocks in living and dead biomass and CSC in soils in revegetated land have only been slightly revised owing to a change in the AD. According to the explanation in the NIR (section 11.2.1.2, p.148), the National Inventory on Revegetation Area database was recently expanded to include activities recorded as “farmers revegetate the land”. In 2018, the second field sampling of the National Inventory on Revegetation Area began covering both previously sampled areas and new areas added since 2011. This sampling is expected to lead to better estimates in the future as CSC can be reported on the basis of observed changes, rather than only against control sites. During the review, Iceland confirmed that the recommendation would be taken into consideration for future submissions.	
KL.12 HWP – CO ₂ (KL.12, 2017) Transparency	Provide in the NIR information on the calculation of emissions from HWP, including the AD and methodology used, including information on HWP from FM and deforestation, as well as information on how Iceland distinguishes between domestic and imported HWP, in accordance with the requirements in decision 2/CMP.8, annex II, paragraph 2(g)(i).	Addressing. According to the NIR (section 11.6), emissions and removals from HWP have been estimated since the 2017 submission. In addition, the 2019 NIR includes information on annual wood and sawn wood production (table 11.2) for 1996–2016. Identical information is reported in section 6.11.1.1 of the NIR (p.168) and in CRF table 4.G. However, the NIR provides no information on the methodology used to estimate HWP from deforestation and FM and does not explain how Iceland distinguishes between domestic and imported HWP.	

^a References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) in which the issue and/or problem was raised. Issues are identified in accordance with paras. 80–83 of the UNFCCC review guidelines and classified as per para. 81 of the same guidelines. Problems are identified and classified as problems of transparency, accuracy, consistency, completeness or comparability in accordance with para. 69 of the Article 8 review guidelines in conjunction with decision 4/CMP.11.

^b The report on the review of the 2018 annual submission of Iceland was not available at the time of the 2019 review. Therefore, the previous recommendations reflected in table 3 are taken from the 2017 annual review report. For the same reason, 2018 is excluded from the list of review years in which the issue could have been identified.

IV. Issues identified in three successive reviews and not addressed by the Party

9. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues included in table 4 have been identified in three successive reviews, including the review of the 2019 annual submission of Iceland, and have not been addressed by the Party.

Table 4

Issues and/or problems identified in three successive reviews and not addressed by Iceland

<i>ID#</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed^a</i>
General		
G.2	Include in the national registry disaster recovery plan information on the roles and responsibilities of primary and alternate registry personnel in disaster recovery; a communication procedure for the contingency plan; documentation for registry operation in a crisis situation; a periodic testing strategy based on procedures agreed with the registry host; and the time frame in which the registry could resume operations following a disaster	3 (2016–2019)
Energy		
E.1	Report information on electrode consumption, steam coal consumption and petroleum coke consumption that provides justification for significant inter-annual changes and gaps in the time series of fuel consumption and associated emissions	4 (2014–2019)
E.3	Provide more transparent information on the modification methodologies used when recategorizing the data received from NEA	5 (2013–2019)
E.14	Use a consistent methodology for the division of vehicle groups and conduct recalculations for the earlier years of the time series (1990–2005)	4 (2014–2019)
IPPU		
I.1	Report in the CRF tables emission estimates or the relevant notation keys, as appropriate, for the subcategories glass production (2.A.3), ammonia production (2.B.1), adipic acid production (2.B.3), soda ash production (2.B.7) and electronic industry (2.E), and for foam blowing agents (2.F.2), fire protection (2.F.3), solvents (2.F.5) and other applications (2.F.6)	3 (2016–2019)
Agriculture		
A.1	Include detailed explanations of the AD, EFs and emission trends for all categories, including for young cattle population and for N ₂ O emissions from synthetic N fertilizer applied to agricultural soils	4 (2014–2019)
A.11	Include in the NIR information on the circumstances under which the country-specific Nex rates have been estimated	5 (2013–2019)

<i>ID#</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed^a</i>
A.18	Collect information on sewage sludge and other organic fertilizers applied to soils and estimate the related emissions, or, if the Party considers these emissions to be insignificant, provide in the NIR sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines	3 (2015/2016–2019)
A.20	Estimate N ₂ O emissions from mineral soils, or, if the Party considers these emissions as insignificant, provide in the NIR sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines	3 (2015/2016–2019)
A.21	Include in the NIR a comparison of the country-specific N ₂ O EF for the cultivation of histosols with peer-reviewed studies	5 (2013–2019)
A.24	Include in the NIR additional information on the non-occurrence of the field burning of agricultural crop residues	4 (2014–2019)
LULUCF		
L.1	Enhance the transparency of the information in the NIR on the uncertainty analysis	4 (2014–2019)
L.4	Select the required information and organize it in a manner that enables the reader to clearly understand the data sources and their quality and the methodology used to derive the land representation	4 (2014–2019)
L.7	Provide an additional description of the processes by which CSC and associated emissions and removals are estimated, including tables with raw data and intermediate outputs stratified by year and forest type	4 (2014–2019)
L.13	Estimate the area of forest land and other land that was converted to cropland before 1990 and report these values under the appropriate categories	3 (2015/2016–2019)
L.14	Ensure the equivalence of climatic, historical and edaphic conditions when analysing pairs of samples (i.e. in cropland and grassland) to determine the dynamic of the soil carbon stocks associated with conversion among the two land uses	4 (2014–2019)
L.15	Prepare estimates for the emissions from degraded areas of grassland	5 (2013–2019)
L.16	Estimate and report CSC in mineral soils under grassland remaining grassland for “Natural birch shrubland – old” and “Revegetated land older than 60 years”	3 (2015/2016–2019)
L.18	Estimate and report CSC in mineral soils under land converted to wetlands	3 (2015/2016–2019)
L.20	Estimate and report CSC in mineral soils under land converted to settlements	3 (2015/2016–2019)
Waste		
W.6	Include in the NIR more background data on sludge removal (e.g. amount and N content), clearly indicating in which category the resulting emissions are accounted for	5 (2013–2019)
KP-LULUCF activities		
KL.2	Include in the NIR country-specific information on the associated FM and AR and background levels of emissions associated with annual disturbances, as well as information on a margin and how to avoid the expectation of net credits or	3 (2015/2016–2019)

<i>ID#</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed^a</i>
	net debits during the commitment period, including through the use of a margin	
KL.3	Report information clearly demonstrating that emissions by sources and removals by sinks resulting from FM under Article 3, paragraph 4, and any elected activities under Article 3, paragraph 4, are not accounted for under activities under Article 3, paragraph 3	3 (2015/2016–2019)
KL.6	Provide an additional description of the process by which CSC and associated emissions and removals are estimated, including tables with raw data and intermediate outputs stratified by year and forest type	4 (2014–2019)
KL.8	Recalculate CSC in soil organic matter by ensuring symmetry among the pairs of land-use conversions (e.g. grassland converted to forest land, and forest land converted to grassland)	4 (2014–2019)

^a The report on the review of the 2018 annual submission of Iceland has not yet been published. Therefore, 2018 was not included when counting the number of successive years in table 4. As the reviews of the Party's 2015 and 2016 annual submissions were conducted together, they are not considered successive and 2015/2016 is considered as one year.

V. Additional findings made during the individual review of the 2019 annual submission

10. Tables 5 and 6 contain findings made by the ERT during the individual review of the 2019 annual submission of Iceland that are additional to those identified in table 3. In accordance with paragraph 76(b) of the UNFCCC review guidelines, the ERT has prioritized in table 5 recalculations that changed the total emissions or removals for a category by more than 2 per cent and/or national total emissions by more than 0.5 per cent for any of the recalculated years.

Table 5
Additional findings made during the individual review of the 2019 annual submission of Iceland related to recalculations

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a
Energy			
E.22	Fuel combustion – reference approach – electrodes – CO ₂	<p>There were significant recalculations for the net carbon emissions from electrodes reported under the reference approach between the 2018 and 2019 annual submissions (e.g. a change from –95.31 to –450.04 kt C for 2016) that were not sufficiently explained in the NIR. In the “electrodes” row of CRF table 1.A(b) under other solid fossil, Iceland reported net carbon emissions for 1990–2016 and blank cells for 2017. During the review, Iceland explained that electrodes were added to the reference approach estimates a few years ago to cover the electrodes used in primary aluminium production. Electrodes are mainly used for their chemical properties (redox reactions that are key to the metallurgical processes they are used in), rather than for their energy content. Therefore, the Party considers that they should be included only under the IPPU sector and not under the energy sector, but, owing to technical issues with CRF Reporter, the entry was not removed from the 2019 submission. As a result, the apparent consumption is not reported and there is more carbon stored than carbon content according to apparent consumption, which leads to negative emissions, causing large discrepancies between the sectoral and reference approach (e.g. –98.15 per cent for 2015) across the time series.</p> <p>The ERT recommends that the Party remove the separate entries for electrodes from the reference approach and report the correct apparent consumption for the reference approach, allowing for meaningful comparison between the estimated CO₂ emissions resulting from the two approaches across the time series. The ERT also recommends that the planned recalculation for the reference approach be explained in the next NIR.</p>	Yes. Convention reporting guidelines
E.23	1.A.3.b.i Cars – liquid fuels – CO ₂	<p>The effect of the recalculations due to the attribution of the difference between liquid fuels sold and calculated among vehicle types for 2015 and 2016 between the 2018 and 2019 submissions is a decrease in estimated CO₂ emissions from diesel oil by 22.1 and 17.2 per cent, respectively, while the recalculations resulted in an increase in estimated CO₂ emissions for 2006–2013 (ranging between 2.2 and 55.0 per cent). During the review and in the NIR (p.47), Iceland explained that, from 2006 to 2016, estimates of fuel consumption for road transportation according to different vehicle types were made by EA using information from the Road Traffic Directorate of Iceland, which does not have similar data for previous years. For 1990–2005, fuel consumption according to vehicle type was estimated by NEA. For previous submissions, gasoline usage was calculated on the basis of vehicle-kilometres travelled and the number of vehicles for each vehicle type. The difference between these calculations and national sales statistics was attributed to passenger cars. The same was done for diesel, except that the difference between calculations and national statistics was attributed to heavy-duty trucks and buses. For the 2019 submission, the difference between calculated use and national sales statistics for both gasoline and diesel was recalculated and attributed proportionally to all vehicle types. This caused recalculations for all vehicle types for 2006–2016; however, it did not change the estimated total emissions for road transportation and only had a minor effect on estimated CH₄ and N₂O emissions. The recalculation was not applied to the years before 2006. The ERT considers that, although the explanation could clarify the revisions in the AD for diesel oil consumption, it does not explain the trend in the recalculations (an increase at the beginning of the period followed by a decrease in the most recent years).</p>	Yes. Consistency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a
		<p>The ERT recommends that Iceland revise the AD for fuel consumption for road transportation using a consistent approach across the entire time series. The ERT notes that consistent reporting in the road transportation sector, particularly for cars, could be ensured, for example, by applying the splicing techniques (overlapping) included in the 2006 IPCC Guidelines (vol. 1, chap. 5) to the AD used across the time series. The ERT also recommends that, when applying the recalculation, the Party clearly indicate in the NIR the reason for the changes compared with previously submitted inventories in line with paragraph 45 of the UNFCCC Annex I inventory reporting guidelines (see ID# G.12 in table 6). Further, the ERT encourages the Party to include in the NIR explanations of the impact of the recalculations on the AD and emission trends, particularly where the impact is not uniform across the time series.</p>	
IPPU			
I.6	2. General (IPPU)	<p>Recalculations were made in the IPPU sector that changed the emission estimate for a category by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with these recalculations.</p>	Not an issue/problem
Agriculture			
A.25	3. General (agriculture) – CH ₄ and N ₂ O	<p>Although the 2019 NIR contains relevant sections on recalculations, not all recalculations are reflected in those sections. Thus, the 2019 NIR indicates no recalculations for direct N₂O emissions from managed soils (section 5.6.7). However, according to the reporting in CRF table 3.D, there were changes in AD for N excretion on pasture, range and paddock and for N input from organic N fertilizers applied to cropland and grassland. Similarly, no recalculation was reported for CH₄ emissions from manure management (NIR, section 5.4.4), but according to CRF table 3.B(a)s1 there is a change for the other livestock category for 2015 and 2016, which saw emission reductions of 23.0 and 8.9 per cent, respectively. During the review, the Party provided some of the missing explanations for the recalculations.</p> <p>The ERT recommends that the Party clearly document and justify the recalculations in the NIR in line with paragraph 44 of the UNFCCC Annex I inventory reporting guidelines and include in the NIR up-to-date and complete information on recalculations applied in the sector (e.g. in specific recalculation sections for each category) and ensure consistent reporting on recalculations between the CRF tables and the NIR.</p>	Yes. Transparency
A.26	3.A.1 Cattle – CH ₄	<p>The comparison of emissions between the 2017 and 2019 submissions showed a significant increase in CH₄ emissions in the growing cattle subcategory as a result of recalculation in the 2018 submission. For example, for 2015 there is a 310.3 per cent increase in estimated emissions, with a 120.3 per cent increase in the AD and a 86.2 per cent increase in the IEF in the 2018 submission compared with the 2017 submission. In the 2018 NIR, the Party reported that the EFs had been updated to bring them in line with the 2006 IPCC Guidelines, which resulted in a small increase in estimated emissions (2018 NIR, section 5.4.4, p.108). During the review, the Party explained that the changes are also due to a regrouping of the growing cattle subcategory between the 2017 and 2018 submissions. The differences in population numbers between the 2017 and 2018–2019 submissions can be explained by the fact that the reporting only included calves (22,372 heads in 2015) in the 2017 submission, while in the 2018 submission this category also included heifers and steers (a total of 49,286 heads). As a result, the reported emissions were higher in the 2018 and 2019 submissions, for example for 2015.</p>	Not an issue/problem

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a
A.27	3.B Manure management – N ₂ O	<p>The ERT encourages the Party to include detailed and transparent information in the NIR on all factors affecting the recalculations of respective emissions for a given category (see also ID# A.25 above).</p> <p>The recalculation of N₂O emissions from manure management between the 2018 and 2019 submissions resulted in a 59.0 per cent decrease in N₂O emissions for 2016. Similar decreases are reported for 1990–2015. The recalculations are reflected in the NIR (section 5.5.6), where the Party explained that the recalculations in the agriculture sector were made as a result of comments from the European Union internal review after the submission of data on 15 January 2019. The review revealed that N₂O emissions calculated by the Party were made using the wrong EF for manure managed in solid storage. The EF was updated for all livestock categories and the recalculations resulted in lower estimated N₂O emissions from manure management. N₂O emissions from solid storage and dry lot dropped by up to 75.3 per cent compared with those reported in previous submissions. This recalculation resulted in a change in estimated N₂O emissions from manure management across the entire time series. However, the magnitude of the change and its impact on overall estimated emissions for the category and sector are not included in the NIR.</p> <p>The ERT encourages the Party to include a discussion on the impact of the recalculations on the emission trend at the category, sectoral and national total level, as appropriate, in line with paragraph 43 of the UNFCCC Annex I inventory reporting guidelines.</p>	Not an issue/problem
A.28	3.B.1 Cattle – N ₂ O	<p>The comparison of emissions between the 2017 and 2019 submissions showed a significant increase in N₂O emissions from manure management for the growing cattle category that was due to significant recalculations in the 2018 submission (e.g. an increase by 270.9 per cent for 2015), with minor recalculations in the 2019 submission (no recalculation for 2015). The reported population numbers increased in the 2018 submission (by 120.3 per cent for 2015) and decreased in the 2019 submission (by 13.5 per cent for 2015), while the N₂O IEF for 2015 increased by 68.4 per cent between the 2017 and 2018 submissions and by 15.6 per cent between the 2018 and 2019 submissions. In the 2018 NIR, it was reported that some minor adjustments had been made for the 2018 submission, which resulted in a slight increase in estimated emissions, owing mostly to a correction following the overestimation of the number of foals for the 2017 submission (2018 NIR, section 5.5.6, p.113), and the 2019 NIR indicated that recalculations resulted in lower estimated N₂O emissions. During the review, the Party explained that the changes in population numbers for growing cattle and in the IEF for 2015 in the 2019 submission were due to a software problem. The error did not have an impact on emission estimates and the Party provided the correct population and IEF values to the ERT. Regarding the differences in population numbers between the 2017 and 2018–2019 submissions, there was a change in grouping for the growing cattle subcategory (see ID# A.26 above). The Party did not include a description of this change in the recalculation section of the 2018 NIR.</p> <p>The ERT recommends that the Party correct the reporting of the AD for growing cattle across the time series (see ID# G.12 in table 6).</p>	Yes. Comparability
LULUCF			
L.25	Land representation – CO ₂	<p>Iceland reported considerable recalculations for land areas, especially for grassland (e.g. 32.5 per cent decrease in the total area for grassland remaining grassland for 2016), wetlands (e.g. 55.2 per cent increase in the total area for wetlands remaining wetlands for 2016) and other land areas (e.g. 34.6 per cent increase in the total area for wetlands remaining wetlands for 2016) in its 2019 submission (NIR, sections 6.1 and 10.2.4). The most important revisions were due to the use of the first habitat map of Iceland. Iceland explained the recalculations of AD for different land</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a
		<p>categories in the NIR as well as the level of the changes (section 6.1.1). During the review, Iceland explained that the use of remote sensors to clearly differentiate between habitat types had proved problematic, resulting in considerable uncertainty regarding the precise size and distribution of a number of habitat types. The ERT concluded that the information provided by Iceland on the classification of uncertainties during the review was essential for explaining the changes in the areas of land categories.</p> <p>The ERT recommends that Iceland improve the transparency of the AD reporting by providing information on the uncertainties related to habitat type classification, especially in relation to separating wetlands from grassland and other land.</p>	
L.26	4.C.1 Grassland remaining grassland – CO ₂	<p>Under the natural birch shrubland categories in the NIR (section 6.7.1.1, p.152), the EF of organic soils is reported on the basis of the tier 1 method from the Wetlands Supplement, that is 0.37 t C/ha/year. However, although the EF had been recalculated since the previous submission, the NIR provides no indication of recalculations related to the EF (section 6.7.1.5, p.156). During the review, Iceland explained that a recalculation had been made and should have been indicated in the NIR. Iceland also explained that the description for the EF used (0.37 t C/ha/year) in table 2.1 of the Wetlands Supplement is better suited to shrubland than the grassland factor of 5.7 t C/ha/year, which appears later in the same table and was previously used. The EF reported for natural birch shrubland in NIR section 6.7.1.2 was not updated from 5.7 t C/ha/year to 0.37 t C/ha/year.</p> <p>The ERT recommends that Iceland update the information on the EF used for organic soils under natural birch shrubland in the NIR and ensure that the information in the NIR is up-to-date and consistent with the information reported in the CRF tables.</p>	Yes. Transparency
L.27	4.D Wetlands – CO ₂ and CH ₄	<p>The recalculations under the wetlands category resulted in a 97.5 per cent increase in estimated net CO₂ removals from wetlands for 2016 and a 95.2 per cent increase in estimated CH₄ emissions for the same year. During the review, Iceland explained that, as described in the NIR (p.164), the time series for the area of intact mires was revised according to the new Icelandic Geographic Land Use Database, a land-use map that categorizes a much larger area as intact mire than the one used for previous submissions. The estimates based on the areas data were revised accordingly.</p> <p>The ERT encourages Iceland to transparently report the effect of recalculations related to the AD for wetlands and to the removals of emissions, as it did in NIR section 6.8.2.5, but also to include information on the effects of recalculations on emissions and removals, for example in a tabular format, and on the trends at category and sectoral level.</p>	Not an issue/problem
L.28	4(I) Direct N ₂ O emissions from N inputs to managed soils – N ₂ O	<p>With regard to land converted to forest land, Iceland indicated in the NIR that it reports N₂O emissions from inorganic fertilizers using the default method described in the 2006 IPCC Guidelines (vol. 4, chap. 11.2) (NIR, section 6.13.1.1, p.169). The ERT noted that the default value is of 0.01 kg N₂O-N/kg N and that the reported IEF for 1990–2013 and 2015 was nearly 25 per cent above the default value, approximately 0.013 kg N₂O-N/kg N in the 2019 submission. Much higher IEFs were reported in the 2018 submission for 2014 (0.02 kg N₂O-N/kg N) and 2016 (0.05 kg N₂O-N/kg N) (the 2019 submission saw drops of 42.2 and 75.8 per cent, respectively). According to the NIR, no recalculations were made for this category (p.214). During the review, Iceland explained that it would investigate the EFs and consider whether the amount of inorganic fertilizer was revised or a calculation error occurred.</p>	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a
L.29	4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – CO ₂ , CH ₄ and N ₂ O	<p>The ERT recommends that Iceland check the EF used for inorganic fertilizer and revise it, if appropriate, and report any recalculations made for N₂O emissions from inorganic fertilizers on forest land.</p> <p>Although section 10.2.4 (p.214) of the NIR indicates that no recalculations were made for the category for the 2019 submission, the Party indicated that recalculations were made for land areas under grassland and wetlands (p.213). The ERT noted that the reported area of drained organic soils under grassland decreased by about 21.5 per cent and the reported area of intact mires under wetlands increased by 95.5 per cent for 2016. The ERT also noted recalculated IEFs for CO₂, CH₄ and N₂O emissions from drained organic soils under forest land (CRF table 4(II)); this change took place between the 2017 and 2018 submissions (the CO₂ and CH₄ IEFs for 2015 decreased by 74.8 and 7.6 per cent, respectively). The 2018 NIR indicates that the method is based on a method in the Wetlands Supplement (2018 NIR, section 6.13.1.2, p.164). On the same page, recalculations are only reported for the N₂O in the methodology section. During the review, Iceland indicated that the different IEFs in CRF table 4(II) for forest land in the 2017 and 2018 submissions result from calculation errors and that the IEFs should have remained the same.</p> <p>The ERT recommends that Iceland check and revise, if appropriate, the EFs for CO₂ and CH₄ emissions from drained organic soils under the forest land category in CRF table 4(II) to avoid the possibility of emissions from forest land soils being underestimated and report any recalculations in the next submission (see also ID# G.12 in table 6).</p>	Yes. Accuracy
Waste			
W.10	5. General (waste)	Recalculations were made in the waste sector that changed the emission estimate for a category by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with these recalculations.	Not an issue/problem
KP-LULUCF activities			
KL.13	FM – CO ₂	<p>Iceland reported recalculated EFs for cultivated forests on mineral and organic soils between the 2017 and 2018 submissions in CRF table 4(KP-I)B.1. There is no information on recalculations for FM in the 2018 NIR (section 12.3.1.6). In CRF table 4(KP-1)B.1, Iceland reported the IEF for mineral soils for 2015 as 0.24 t C/ha in the 2017 submission and as 0.21 t C/ha in the 2018 and 2019 submissions. For organic soils, the IEFs were –0.49 t C/ha (2017 submission) and –0.37 t C/ha (2018 and 2019 submissions). During the review, Iceland indicated that part of the FM area under mineral soils includes lands which were converted to forest land less than 50 years ago but before 1990. Carbon sequestration in these forest areas is higher than in those areas that remained forest land for longer. Therefore, the carbon sequestration rate in mineral soils is not fixed. Iceland clarified that the EF for organic soils should have remained unchanged since the 2017 submission and that the value reported in the 2017 submission was an error.</p> <p>The ERT recommends that Iceland report transparently in the NIR any recalculations for FM (including changes in CSC factors for the pools, e.g. mineral and organic soils).</p>	Yes. Transparency
KL.14	FM – CO ₂	Iceland reported slightly lower losses of above-ground biomass for cultivated forests compared with in the previous submission, although this is not mentioned in the NIR. For example, according to the 2019 submission, losses were 0.89 kt C in 2016, while in the 2018 submission they were reported as 0.92 kt C for the same year, with the same	Yes. Transparency

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?^a</i>
		AD. During the review, Iceland indicated that a recalculation had been carried out after discovering a slight error in the wood density calculation for roundwood for one tree species. The ERT recommends that Iceland provide information on any changes in data and methods from previous submissions, including those resulting from a detected error, in future annual submissions.	

^a Recommendations made by the ERT during the review are related to issues as defined in para. 81 of the UNFCCC review guidelines, or problems as defined in para. 69 of the Article 8 review guidelines.

11. Table 6 contains additional findings made by the ERT during the individual review of the 2019 annual submission that are not covered in table 3 or 5, but are within the scope of the desk review as specified in paragraph 76 of the UNFCCC review guidelines or paragraph 65 of the Article 8 review guidelines and are findings that the ERT wishes to convey to the Party.

Table 6

Additional findings made during the individual review of the 2019 annual submission of Iceland

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?^a If yes, classify by type</i>
General			
G.8	National system	The previous ERT noted that the Party is not implementing decision 19/CMP.1, annex, paragraph 10(b), in conjunction with decisions 3/CMP.11 and 4/CMP.11, to an extent that ensures sufficient capacity for the timely performance of the functions defined in the guidelines for national systems, including data collection for estimating anthropogenic GHG emissions by sources and removals by sinks and arrangements for the technical competence of the staff involved in the inventory development process. The current ERT noted that, given the size of the inventory team (3.7 positions) and the team's responsibilities, which include reporting on air pollutants under the Convention on Long-range Transboundary Air Pollution and following up on the implementation of the European Union directive on national emission ceilings (directive 2016/2284), in addition to preparing the GHG inventory submission, the tasks may be highly demanding. During the review, the Party indicated that, since the review in 2017, one position has been added to the EA inventory team, but this has largely been used for reporting on policies, measures and projections to the European Union under European Union regulation 525/2013. Moreover, additional staff were added to the team responsible for the LULUCF sector from the Soil Conservation Service of Iceland and the Icelandic Forest Service, bringing the inventory team to 6.3 positions. The Party explained that, in 2018, major staff changes in the inventory team based at EA affected the team's capacity for implementing the previous review recommendations and improving the team members' technical competence. The Party also indicated that plans are being discussed to add one position at the Soil Conservation Service of Iceland and create two additional positions in	Yes. KP reporting adherence

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
		<p>the EA inventory team, pending national budget approval in 2020. The ERT commends Iceland for preparing and submitting the inventory in a timely manner given the challenges of having a small team with many responsibilities.</p> <p>The ERT recommends that Iceland include in the NIR information on the improvement of the inventory team's technical competence, including the addition of personnel, the division of responsibilities of the current inventory team and any activities undertaken to increase the technical capacity of the inventory team.</p>	
G.9	National system	<p>The Party reported in the NIR that the inventory-related databases are stored on servers in different locations; that is, at EA, the Agricultural University of Iceland, the Icelandic Forest Service and the Soil Conservation Service of Iceland (NIR, section 1.3.3). During the review, the Party explained that, since the inventory is compiled by different agencies, different information technology systems and servers are involved, and there are no plans to centralize the storage.</p> <p>The ERT encourages Iceland to include in the NIR information on its efforts to archive information at a single location as part of its inventory management in line with decision 19/CMP.1, annex, paragraph 17, in conjunction with decisions 3/CMP.11 and 4/CMP.11.</p>	Not an issue/problem
G.10	Article 3, paragraph 14, of the Kyoto Protocol	<p>Iceland did not provide information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its annual submission. In response to questions raised by the ERT during the review, the Party acknowledged that such information has not been updated in the last two years because Iceland does not support many mitigation projects directly linked to fossil fuel use. The Party provided a list of projects it supported, as per its seventh national communication and third biennial report. The ERT concluded that the information provided has not been updated since the previous submission.</p> <p>The ERT recommends that the Party, in its annual submission, report any changes in its information provided under Article 3, paragraph 14, of the Kyoto Protocol in accordance with decision 15/CMP.1 in conjunction with decision 3/CMP.11.</p>	Yes. KP reporting adherence
G.11	QA/QC and verification	<p>Some sections of the NIR still refer to the IPCC good practice guidance as one of the methodological documents for estimating GHG emissions, while other sections refer to the 2006 IPCC Guidelines. For example, in NIR section 1.3.1 (p.6), the Party indicated that the EFs are mainly taken from the 2006 IPCC Guidelines, the IPCC good practice guidance and the IPCC <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>, since limited information is available from emission measurements in Iceland. In section 1.3.2. (p.7), it is indicated that the estimation methods for all GHGs are harmonized with the 2006 IPCC Guidelines and are in accordance with the IPCC good practice guidance. Section 1.6 of the NIR indicates that the uncertainty analysis is in accordance with the tier 1 method of the IPCC good practice guidance and section 1.7 makes reference to the IPCC good practice guidance regarding the assessment of the completeness of the inventory. During the review, Iceland explained that, for the most part, the references to the IPCC good practice guidance are outdated, and it had already rectified some of the references in the 2019 NIR. Iceland also explained that all references would be corrected in the 2020 NIR, and that section 1.7 on completeness would be rewritten for the 2020 submission, taking into account the completeness checks listed in table 6.1 of the 2006 IPCC Guidelines (vol. 1, chap. 6).</p> <p>The ERT recommends that Iceland use the 2006 IPCC Guidelines as the only guidelines for QA/QC procedures and for assessing completeness. The ERT also recommends that Iceland remove all outdated references to earlier IPCC guidelines from the NIR in order to improve its transparency and comparability.</p>	Yes. Convention reporting adherence

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?^a If yes, classify by type</i>
G.12	Recalculations	<p>The Party did not provide in the NIR complete information on the recalculations undertaken since the previous submission. As indicated in ID#s A.25–A.28, L.28, L.29 and KL.13 in table 5, the main issues detected related to the lack of detailed description of recalculations made; inconsistent reporting of the recalculations in the NIR and CRF tables; the failure to cover all of the changes affecting the recalculations, instead only pointing out some of them; and the failure to explain the impact of the recalculations on the emission trends.</p> <p>The ERT recommends that Iceland improve its reporting on recalculations, particularly for the agriculture and LULUCF sectors, by clearly documenting and justifying the recalculations and clearly indicating the reason for the changes compared with previously submitted inventories (e.g. error correction, statistical reasons) in the NIR in line with the UNFCCC Annex I inventory reporting guidelines, annex I, paragraphs 44–45. The ERT also recommends that the Party improve the QC for the NIR to ensure that all changes affecting the recalculation of a given category are included in the description of the recalculations in the NIR and to ensure consistent reporting of the recalculations between the NIR and the CRF tables. Further, the ERT encourages the Party to include in the NIR explanations of the impact of the recalculations on the AD and emission trends at the category and sectoral level.</p>	Yes. Transparency
G.13	Further improvements (identified by the Party)	<p>The Party reported in the NIR the implemented and planned improvements for the preparation of the GHG inventory, such as enhanced collaboration with NEA, revision of the F-gas inventory and implementation of a QA/QC plan (NIR, section 10.4). However, the NIR does not include information on additional planned improvements resulting from the QA/QC exercise, nor does it provide a timeline for the implementation of the improvements. During the review, the Party explained the status of the planned improvements.</p> <p>The ERT encourages Iceland to establish clearer linkages between its improvement plan and QA/QC findings. The ERT also encourages the Party to include timelines and report on the progress of its improvement plans in the NIR.</p>	Not an issue/problem
Energy			
E.24	1. General (energy sector)	<p>Iceland did not provide information on any category-specific QA/QC activities in the sector, although the previous ERT had encouraged the Party (see ID# E.18 in the 2017 ARR) to develop and implement category-specific QC procedures for key categories and for energy sector categories for which significant methodological changes and/or revisions have occurred. During the review, Iceland indicated that it is currently reviewing the QA/QC activities for all sectors and intends to have an updated QA/QC manual ready for the 2020 submission.</p> <p>The ERT encourages Iceland to develop and implement category-specific QC procedures for key categories and for energy sector categories for which significant methodological changes and/or revisions have occurred and to report on them in the next NIR.</p>	Not an issue/problem
E.25	1. General (energy sector)	<p>Although there is a list of planned improvements for the sector, the Party did not present in the NIR a prioritized improvement plan for the energy sector that takes into consideration the previous recommendations and the results of the key category analysis and the uncertainty analysis. The ERT noted a number of recurring issues from previous recommendations (see table 4 above). During the review, Iceland indicated that all QA/QC procedures are currently</p>	Not an issue/problem

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
		being reviewed along with the improvement plan, and that a formal improvement plan was expected to be ready in September 2019.	
		The ERT encourages the Party to develop a prioritized improvement plan for the energy sector that takes into consideration any previous recommendations and the results of the key category analysis and the uncertainty analysis.	
E.26	Fuel combustion – reference approach	The ERT noted a number of differences between the reference and sectoral approach estimates (see ID#s E.22 above and E.27–E.28 below). Iceland explained in the NIR (section 3.6.1, p.56) that there are discrepancies between the data sources used, with data provided by the Directorate of Customs to Statistics Iceland, previously used for the reference approach, and data provided by NEA, which is responsible for reporting national energy statistics to Eurostat (the statistical office of the European Union), which was used for the latest submission and for the sectoral approach. Iceland mentioned in the NIR (section 3.6.1, p.56) that these discrepancies would be analysed with NEA for the next submission. Improvements are also expected to be made to the energy balance drawn up by NEA as a result of collaboration among the agencies providing the data.	Yes. Accuracy
		The ERT recommends that Iceland report the results of the data analysis by NEA in the NIR and ensure the use of consistent AD for the inventory estimates across the time series. The ERT encourages the Party to improve the energy balance as planned and report on the improvements in the next NIR.	
E.27	Fuel combustion – reference approach – jet kerosene – CO ₂	For 2017, Iceland reported CO ₂ emissions from jet kerosene as “NA” in CRF table 1.A(b). Consumption of this fuel is reported under domestic and international navigation in CRF tables 1.A(a) and 1.D. During the review, the Party explained that the data on jet kerosene were omitted from the reference approach because, according to IEA data, the apparent consumption of jet kerosene was a negative number; that is, more was used than imported. The Party indicated that the issue is being investigated in collaboration with NEA. Further, the Party noted that according to recent data, a new importer of jet kerosene had not been included in the data used for the reference approach, which caused the discrepancy. Not reporting jet kerosene has an impact on the comparison between the reference and sectoral approach.	Yes. Convention reporting adherence
		The ERT recommends that the Party correctly report consumption of and CO ₂ emissions from jet kerosene in CRF table 1.A(b).	
E.28	Fuel combustion – reference approach – peat – CO ₂	Peat imports were reported in the 2018 submission for the entire time series. In the 2019 submission, Iceland reported the import of peat as “NO” for 1990–2016 but reported a value for 2017. Net carbon emissions appear as “NE, NO” in CRF table 1.A(b) of the 2019 submission for 1990–2016 but a value of zero is reported for 2017. In both the 2018 and 2019 submissions, peat consumption is reported as “NO” in the sectoral approach (CRF table 1.A(a)) for the entire time series. During the review, Iceland explained that this discrepancy was due to inconsistencies between the data sets from NEA and Statistics Iceland. For the 2018 submission, the Party used the Statistics Iceland data set, whereas it used the NEA data set for the 2019 submission. Iceland plans to hold a meeting with both agencies in order to establish the source of various discrepancies. The Party clarified that peat is usually used for non-energy purposes (such as building or gardening), with no associated GHG emissions. The ERT noted that, in accordance with the 2006 IPCC Guidelines (vol. 2, chap. 1, table 1.1), the NEU of peat is not included in the inventory.	Yes. Transparency
		The ERT recommends that the Party report on peat consistently between the sectoral and reference approach.	

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
E.29	Comparison with international data – solid, liquid and other fuels – CO ₂	<p>The comparisons provided by IEA revealed some discrepancies between the data reported in the CRF tables and the IEA data set. For example, the production of waste (non-biomass fraction) is reported in both data sets for 1993–2010. Previously noted discrepancies for the production of waste for 1993–2010 have been substantially reduced, and production figures reported in CRF tables are consistently greater than those reported to IEA. However, small quantities are reported in the CRF tables for 2011–2013 but not to IEA. During the review, Iceland explained that the report submitted in 2018 by NEA to IEA contained some errors, which will be corrected through collaboration between NEA and EA.</p> <p>Differences were also noted for the export of liquid fuels, which has been reported intermittently in the CRF tables since 2004. For 2017, exports of other oil are shown in the CRF tables (108 TJ), but exports were not reported to IEA for the time series, except for 2009. Iceland explained that for some fuels it used export data from Statistics Iceland, which reports some exports. The IEA data come from NEA, which does not report any exports. Work is under way among these agencies to investigate the discrepancies and harmonize the data.</p> <p>The comparison with the IEA data for solid fuels showed that stock changes reported to IEA between 2007 and 2012 are related to other bituminous coal and coke oven/gas coke, while the CRF data only contain data for other bituminous coal. During the review, Iceland explained that this discrepancy was due to an error in the calculation file and stock changes for coke oven/gas coke will be added to the CRF tables in the next submission.</p> <p>The ERT recommends that the Party enhance the collaboration among NEA, IEA and relevant national authorities to resolve the errors detected in the data, and report correctly in CRF table 1.A(b) the production of waste (non-biomass fraction) for the entire time series; the export of liquid fuels for the time series; and stock changes for coke oven/gas coke between 2007 and 2012 and make corrections to the emission estimates.</p>	Yes. Convention reporting adherence
E.30	Feedstocks, reductants and other non-energy use of fuels – liquid fuels – CO ₂	<p>Iceland reported CO₂ emissions from the NEU of lubricants and petroleum coke as “IE” in CRF table 1.A(d) under “CO₂ emissions from the NEU reported in the inventory” rather than giving a value for these emissions in kt CO₂ and specifying the category under which they are included. During the review, Iceland explained, as stated in the NIR (section 4.5.1, p.74), that the available AD do not allow for lubricants mixed with other fuel in two-stroke engines to be separated from lubricants used for their lubricating properties; however, the amount of lubricant used as two-stroke engine fuel is likely to be very small. Thus, the Party attributes all emissions from lubricants to category 2.D.1, and no emissions are attributed to combustion in the energy sector. The ERT noted that the column entitled “CO₂ emissions from the NEU reported in the inventory” is included for information purposes to provide an estimate of the emissions from fuels not included in the energy sector and therefore also relates to the emissions reported under the IPPU sector. Regarding petroleum coke, the Party indicated that its use and time series are unclear and being investigated.</p> <p>The ERT recommends that the Party correctly fill in CRF table 1.A(d) for lubricants. The ERT also recommends that the Party correctly estimate and consistently report the use of petroleum coke across the time series.</p>	Yes. Convention reporting adherence
E.31	1.A Fuel combustion – sectoral approach – liquid fuels – CO ₂	<p>Iceland reported blank cells for the information item waste incineration with energy recovery in CRF table 1.A(a)s4 for 1990–2017. At the same time, the NIR indicates that emissions from incineration with energy recovery were reported under the energy sector (categories 1.A.1.a and 1.A.4.a) (NIR, section 7.4, p.195). The NIR (section 3.2.1) specifies that waste incineration included under category 1.A.1 was calculated using the tier 2 method. During the</p>	Yes. Convention reporting adherence

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
		<p>review, the Party indicated that information would be added under the information item waste incineration with energy recovery in the next submission.</p> <p>The ERT recommends that the Party report information on AD and emissions for the information item waste incineration with energy recovery in CRF table 1.A(a)s4.</p>	
E.32	1.A.3.b.i Cars – gasoline – N ₂ O	<p>Several inter-annual changes in the N₂O IEF (in kg/TJ) for gasoline were noted as significant, including for 1994/1995 (30.2 per cent), 1996/1997 (23.2 per cent) and 1998/1999 (23.5 per cent). The 1990–2017 increase in the N₂O IEF (115.7 per cent) is the highest reported by any Party (ranging from –92.4 to 41.7 per cent without Iceland). During the review, Iceland explained that emissions from passenger cars with no catalytic converters and emissions from passenger cars with three-way catalytic converters are currently calculated separately using different N₂O EFs. A significant increase in IEF occurs when there is an increase in cars with three-way catalytic converters, which have a higher N₂O EF compared with cars without them (0.8 g compared with 0.35 N₂O/kg for gasoline) (NIR, p.48, table 3.17). As indicated in the NIR (section 3.4.2.5, p.49) and reaffirmed during the review, COPERT will be used for emission calculations for 2000–2018 in the next submission. The entire time series, including 1990–1999, will be recalculated for the 2021 submission. The ERT welcomes the planned application of COPERT for 2000–2018 for the next submission and for 1990–1999 for the 2021 submission with the aim of improving the accuracy of the estimates and increasing time-series consistency.</p> <p>The ERT recommends that the Party explain in the NIR any significant inter-annual and trend changes in the AD, emissions and IEFs for CH₄ and N₂O emissions related to the use of gasoline for passenger cars.</p>	Yes. Transparency
E.33	1.A.3.b.i Cars – biomass – CO ₂ , CH ₄ and N ₂ O	<p>Several inter-annual changes in the biomass IEFs for 2007–2017 were noted by the ERT as significant, including 2012/2013 (9.5 per cent for CO₂, –32.6 per cent for CH₄ and 9.6 per cent for N₂O), 2014/2015 (11.3 per cent for CO₂, –57.2 per cent for CH₄ and 134.2 per cent for N₂O) and 2016/2017 (–11.5 per cent for CH₄ and –11.5 per cent for N₂O). During the review, Iceland explained that in 2012–2013 the use of biodiesel increased tenfold; in 2014–2015 a significant amount of biogasoline was introduced into the biofuel mix; and in 2016–2017 the use of biodiesel increased by 26 per cent. The ERT concluded that the information is not sufficient to explain the inter-annual changes in the IEFs. The ERT welcomes the planned application of COPERT for the next submission (see ID# E.32 above).</p> <p>The ERT recommends that the Party clearly explain any significant inter-annual changes in the AD used for biomass and provide information on the EFs used for biofuels to justify any significant inter-annual changes in the biomass IEFs.</p>	Yes. Transparency
E.34	1.A.3.b.i Cars – biomass – N ₂ O	<p>The Party's 2017 N₂O IEF for biomass (9.72 kg/TJ) is the highest reported by any Party (ranging from 0.001 to 7.36 kg/TJ, excluding Iceland). During the review, Iceland explained that an outdated EF for N₂O emissions from biogasoline was used. For the next submission, that EF will be updated in accordance with the 2006 IPCC Guidelines (vol. 2, chap. 3, table 3.2.2), which will change the IEF from 9.72 to 6.01 kg/TJ. The ERT noticed, however, that the value of 6.01 kg/TJ is not included in that table.</p> <p>The ERT recommends that the Party update the N₂O EF for biogasoline and ensure that the EF choice is well documented and justified in the NIR.</p>	Yes. Accuracy

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?^a If yes, classify by type</i>
E.35	1.A.3.e Other transportation – liquid fuels – CO ₂ , CH ₄ and N ₂ O	<p>The NIR (section 3.3.1, p.43) mentions that all fuel sold for off-road vehicles for ground activities at airports and harbours (category 1.A.3.e.ii) and in agriculture and forestry (category 1.A.4.c.ii) is included under category 1.A.2 (manufacturing industries and construction), an allocation which deviates from that suggested in the 2006 IPCC Guidelines (vol. 2, chap. 3.3). During the review, Iceland explained that it is not possible to split its AD between airports and harbours, and agriculture and forestry.</p> <p>The ERT recommends that the Party further investigate the possibility of separately estimating and reporting fuel consumption by splitting it between ground activities at airports and harbours (category 1.A.3.e.ii), agriculture and forestry (category 1.A.4.c.ii) and manufacturing industries and construction (category 1.A.2) by developing institutional cooperation or by extending the reporting obligations included in Icelandic regulation 520/2017, which is expected to be updated soon.</p>	Yes. Comparability
E.36	International bunkers and multilateral operations – liquid fuels – CO ₂ , CH ₄ and N ₂ O	<p>Comparison with IEA data indicated that the data on consumption in international marine bunkers are comparable for 2013–2017, but differ significantly for other years. For international marine bunkers, differences of up to 100 per cent are observed for 1990–2012, with the data in the CRF tables being systematically lower for both residual fuel oil and gas/diesel oil. For other years, the data agree within 2 per cent. For international aviation, discrepancies of greater than 4 per cent occur for 1991, 1995–1997 and 2003–2006, with jet kerosene quantities higher in the CRF tables than in IEA data. For most other years, the figures in the CRF tables exceed those reported to IEA by approximately 3 per cent owing to differences in the NCV for jet kerosene. During the review, Iceland explained that the 2018 NEA report contains some errors, which will be corrected through collaboration between NEA and EA and reported correctly in the next submission.</p> <p>The ERT encourages the Party to enhance the collaboration among NEA, IEA and relevant national authorities to resolve the errors detected in the data, and report accurately AD for bunker fuels across the time series, particularly in relation to liquid fuels for marine bunkers for 1990–2012 and liquid fuels for international aviation for 1991, 1985–1997 and 2003–2006.</p>	Not an issue/problem
IPPU			
I.7	2. General (IPPU) – NF ₃	<p>Iceland reported NF₃ emissions as “NO” and “NA” in the CRF tables. The CRF tables and the NIR are missing any explanation for this. During the review, the Party informed the ERT that the EA Chemical Team confirmed that NF₃ is not used in Iceland and has not been imported (customs registers all goods imported to Iceland). In addition, no industry that may use NF₃ in manufacturing (e.g. semiconductors, liquid-crystal displays, solar panels or chemical lasers) is present in Iceland.</p> <p>The ERT recommends that Iceland include in the NIR an explanation, based on the information provided during the review, for the non-occurrence of NF₃ emissions in the country.</p>	Yes. Transparency
I.8	2.C.3 Aluminium production – CO ₂ and PFCs	<p>Iceland reported in the NIR (section 4.4.4, p.74) that there are two plants in the country that produce secondary aluminium. The Party stated that no GHG emissions result from this production, but did not explain which technology is used to avoid oxidation in the aluminium smelter. During the review, Iceland contacted the relevant companies for clarification on the oxidation process. The Party confirmed that the secondary aluminium industries</p>	Not an issue/problem

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		use two processes to prevent oxidation: one is a salt-flux process and the other involves slag acting as a cover for oxidation when the raw material melts.	
		The ERT encourages Iceland to explain in the NIR that there are two aluminium producers in the country, but they do not use F-gases because one uses a salt-flux process to avoid oxidation and the other uses slag as a cover for oxidation when the raw material melts.	
I.9	2.D.2 Paraffin wax use – CO ₂	Iceland reported in the NIR (section 4.5.2, p.76). under category-specific planned improvements that it plans to gather better AD for all sources of paraffin wax use in Iceland. During the review, the Party explained that AD for paraffin wax use are currently from Statistics Iceland. The planned improvement comprises a review of these data and a check in collaboration with Statistics Iceland and the Directorate of Customs to ensure that all possible paraffin wax sources are correctly reflected in Iceland's data. As a result of staff changes, the improvement was postponed. The Party clarified that, for 2017, emissions for the category were 0.35 kt CO ₂ , which is below the threshold of significance. Nevertheless, the Party is committed to further investigation of the reported values. The ERT recommends that the Party carry out the planned improvement and revise the AD, if appropriate, and report on any improvements in the quality of the data on paraffin wax use in the NIR.	Yes. Completeness
I.10	2.D.2 Paraffin wax use – CO ₂	Iceland reported in the NIR (section 4.5.2, p.76) that AD for candle production are missing. During the review, the Party clarified that these data are not collected by Statistics Iceland and that a check of companies producing candles would have to be carried out to collect the AD. The Party explained that the vast majority of the candles used in Iceland are imported (and are therefore accounted for), and only candles produced by very small local crafts workshops might be missing from the estimates. The inclusion of the emissions from candles is part of the improvement mentioned in ID# I.9 above. The ERT notes that the expected emissions would be below the threshold of significance and commends Iceland for its planned improvements. The ERT recommends that the Party carry out the planned improvement and include AD for candle production to improve the completeness of the estimates for the category.	Yes. Completeness
I.11	2.F.1 Refrigeration and air conditioning – HFC-23	HFC-23 emissions from the disposal of commercial refrigeration equipment are reported as “NO” for all years in the time series, except for 2009, 2012 and 2015, for which an IEF of 20 per cent is reported. The NIR provides no specific explanation as to the gaps in the time series. Noting the low level of emissions in the reported years (e.g. 0.35 kt CO ₂ eq in 2017), the ERT notes that any possible emissions in the years in the time series that were omitted would be below the significance threshold. The ERT recommends that Iceland include consistent data on HFC-23 emissions from the disposal of commercial refrigeration equipment over the entire time series, or include information justifying the reporting of “NO” for some of the years, explaining the trend in emissions, in the NIR.	Yes. Completeness
I.12	2.G.3 N ₂ O from product uses – N ₂ O	Iceland reported in the NIR (section 4.8.2.1, p.94) the use of N ₂ O in a medical context, as a fuel oxidant in auto racing, and in fire extinguishers. Iceland reported no emissions from the use of aerosol cans of cream. During the review, the Party explained that the toll system does not register the number of aerosol cans of cream or whipped cream cartridges. In order to estimate the amount of N ₂ O that could be emitted from whipped cream containers, Iceland followed the Finnish example of applying an average of the EFs used for Central Europe; that is, 3.3 g	Yes. Completeness

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		<p>N₂O/inhabitant/year. On the basis of this information, the Party made an expert judgment to determine possible imported amounts and provided emission estimates for 1990–2018. The estimated value for 2017 was 0.34 kt CO₂ eq, which proved that emissions are below the significance threshold. The Party informed the ERT that the calculation would be implemented in Iceland’s model and the whole time series submitted in the 2020 submission.</p> <p>The ERT recommends that the Party include estimates for N₂O emissions from whipped cream containers in its next submission.</p>	
Agriculture			
A.29	3.A Enteric fermentation – CH ₄	<p>The NIR (p.105 and table 5.7) shows country-specific CH₄ EFs for cattle and sheep, which were calculated on the basis of equation 10.21 from the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.31). The ERT required more information from the Party about the procedures used to obtain the gross energy intake and CH₄ conversion factor for equation 10.21, and enquired whether they were obtained from peer-reviewed studies. During the review, Iceland provided a calculation example for mature dairy cattle for 2017 with the sources of the different parameters. All parameters came from measurements published annually by the Icelandic Food and Veterinary Authority (population number) or the Icelandic Agricultural Advisory Centre (lactation parameters, fat content of milk), or from publications of the Agricultural University of Iceland. The ERT noted that the parameters were not obtained from peer-reviewed studies, although they were representative of the Party’s circumstances.</p> <p>The ERT encourages the Party to try to obtain parameters from peer-reviewed studies and/or include in the NIR information showing the verification of the data used for the estimates (e.g. by comparing the parameters with those used by Parties with similar conditions).</p>	Not an issue/problem
A.30	3.A.1 Cattle – CH ₄	<p>The Party reported a small number of animals and a constant CH₄ IEF (72.50 kg/head/year) for other mature cattle for 1992 onward. The EF of 72.50 kg/head/year was calculated using equation 10.21 of the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.31). However, the ERT noted that the parameters used for the calculation, such as weight, are constant over the time series, leading to a constant EF over the time series. During the review, the Party explained that efforts would be made to update the input parameters for future submissions.</p> <p>The ERT recommends that Iceland justify the appropriateness of the current parameters and/or update the input parameters and consequently the CH₄ EF for future submissions, as planned.</p>	Yes. Accuracy
A.31	3.A.1 Cattle – CH ₄	<p>The Party reported emissions from other mature cattle as “NO” for 1990–1991. Iceland did not discuss time-series consistency for the category in the NIR and there were no planned improvements regarding the reporting of the cattle subcategory. During the review, the Party explained that no data are available from the Icelandic Food and Veterinary Authority for 1990–1991 owing to a different categorization at that point of time.</p> <p>The ERT recommends that Iceland ensure time-series consistency for subcategory 3.A.1 cattle by obtaining data on animal population for 1990–1991 and, if this is not possible, use one of the techniques included in the 2006 IPCC Guidelines (vol. 1, chap. 5), as appropriate, to extrapolate the time series. The ERT also recommends that the Party include a section in the NIR that explains how it has ensured time-series consistency for the estimates in the category.</p>	Yes. Consistency
A.32	3.A.1 Cattle – CH ₄	<p>Several inter-annual changes in the CH₄ IEF (kg CH₄/head/year) for growing cattle are significant, including 2013/2014 (7.3 per cent), 2014/2015 (6.3 per cent) and 2015/2016 (5.9 per cent). Moreover, the CH₄ IEF is below the</p>	Yes. Transparency

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		<p>IPCC default range (35–48 kg CH₄/head/year) for some years, including 1990 (34.79 kg CH₄/head/year), 2003 (34.22 kg CH₄/head/year), 2004 (33.17 kg CH₄/head/year), 2005 (33.93 kg CH₄/head/year) and 2006 (34.58 kg CH₄/head/year). During the review, the Party explained that growing cattle is divided into three subcategories: heifers (EF of 58.4 kg CH₄/head/year), steers (EF of 46.2 kg CH₄/head/year) and calves (EF of 19 kg CH₄/head/year). The proportion of heifers, steers and calves varies along the time series, resulting in the varying IEF, which is calculated by dividing the emissions for the category by the total number of animals. Each subcategory has a different EF that is constant over time and based on equation 10.21 from the 2006 IPCC Guidelines (vol. 4, chap. 10).</p> <p>The ERT recommends that the Party justify the low CH₄ IEF reported for growing cattle and explain any significant changes in the animals covered by this subcategory that would affect the CH₄ IEF trend.</p>	
A.33	3.A.1 Cattle – CH ₄	<p>The CH₄ IEF for mature dairy cattle was below the IPCC default range (90–128 kg CH₄/head/year) for 1990–1999 (values range between 85.00 and 89.91 kg CH₄/head/year) in the original 2019 submission. The 2017 value (106.27 kg CH₄/head/year) was the lowest reported by any Party (ranging from 106.27 to 151.92 kg CH₄/head/year). During the review, Iceland clarified that, when calculating energy for maintenance, it still used the value of 0.335 for the C_{f_i}, which is taken from the IPCC good practice guidance and not the 2006 IPCC Guidelines (vol. 4, table 10.4; default value of 0.386 MJ/day/kg). This was the cause of the lower IEF compared with the IPCC default range. This error was rectified during the review with the submission of revised estimates using the correct IPCC value (from the 2006 IPCC Guidelines, vol. 4, table 10.11, p.10.29) and the 2017 IEF has been changed to 111.21 kg CH₄/head/year.</p> <p>The ERT recommends that the Party revise the explanation of CH₄ estimates for mature dairy cattle in the NIR by indicating the use of the C_{f_i} value from the 2006 IPCC Guidelines and ensure that the approach is used consistently across the time series.</p>	Yes. Transparency
A.34	3.B.1 Cattle – N ₂ O	<p>In the original 2019 submission, the country-specific Nex rate for mature dairy cattle ranges from 72.00 kg/head/year for 1990 to 94.79 kg/head/year for 2000 (see ID# A.16 in table 3). After 2000, the Nex rate is constant and equal to 94.79 kg/head/year. There was also an increase in milk yield, which grew from 11.35 l/day (1990) to 12.76 l/day (2000) and then to 16.87 l/day (2017). The ERT considered that an increase in milk production between 2000 and 2015 would lead to an increase in the Nex rate for the same period. Moreover, the 2006 IPCC Guidelines (vol. 4, equation 10.25) provide default EFs for estimating emissions using the default Nex rates and default manure management system data. The ERT concluded that an incorrect Nex rate may lead to emissions being underestimated for the category. Further, the ERT noted that modifying Nex rates would affect direct and indirect N₂O emissions for categories 3.B (manure management), 3.D(a).2.a (animal manure applied to soils), 3.D(a).3 (urine and dung deposited by grazing animals), 3.D(b).1 (atmospheric deposition) and 3.D(b).2 (N leaching and run-off). Therefore, in accordance with decision 22/CMP.1, annex, paragraph 73, in conjunction with decision 4/CMP.11, the ERT included this issue in the list of potential problems and further questions raised by the ERT.</p> <p>In response to the list of potential problems and further questions raised by the ERT, Iceland submitted revised CRF tables with calculations in accordance with the 2006 IPCC Guidelines, mostly using default values. The revised calculation method takes into account several modifications: (1) the C_{f_i} for calculating energy for maintenance was updated to match that in the 2006 IPCC Guidelines; in particular, the C_{f_i} was calculated on the basis of the values for lactating and non-lactating cows from table 10.4 of the 2006 IPCC Guidelines (vol. 4, chap. 10) (0.386 and 0.322 MJ/day/kg, respectively) and the lactation period of mature dairy cattle of 305 days/year; (2) the fat content of milk</p>	Yes. Transparency

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		<p>was updated for some years to reflect yearly measurements; (3) the gross energy intake results were updated in the light of the updated Cf_i; (4) the N retention was calculated using equation 10.33 from the 2006 IPCC Guidelines (vol. 4, chap. 10, p. 10.60), setting weight gain at zero, and the N retention fraction was calculated by dividing the N retention obtained through equation 10.33 by the N intake obtained by applying equation 10.32 from the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.58); and (5) the Nex rate for mature dairy cattle was calculated using equation 10.31 from the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.58) for the whole time series. The changes in the calculation method affected categories 3.B and 3.D and led to an increase in the N₂O emission estimate for 2017 by 7.88 kt CO₂ eq (from 110.35 to 118.23 kt CO₂ eq).</p> <p>The ERT recommends that Iceland update the NIR with the revised information on the estimation method and the input parameters used for the N₂O estimates for mature dairy cattle across the time series.</p>	
A.35	3.B.2 Sheep – CH ₄	<p>The CH₄ IEF reported by Iceland for sheep over the entire time series (0.63 kg CH₄/head/year) is well above the IPCC default value from the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.15) for cool climate and developed countries (0.19 CH₄/head/year) and among the highest reported by Parties (ranging from 0.002 to 1.28 kg CH₄/head/year for 2017). During the review, Iceland clarified that CH₄ emissions from sheep are calculated using the tier 2 method from the 2006 IPCC Guidelines, which involves applying equations 10.22, 10.23 and 10.24 (vol. 4, chap. 10), and explained that the sheep population is subdivided into mature ewes, other mature sheep, animals for replacement and lambs. An Excel file was provided to show the calculation procedure and factors used for 2017. The Party explained that an error was found in the calculation of volatile solids as urinary energy was not included in the estimates.</p> <p>The ERT recommends that the Party correct the volatile solid values and recalculate emissions from sheep for the entire times series, transparently documenting the change in the NIR. The ERT believes that future ERTs should consider this issue further to ensure that there is no underestimation of emissions. Further, the ERT encourages the Party to verify the updated EFs against the IPCC default values and the IEFs reported by other Parties, including information on the results of the check under the QA/QC and verification section for the category.</p>	Yes. Accuracy
A.36	3.B.5 Indirect N ₂ O emissions – N ₂ O	<p>Iceland reported N₂O emissions from N leaching and run-off as “NE” for 1990–2017 (see ID# A.17 in table 3). In the NIR, Iceland explained that it has no country-specific data on the fraction of N from manure storage that goes to leaching and run-off, which would be needed to calculate emissions from leaching and run-off from storage (NIR, section 5.5.5, p.114). Furthermore, the Party clarified that, after reviewing the approaches used by several other Parties (Denmark, Finland, Norway and Sweden), it was clear that a wide variety of approaches and assumptions are used to estimate emissions for this category. Notably, no default fraction is given to support a tier 2 calculation. In the 2006 IPCC Guidelines (vol. 4, chap. 10, p. 10.61) it is stated that the Frac_{leachMS} is highly uncertain and should be developed as a country-specific value applied in the tier 2 method. During the review, the Party indicated that its approach of not subtracting the fraction that goes to leaching and run-off from N applied in the fields (organic fertilizer) is expected to result in a small overestimation of N₂O emissions from the agriculture sector since the EF for leaching and run-off (0.0075 kg N₂O-N/kg N leaching and run-off) is smaller than the EF for storage and/or application (0.01 kg N₂O-N/kg N applied).</p> <p>The ERT noted that the estimates for N₂O-N/kg N leaching and run-off are based on equations 10.28–10.29 of the 2006 IPCC Guidelines (vol. 4, chap. 10, pp.10.56–10.57) and that, as indicated in the 2006 IPCC Guidelines (vol. 4,</p>	Not an issue/problem

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		<p>chap. 10, p. 10.61), the $Frac_{leachMS}$ in equation 10.28 (range of 1–20 per cent) is highly uncertain and should be developed as a country-specific value applied in the tier 2 method. The ERT welcomes the information provided by Iceland on its efforts to define a country-specific value by reviewing the approaches applied by other Parties and acknowledges that the selection of a $Frac_{leachMS}$ strongly depends on national circumstances such as soil type, drainage conditions and rainfall.</p> <p>The ERT encourages Iceland to take steps to define an appropriate $Frac_{leachMS}$ value and include estimates for indirect N emissions from leaching and run-off in the inventory, along with a justification of the methodology and assumptions used in the calculations.</p>	
A.37	3.D.a.1 Inorganic N fertilizers – N ₂ O	<p>The ERT noted sharp peaks in the use of N fertilizers in 2009 and 2014 (NIR, section 5.6.2, p.117, and figure 5.3). The ERT asked the Party to explain the cause of these sudden peaks and enquired whether the country-specific data on synthetic fertilizer consumption were compared with fertilizer usage data from the International Fertilizer Association and synthetic fertilizer consumption estimates from the Food and Agriculture Organization of the United Nations (see the 2006 IPCC Guidelines, vol. 4, p.11.26 (AD check)). During the review, the Party explained that such a comparison has not yet been carried out but would be added to its improvement plan. Data on synthetic fertilizer were obtained from Statistics Iceland, which in turn obtains information from the Icelandic Food and Veterinary Authority, which must be notified about all fertilizer imports and manufacture in the country according to Icelandic laws and regulations regarding the inspection of food, fertilizer and seeds and animal diseases and their prevention. After consulting the Icelandic Food and Veterinary Authority about the peaks in fertilizer use in 2009 and 2014, the Party explained that the peak in fertilizer imports occurred during Iceland's financial boom, and the subsequent financial crisis and fall in the value of the currency are expected to have caused the drop in imports following a sharp increase in the price of imported goods. The numbers reported refer to import data over a year. One company imported more than 2,000 t fertilizer in November 2014, which was then sold in early 2015 – such events could distort the overall picture and led to the artificial peaks seen in the data. The ERT welcomes the explanation provided by the Party.</p> <p>The ERT recommends that Iceland include in the next NIR the explanation provided during the review for the cause of sudden peaks in the use of N fertilizers, along with any other relevant explanations for significant changes in the emission trend.</p>	Yes. Transparency
A.38	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N ₂ O	<p>The N₂O IEF for the cultivation of organic soils for 1990–2017 (0.96 kg N₂O-N/ha) is lower than the IPCC default value (2006 IPCC Guidelines, vol. 4, chap. 10, table 11.1) of 8 kg N₂O-N/ha and is the lowest value reported by any Party (ranging from 0.96 to 13.00 kg N₂O-N/ha). Iceland explained during the review that a country-specific EF was used for organic soils on the basis of findings from a project wherein N₂O emissions from drained organic soils were measured. A total of 231 samples were taken from drained organic soils in every season over three years. The results show that the EF for cultivated drained soils (0.96 kg N₂O-N/ha) is higher than the EF for other drained soils (0.01 and 0.44 kg N₂O-N/ha) and much lower than the EF for tilled drained soils (8.36 kg N₂O-N/ha). This research was conducted in Iceland from 2006 to 2008 and its results (Guðmundsson, 2009) are considered to be reliable. The ERT was not convinced of the accuracy of the country-specific EF on the basis of the information provided. Therefore, in accordance with decision 22/CMP.1, annex, paragraph 73, in conjunction with decision 4/CMP.11, the ERT included this issue in the list of potential problems and further questions raised by the ERT. The ERT recommended that</p>	Yes. Transparency

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		<p>Iceland provide further justification or documentation to support the low N₂O EF used for the cultivation of organic soils or, if this was not possible, revised estimates for the category using the default IPCC EF specified in the 2006 IPCC Guidelines (vol. 4, chap. 11, table 11.1). During the review, and in response to the list of potential problems and further questions raised by the ERT, Iceland explained that the low country-specific EF used for cultivated organic soils is due to the volcanic sediments beneath Icelandic soils. According to a peer-reviewed study quoted by Iceland (Liimatainen et al., 2018), N₂O emissions are linked to the amount of phosphorus and copper in the peat; if it contains small amounts of both phosphorus and copper, these can limit N₂O production, even though sufficient N is available in the soil. Low phosphorus content and intermediate copper content in Icelandic soils is caused by the mineral composition of the soils, which is strongly influenced by mostly basic volcanic parent material, tephra, which weathers easily, releasing aluminium, iron and silicon. The Party indicated that the documentation presented during the review would be included in the next NIR. The ERT accepted the explanations and the justification for the low N₂O EF provided by the Party.</p> <p>The ERT recommends that the Party include in the NIR the explanation for the low country-specific N₂O EF for cultivated organic soils provided during the review.</p>	
A.39	3.G Liming – CO ₂	<p>Iceland reported CO₂ emissions from liming as “IE” for until 2012. There is no information in the documentation box to CRF table 3.G-I or in CRF table 9 on the allocation of the emissions used by the Party, although section 5.8.3 of the NIR (on recalculations) indicates that until 2012 liming was allocated under LULUCF. The ERT noted the constant AD value reported for 2012–2017 and the planned check of the import data used in the estimates (NIR, section 5.8.5). During the review, the Party explained that further information would be provided in the documentation box to CRF table 3.G-I and in CRF table 9 on the allocation of the emissions.</p> <p>The ERT recommends that the Party implement the planned checks of the AD for the category and update them as planned and report CO₂ emissions from liming following the UNFCCC Annex I inventory reporting guidelines in future submissions, ensuring consistent reporting of the emissions across the entire time series under category 3.G. If the change is not made in the next submission, the ERT recommends that Iceland justify this in the NIR and include explanation of the allocation in CRF table 9.</p>	Yes. Consistency
A.40	3.I Other carbon-containing fertilizers – CO ₂	<p>Iceland reported CO₂ emissions from other carbon-containing fertilizers as “IE” for until 2012. There is no information in the documentation box to CRF table 3.G-I or in CRF table 9 on the allocation of the emissions used by the Party. During the review, the Party explained that further information would be provided in the documentation box to CRF table 3.G-I and in CRF table 9 on the allocation of the emissions, which were reported under LULUCF for until 2012.</p> <p>The ERT recommends that the Party report CO₂ emissions from other carbon-containing fertilizers consistently across the time series under category 3.I. If the change is not made in the next submission, the ERT recommends that Iceland justify this in the NIR and include explanation of the allocation in CRF table 9.</p>	Yes. Consistency
	LULUCF		
L.30	4. General (LULUCF)	<p>Iceland has made substantial changes to the structure and content of the NIR chapters since the previous review. However, there are several links between NIR sections that have not been updated accordingly; for example, sections 6.6.2.1 and 6.9.2.1 refer to section 6.4 on area estimates by Icelandic Forest Research instead of section 6.5. During</p>	Yes. Convention reporting adherence

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
		<p>the review, Iceland explained that the numbering of NIR sections is automated, using Microsoft Word functions, but that some mistakes have occurred. Iceland does not currently have any specific QA/QC measures to ensure correct numbering throughout the NIR; however, the Party indicated that this would be added to the new QA/QC plan, which is expected to be developed in late 2019.</p> <p>The ERT recommends that Iceland improve its QA/QC plan to avoid discrepancies in cross references between NIR sections and to ensure that section numbering is correct.</p>	
L.31	4. General (LULUCF)	<p>Iceland reported some land uses and land-use changes as “IE” in CRF table 4.1 (e.g. cropland and managed wetlands to settlements; other land to cropland and settlements) without providing further details in the NIR sections discussing the land classification and land transition matrix (sections 6.1–6.3).</p> <p>The ERT recommends that Iceland provide transparent information in the NIR section discussing the land transition matrix on the use of the notation key “IE” where areas have been accounted for elsewhere.</p>	Yes. Transparency
L.32	Land representation – CO ₂ , CH ₄ and N ₂ O	<p>There are small inconsistencies in the total country area reported by Iceland in CRF table 4.1; for example, 10,232.09 kha in 1990 and 10,227.26 kha in 2017. During the review, Iceland explained that, for the current submission, the Party used the Icelandic Geographic Land Use Database, which was compiled and is maintained by the Agricultural University of Iceland. However, estimates other than from the land-use map exist for several land-use categories. When more accurate estimates are available, the area of the category is reported accordingly. The different data sources used do not agree on the total area, mainly because different coastline maps are used. Choosing one source over another is not an option according to the Party, and during the review it referred to section 6.3 of the NIR, where land-use mapping is discussed. The ERT noted that according to the 2006 IPCC Guidelines (vol. 4, chap. 3, p.3.10), it is important that the national land area is consistent across the inventory time series, otherwise stock changes will reflect false carbon increases or decreases owing to a change in the total land area accounted for when using a stock change emission estimation method.</p> <p>The ERT recommends that Iceland report a consistent national land area across the inventory time series in line with the 2006 IPCC Guidelines. This can be derived, for example, from the official land area of the Party and applied across the entire time series, possibly leading to recalculations of areas.</p>	Yes. Accuracy
L.33	4.A Forest land – CO ₂	<p>Iceland reported CSC in deadwood as “IE” for forest land remaining forest land and for other land converted to forest land. There is no information on the allocation of the net emissions or removals in the documentation box to CRF table 4.A or in CRF table 9. In addition, Iceland reported CSC in litter as “NE” for the entire time series for forest land remaining forest land. During the review, Iceland stated that an explanation of the notation keys is given in the NIR (p.143) and that it would improve the information on this issue in the documentation box to CRF table 4.A in future submissions. In the NIR, it explained that changes in the litter carbon stock in the forest land remaining forest land category are likely to be removals rather than emissions and are therefore assumed to be zero according to the tier 1 approach. However, the ERT noted that the Party reported “NE” instead of “NA” in CRF table 4.A although equilibrium is assumed.</p> <p>The ERT recommends that Iceland provide transparent information in CRF table 9 for reporting “IE” where GHG emissions have been accounted for elsewhere and correct the notation key from “NE” to “NA” for litter carbon stock</p>	Yes. Comparability

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
		in the forest land remaining forest land categories (see ID#s L.8 above and KL.17 below). The ERT encourages the Party to include explanatory information in the documentation box to CRF table 4.A.	
L.34	4.B.1 Cropland remaining cropland – CO ₂	Iceland reported an annual change in SOC for mineral soils for the first time in the 2018 submission (see ID# L.12 in table 3). Iceland reported a relatively high EF for mineral soils (0.17 t C/ha/year in 2017) compared with those of other countries. During the review, the Party explained that Andosol is the main soil type in Iceland, which has a high carbon storage capacity. If the land prior to cultivation did not reach the potential carbon content level of that soil, the carbon content could increase significantly. The ERT recommends that Iceland provide information to justify the high EF for mineral soils in the next annual submission.	Yes. Transparency
L.35	4.B.2 Land converted to cropland – CO ₂	Iceland reported CSC in DOM as “IE” for grassland and wetlands converted to cropland. There is no information on the allocation of the net emissions or removals in the documentation box to CRF table 4.B or in CRF table 9. During the review, Iceland explained that the estimation of CSC in biomass is described in the NIR (section 6.6.2.2) and DOM CSC is included in biomass losses. The ERT recommends that, to improve the transparency of the reporting, the Party provide an explanation for reporting “IE” in CRF table 9 with regard to net CSC in DOM for grassland and wetlands converted to cropland and consider adding explanatory information to the documentation box to CRF table 4.B.	Yes. Transparency
L.36	4.C Grassland – CO ₂	Iceland reported “IE” in several instances in CRF table 4.C for CSC in DOM and soils for 1990–2017 without explaining the allocation in the documentation box to CRF table 4.C or in CRF table 9. During the review, Iceland stated that explanations are provided in the NIR (sections 6.6.2 and 6.7.2.2). The Party explained that the changes in DOM are included in CSC in living biomass for the cropland converted to grassland category. The changes in DOM are also included in living biomass of the three RV subcategories under other land converted to grassland, as described in the NIR (section 6.7.2.2). The ERT recommends that Iceland explain the reporting of “IE” for each subcategory and pool in CRF table 9 in the reporting of grassland CSC in DOM and soils, and consider adding explanatory information to the documentation box to CRF table 4.C.	Yes. Transparency
L.37	4.C.1 Grassland remaining grassland – CO ₂	Iceland reported CSC in mineral soils on revegetated land older than 60 years as “NE” for 1990–2015 and as “NO” for 2016 and 2017. During the review, Iceland indicated that CSC in mineral soils on revegetated land older than 60 years is reported as “NE” for 1990–2015 owing to lack of data. CSC for revegetated land older than 60 years is currently reported as “NO” in line with the tier 1 method. Iceland explained that the method is described in the NIR (section 6.7.1.1, p.153). The ERT recommends that Iceland improve the transparency of the reporting of CSC under grassland mineral soils for revegetated land older than 60 years by providing an explanation in the NIR and in CRF table 9 as to why estimates could not be produced for this pool for 1990–2015 and by reporting “NA” where CSC is assumed to be in equilibrium (i.e. zero).	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
L.38	4.D.1 Wetlands remaining wetlands – CO ₂	<p>Iceland recognized that wetlands remaining wetlands (CRF table 4.D) is a key category for both level and trend assessment. Most of the wetland areas are intact mires (other wetlands remaining other wetlands) and are reported as a large sink of emissions using a tier 1 EF on the basis of guidance in the Wetlands Supplement (see NIR section 6.8.1.2, p.162). During the review, Iceland indicated that it launched a project in 2016 for gathering data on GHG emissions from drained wetlands. It plans to use these data for developing tier 2 estimates in the near future. The ERT welcomes the planned improvements.</p> <p>The ERT recommends that Iceland develop a country-specific methodology for managed wetlands that would allow it to use the tier 2 approach for key categories in line with the 2006 IPCC Guidelines.</p>	Yes. Accuracy
L.39	4.D.2.2 Land converted to flooded land – CO ₂ and CH ₄	<p>Iceland explained in the NIR (section 6.8.2.2) that the EFs reported for reservoirs under land converted to wetlands are affected by the length of the ice-free period in the country. During the review, Iceland stated that the same ice-free period is applied to all reservoirs for all years. With regard to uncertainties reported in the NIR, during the review Iceland indicated that some reservoirs are still unaccounted for (in NIR section 6.8.2.3). The reservoirs that are not included in the emission estimate are mostly small and there are no data on either the carbon stock or the vegetation type and coverage for the impounded areas. Iceland indicated that, although there are possible improvements for some reservoirs, this is not seen as a priority issue because of the insignificance of the emissions. The ERT commends Iceland on its transparent reporting of the EFs and AD under land converted to wetlands for reservoirs.</p> <p>The ERT encourages Iceland to complete the information on the area of flooded land and to compile information on the ice-free period for individual reservoirs or regions to be applied with corresponding EFs.</p>	Not an issue/problem
L.40	4(III) Direct N ₂ O emissions from N mineralization/ immobilization – N ₂ O	<p>The 2006 IPCC Guidelines (vol. 4, chap. 11, section 11.2) consider N mineralization to be associated with the loss of soil organic matter resulting from land-use change or management of mineral soils. However, the Party reported gains instead of losses on mineral soils under the cropland category, both under cropland remaining cropland and under land converted to cropland, under the LULUCF sector. In the case of loss of soil organic matter resulting from management of cropland remaining cropland, N₂O emissions from N mineralization or immobilization should be accounted for under the agriculture sector (CRF table 3.D). The Party reported carbon accumulation rates of 0.17 and 0.10 t C/ha/year for the respective categories. N₂O emissions only occur when there are carbon losses. During the review, the Party provided an explanation for the carbon accumulation, stating that Andosol is Iceland's main soil type, which has a high carbon storage capacity. If the land prior to cultivation had a lower carbon content than the potential carbon content level for the soil type, this could lead to a significant increase in carbon content. The ERT considers that carbon losses would be expected on cropland soils, especially as a result of land-use changes. The ERT is of the view that neither the reasons for carbon accumulation on cropland soils nor the allocation of emissions for the category between the agriculture and LULUCF sectors are transparently reported in the NIR.</p> <p>The ERT recommends that Iceland transparently report in the NIR the reasons for carbon accumulation on cropland soils, especially on mineral soils converted to cropland (see ID#s L.34 above and A.20 in table 3).</p>	Yes. Transparency
L.41	4(V) Biomass burning – CO ₂ , CH ₄ and N ₂ O	<p>For biomass burned on cropland, Iceland reported AD for 2006 (20.34 ha) and “NE” for the preceding years, while “NO” was reported for 2007–2017. During the review, Iceland confirmed that the reporting of “NE” is correct, because AD were not estimated until 2006, when a wildfire occurred on cropland and some biomass was lost. Since then, no wildfires have occurred on cropland. On grassland, controlled burning is reported as “NE” for 1990–2017</p>	Yes. Completeness

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
		<p>and wildfires are reported as “NE” for until 2005, with AD or “NO” reported for the following years 2006–2017. However, the ERT noted that these details are not given in NIR section (6.17.1.1) on biomass burning.</p> <p>The ERT recommends that Iceland include estimates of the emissions from biomass burning on cropland and grassland for the entire time series, or, if not, include information on the reporting of “NE” (both in the NIR and the CRF tables) and provide an explanation as to why these pools could not be estimated (see ID# L.24 in table 3 on correcting the use of notation keys).</p>	
Waste			
W.11	5.A.1 Managed waste disposal sites – CO ₂ , CH ₄ and N ₂ O	<p>In the NIR (section 7.2.4.1, p.191) and in figure 7.4, which shows CH₄ recovery at the Álfsnes and Glerárdalur SWDS, the Party reported on recovered CH₄ used for electricity production and other stationary and mobile combustion. However, the ERT could not establish where in the CRF tables these emissions are included in the energy sector. In the NIR, the Party stated that there was combustion of landfill gas for stationary combustion in 1996–2001 and electricity generation in 2002–2006, while mobile combustion has been occurring since 2007. In accordance with the 2006 IPCC Guidelines (vol. 5, chap. 3), if the recovered landfill gas is used for energy, then the resulting emissions should be allocated under the energy sector. The CO₂ emissions from this combustion of landfill gas are biogenic in nature; however, CH₄ and N₂O emissions must be estimated and included in the energy sector and national totals. The 2006 IPCC Guidelines (vol. 2, chap. 2, tables 2.2–2.3) provide the default EFs for CO₂, CH₄ and N₂O for landfill gas combusted in energy industries and EFs for landfill gas combusted in manufacturing industries and construction, respectively. In response to a question raised by the ERT, the Party explained that, in recent years, almost all CH₄ recovered has been sold as fuel and the emissions from mobile combustion are included as biomass under category 1.A.3.b(i) (cars), and it provided the NCVs used. The Party also stated that the information will be included in its next submission. The Party further indicated that landfill gas used for electricity production in 2002–2009 is currently not accounted for in the inventory, but will be included under category 1.A.1a (public electricity and heat production) in the next submission.</p> <p>The ERT recommends that the Party estimate emissions from the combustion of landfill gas for energy and transparently allocate them under the relevant categories in the energy sector (e.g. for electricity production in 2002–2009). The ERT also recommends that the Party improve its explanation of the allocation of emissions from landfill gas in the inventory (NIR section 7.2.4.1).</p>	Yes. Completeness
W.12	5.A Solid waste disposal on land – CH ₄	<p>In the NIR (section 7.2.2.2, p.180), the Party explained that it used population as surrogate data to estimate waste generation and disposal data for until 1972. The population figures used are not provided in the NIR; moreover, the assumption of allocating 50 per cent of waste to SWDS and the remaining 50 per cent to open burning is not transparently documented in the NIR. In response to a question raised by the ERT during the review, the Party gave the ERT access to the calculation file that contains the population data and waste generation rates used in the calculation (using the IPCC first-order decay model from the 2006 IPCC Guidelines, vol. 5, p.3.8).</p> <p>The ERT recommends that the Party document and provide in the NIR all the parameters used in the estimation of CH₄ emissions from solid waste disposal and include in its future submissions the population data and waste generation rates used as input data in the IPCC solid waste disposal model.</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
W.13	5.A Solid waste disposal on land – CH ₄	<p>The previous ERT recommended that the Party include information in the NIR on the AD used for this category, such as the amount of waste deposited in SWDS, categorized by type of waste, for the entire time series, where such AD was not presented in the previous NIR (see ID# W.2 in table 3). In the 2019 submission, the Party reported the AD in NIR tables 7.3–7.4 categorized by waste type, and it assumed a similar composition of waste between municipal solid waste and industrial waste. In the NIR, the Party highlighted that existing data on waste amounts do not support this distinction. During the review, the Party explained that household waste and production waste are assumed to have similar compositions. On the basis of data from all waste operators in Iceland received according to the European Waste Catalogue and, from 2014, according to the waste statistics regulation categories of European Union regulation 2150/2002, Iceland categorizes all waste into IPCC waste model categories, including industrial waste.</p> <p>The ERT recommends that the Party investigate the composition of both municipal solid waste and industrial waste and reconsider estimating separately emissions from industrial waste. The ERT also recommends that the Party report information on waste composition for municipal solid waste and industrial waste separately in its future submissions in order to enhance the transparency of the NIR.</p>	Yes. Accuracy
W.14	5.A.1 Managed waste disposal sites – CH ₄	<p>In the NIR (p.189 and table 7.7), the Party reported the half-life, CH₄ generation rate and degradable organic carbon values for waste sent to SWDS. According to the NIR (p.242), the Party has reverted to using IPCC default values as there was no justification for using country-specific values. Furthermore, in table 7.7 of the NIR (p.189), the Party used a CH₄ generation rate of 0.09 as a default value for industrial waste, suggesting the use of a bulk waste approach. At the same time, however, the Party used a value of 23 for half-life, which suggests a classification of wood/straw waste for industrial waste. During the review, the Party was asked to clarify its choice of half-life values. The Party acknowledged an error had occurred in the NIR and not in the solid waste disposal model as the Party used the half-life value 7.7 for industrial waste, which is in line with the recommended default half-life values under the tier 1 method for bulk waste (range: 6–9) in the 2006 IPCC Guidelines (vol. 5, chap. 3, table 3.4).</p> <p>The ERT recommends that the Party correct the value for the half-life of industrial waste in the NIR and enhance its QA/QC procedures in order to ensure that the information reported in the NIR is consistent with the information used in its estimation files.</p>	Yes. Convention reporting adherence
W.15	5.D Wastewater treatment and discharge – CH ₄	<p>In the NIR (p.202), the Party reported that TOW are calculated using equation 6.3 of the 2006 IPCC Guidelines (vol. 5, chap. 6, p.6.13). In the equation, the annual amount of TOW is a product of population, kg biochemical oxygen demand/head/year, and a correction factor for additional industrial biochemical oxygen demand discharged into sewers. The Party explained that the correction factor was set to zero since all CH₄ emissions originate from domestic sewage. In CRF table 5.D, the Party reported “IE” for both TOW and CH₄ emissions from industrial wastewater. During the review, the Party acknowledged that the statement in the NIR on the correction factor used is incorrect and that the correction factor used to account for co-discharge of industrial wastewater is 1.25, and it provided the ERT with the calculation file to demonstrate how equation 6.3 was implemented. The Party also noted in its response that it would investigate this issue further and make changes for the 2020 submission, as appropriate.</p> <p>The ERT recommends that the Party correct the statement in its NIR on the correction factor used to account for additional biochemical oxygen demand from industrial wastewater co-discharge in order to ensure that the information reported in the NIR is consistent with the estimates reported in CRF table 5.D.</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
W.16	5.D.1 Domestic wastewater – N ₂ O	<p>Table 7.12 of the NIR (p.203) provides information on population, protein consumption and TOW for 1990–2017. With reference to an issue raised by the previous ERT, the Party used per capita protein consumption values from country-specific surveys that were lower than those reported in FAOSTAT (see ID# W.7 in table 3). During the review, the ERT asked the Party about a potential underestimation of indirect N₂O emissions from domestic wastewater treatment and discharge. The Party referred the ERT to the country-specific surveys documented in section 7.5.2.2 of the NIR, which were used to estimate the figures that justify the use of lower country-specific values than those reported in FAOSTAT for per capita protein consumption. After assessing the country-specific surveys and the justification provided by the Party, the ERT commends the Party for the comprehensive studies of Icelandic diet based on surveys. Each study had more than 1,300 respondents, which is a large number for a country with a small population. In addition, the survey reports show a representative approach that roughly reflects the share of both males and females and different age groups in the population. The reports are broad and cover all food types, as well as many vitamins and minerals. During the review, the Party mentioned that there are plans in place to conduct a new survey aimed at estimating protein consumption.</p> <p>The ERT encourages Iceland to continue to work on implementing country-specific surveys on protein consumption in Iceland and to report on their results in the NIR.</p>	Not an issue/problem
KP-LULUCF activities			
KL.15	General (KP-LULUCF activities)	<p>The Party provided information in the NIR (section 11.4.2) on how harvesting or forest disturbance that is followed by the re-establishment of a forest is distinguished from deforestation (see ID# KL.1 in table 3). During the review, Iceland explained that, according to its new forest act of 2019 that prohibits deforestation unless it is unavoidable, planned deforestation must be reported to the National Planning Agency to comply with environmental impact assessment legislation. The National Planning Agency must seek a review from the Icelandic Forest Service for every planned action of deforestation. Information on the precise location and type of forest is required. In addition, municipalities must seek the approval of the Icelandic Forest Service before issuing a permit for any development involving deforestation. The Icelandic Forest Service has a register for planned deforestation and monitors when deforestation takes place. All this information is sent to the climate change division of Icelandic Forest Research, which is responsible for reporting on forests and forestry under the Convention.</p> <p>The ERT encourages the Party to include information in the NIR on harvesting and clear-cut regulations, as well as on licensing procedures, to improve the transparency of the reporting.</p>	Not a problem
KL.16	AR – CO ₂	<p>In the NIR (section 11.2.1, p.246), Iceland reported on how the areas of afforested natural birch forests are calculated. For natural birch forests, afforestation is based on natural birch woodland maps and extrapolation. The Party referred to the NIR (section 6.4) for information on the exact years in the extrapolation. However, the ERT noted that the NIR section has been changed in the current submission and the correct reference is now NIR section 6.5. The Party confirmed that the cross reference was incorrect.</p> <p>The ERT recommends that Iceland carry out additional QA/QC procedures to update the cross references in the latest NIR to other chapters within the document and update the text of the NIR as needed (e.g. in this case, extrapolated years should be updated from 2013–2016 to 2013–last reported year).</p>	Yes. Convention reporting adherence

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
KL.17	AR – CO ₂	<p>Iceland used the same EF (0.14 t C/ha) for litter in natural birch forests and cultivated forests under AR (CRF table 4(KP-I)A.1). However, Iceland reported “NE” for litter in natural birch forests under FM (CRF table 4(KP-I)B.1). The EF under AR (0.14 t C/ha) is higher than the EF for litter in cultivated forest under FM (0.08 t C/ha) (see CRF table 4(KP-I)B.1). The Party described CSC in litter in NIR section 6.5.1.2 (pp.141–144) for FM and in section 6.5.2.2 (p.146) for AR. The Party stated in the NIR (p.146) that the EF for litter under AR is the arithmetic average of data from two research projects, without indicating that both birch forests and cultivated forest were considered by the projects. During the review the Party provided additional information on the estimates for litter.</p> <p>The ERT recommends that the Party improve the transparency of the reporting by indicating in the NIR that the average EF obtained from the data from two research projects for litter on AR includes both natural birch forests and cultivated forests.</p>	Yes. Transparency
KL.18	Deforestation – C and N ₂ O	<p>Iceland reported “NE” for AD and CSC for deforestation in CRF table 4(KP-II)3 for 2008–2017 in relation to N₂O emissions from N mineralization and immobilization and “NA” for N₂O emissions. There is no information on the use of the notation key in the documentation box to CRF table 4(KP-II)3. During the review, Iceland indicated that it would consider the issue for future submissions.</p> <p>The ERT recommends that the Party report the AD, CSC and related N₂O emissions for this category to avoid underestimating the emissions. If this is not possible, the ERT recommends that the Party provide information that justifies the reporting of “NE” for AD and CSC related to N₂O emissions from mineralization and immobilization due to carbon loss or gain associated with land-use conversion and management change in mineral soils on land subject to deforestation in the NIR in the next annual submission and consider providing information in the documentation box to CRF table 4(KP-II)3.</p>	Yes. Completeness
KL.19	FM – CO ₂	<p>Iceland reported “NE” for CSC for litter in the reporting of natural birch forest under FM for 2013–2017, without justifying in the NIR why the pool is not a net source of emissions. In contrast, Iceland reported litter for cultivated forests under FM and described CSC in that litter in the NIR (section 6.5.1.2, pp.141–144). In line with the explanation in the NIR, Iceland clarified during the review that the EF for litter in cultivated forests under FM is not fixed since FM includes afforested areas before 1990 that are younger than 50 years and those areas sequester carbon in litter. Evidence for an increasing carbon stock litter pool in forest older than 50 years does not currently exist. In contrast, natural birch forests defined under FM are considered in all cases to be forest older than 50 years and without a carbon stock increase in the litter pool. During the review, Iceland explained that it would take this issue into consideration for future submissions.</p> <p>The ERT recommends that Iceland report estimates for CSC in the litter of natural birch forests under FM or justify why the carbon pool is not a net source, in accordance with decision 2/CMP.8, annex II, paragraph 2(e). If “NE” is reported, the ERT encourages the Party to include an accompanying explanation in the documentation box to CRF table 4(KP-I)B.1.</p>	Yes. Completeness
KL.20	FM – CO ₂	<p>Iceland made a technical correction to the FMRL for the 2018 submission, as reported in the 2019 NIR (section 11.5.3, p.251). The 2018 NIR (section 11.5.3, pp.233–234) enumerated the issues included in the technical correction. The same technical correction value (76.95 kt CO₂ eq) is reported in the CRF accounting table of the 2019 submission. However, the corresponding reference to the information on the technical corrections made in previous</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
		<p>submissions is not included in the current NIR. During the review, Iceland indicated that it would provide this information in the next submission.</p> <p>The ERT recommends that Iceland report transparently the technical corrections made to the FMRL, including those made in previous submissions, as stated in sections 2.7.5 and 2.7.6 of the Kyoto Protocol Supplement and in CRF table 4(KP-I)B.1.1.</p>	
KL.21	FM – CO ₂	<p>In response to recommendation ID# KL.9 in table 3, Iceland provided a technical correction to the FMRL in its 2018 NIR (section 11.5.3). During the review, Iceland explained that an update to the technical correction is planned for future submissions. In the 2019 NIR (section 11.5.3, p.251), Iceland stated that a further technical correction would be made before the end of the commitment period.</p> <p>The ERT recommends that the Party provide the revised technical correction to the FMRL, as planned, before the end of the commitment period.</p>	Yes. Accuracy
KL.22	FM – CO ₂	<p>The ERT noted that, according to decision 6/CMP.9, paragraph 12, the FM cap is established as part of the report to facilitate the calculation of the assigned amount and shall remain fixed for the second commitment period. In the initial report, the value for the FM cap for Iceland was set to 1,071.396 kt CO₂ eq. The Party reported the FM cap in the CRF accounting table in the 2019 submission as 1,007.516 kt CO₂ eq.</p> <p>The ERT recommends that, in accordance with decision 6/CMP.9, paragraph 12, the Party report in the CRF accounting table the FM cap as established in the initial report.</p>	Yes. KP reporting adherence
KL.23	HWP – CO ₂	<p>Iceland reported emissions and removals in CRF table 4(KP-I)C for CSC in the HWP pool. However, harvest data (in m³ or kt C) were not reported for FM. During the review, the Party provided the relevant background information on the calculation procedure. The Party also explained that the information missing from CRF table 4(KP-I)C was due to a technical problem. Therefore, the Party provided the corresponding information in NIR table 11.2 (p.251).</p> <p>The ERT recommends that Iceland improve the comparability of its reporting by including harvest data (e.g. in m³ or kt C) for FM in column D of CRF table 4(KP-I)C on CSC in the HWP pool and report data that are consistent with those in NIR table 11.2.</p>	Yes. Comparability

^a Recommendations made by the ERT during the review are related to issues as defined in para. 81 of the UNFCCC review guidelines, or problems as identified in para. 69 of the Article 8 review guidelines. Encouragements are made to the Party to address all findings not related to such issues or problems.

VI. Application of adjustments

12. The ERT did not identify the need to apply any adjustments to the 2019 annual submission of Iceland.

VII. Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol

13. Iceland has elected commitment period accounting and therefore the issuance and cancellation of units for KP-LULUCF activities is not applicable to the 2019 review.

VIII. Questions of implementation

14. No questions of implementation were identified by the ERT during the individual review of the Party's 2019 annual submission.

Annex I

Overview of greenhouse gas emissions and removals for Iceland for submission year 2019 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as submitted by Iceland in its 2019 annual submission

1. Tables 1–4 provide an overview of total GHG emissions and removals as submitted by Iceland.

Table 1
Total greenhouse gas emissions for Iceland, base year^a–2017
(kt CO₂ eq)

	<i>Total GHG emissions excluding indirect CO₂ emissions</i>		<i>Total GHG emissions including indirect CO₂ emissions^b</i>		<i>Land-use change (Article 3.7 bis as contained in the Doha Amendment)^c</i>	<i>KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)^d</i>	<i>KP-LULUCF activities (Article 3.4 of the Kyoto Protocol)</i>	
	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>			<i>CM, GM, RV, WDR</i>	<i>FM</i>
FMRL								–154.00
Base year	13 020.13	3 613.02	NA	NA	NA		–347.70	
1990	13 020.13	3 613.02	NA	NA				
1995	12 798.61	3 437.71	NA	NA				
2000	13 433.80	4 046.86	NA	NA				
2010	14 326.45	4 854.51	NA	NA				
2011	14 033.47	4 591.40	NA	NA				
2012	14 043.48	4 611.41	NA	NA				
2013	14 022.44	4 608.30	NA	NA		–185.29	–547.52	–79.83
2014	14 035.10	4 644.45	NA	NA		–206.17	–556.98	–83.02
2015	14 089.57	4 726.25	NA	NA		–226.79	–567.34	–86.76
2016	13 996.55	4 651.25	NA	NA		–232.59	–575.53	–91.68
2017	14 086.61	4 765.83	NA	NA		–258.39	–592.84	–86.78

Note: Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions.

^a “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for all gases except NF₃, for which the base year is 1995. The base year for RV under Article 3, para. 4, of the Kyoto Protocol is 1990 for Iceland. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

^b The Party did not report indirect CO₂ emissions in CRF table 6.

^c The value reported in this column refers to 1990.

^d Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.

Table 2
Greenhouse gas emissions by gas for Iceland, excluding land use, land-use change and forestry, 1990–2017
 (kt CO₂ eq)

	<i>CO₂^a</i>	<i>CH₄</i>	<i>N₂O</i>	<i>HFCs</i>	<i>PFCs</i>	<i>Unspecified mix of HFCs and PFCs</i>	<i>SF₆</i>	<i>NF₃</i>
1990	2 237.43	546.72	332.44	0.69	494.64	NO, NA	1.10	NO, NA
1995	2 465.11	580.28	311.49	10.22	69.36	NO, NA	1.24	NO, NA
2000	2 933.99	605.22	313.17	43.28	149.89	NO, NA	1.31	NO, NA
2010	3 620.94	635.72	275.69	145.83	171.67	NO	4.66	NO
2011	3 486.41	612.24	270.69	144.50	74.52	NO	3.05	NO
2012	3 488.68	575.81	276.13	171.47	94.00	NO	5.32	NO
2013	3 481.79	584.36	271.64	179.15	88.16	NO	3.20	NO
2014	3 461.72	601.73	299.28	180.48	99.03	NO	2.22	NO
2015	3 533.38	602.29	280.59	204.76	103.70	NO	1.53	NO
2016	3 489.97	597.09	279.09	191.96	91.86	NO	1.28	NO
2017	3 614.50	584.40	291.68	204.91	68.04	NO	2.31	NO
Per cent change 1990–2017	61.5	6.9	-12.3	29 599.3	-86.2	NA	110.4	NA

Note: Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions.

^a Iceland did not report indirect CO₂ emissions in CRF table 6.

Table 3
Greenhouse gas emissions by sector for Iceland, 1990–2017
 (kt CO₂ eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1990	1 866.69	958.01	607.43	9 407.11	180.89	NO
1995	2 068.65	571.21	559.15	9 360.90	238.70	NO
2000	2 210.48	1 008.56	560.94	9 386.94	266.89	NO
2010	2 056.98	1 951.13	555.42	9 471.94	290.99	NO
2011	1 922.49	1 845.72	555.49	9 442.06	267.70	NO
2012	1 880.60	1 937.49	554.65	9 432.07	238.67	NO
2013	1 844.35	1 962.75	549.27	9 414.14	251.93	NO
2014	1 859.47	1 941.85	593.25	9 390.65	249.88	NO
2015	1 876.94	2 023.00	581.68	9 363.32	244.64	NO
2016	1 857.62	1 973.99	582.48	9 345.30	237.16	NO

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
2017	1 907.49	2 039.34	589.38	9 320.78	229.62	NO
Per cent change 1990–2017	2.2	112.9	-3.0	-0.9	26.9	NA

Notes: (1) Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions. (2) Iceland did not report indirect CO₂ emissions in CRF table 6.

Table 4

Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year^a–2017, for Iceland
(kt CO₂ eq)

	<i>Article 3.7 bis as contained in the Doha Amendment^b</i>	<i>Activities under Article 3, paragraph 3, of the Kyoto Protocol</i>		<i>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</i>				
	<i>Land-use change</i>	<i>AR</i>	<i>Deforestation</i>	<i>FM</i>	<i>CM</i>	<i>GM</i>	<i>RV</i>	<i>WDR</i>
FMRL				-154.00				
Technical correction				76.95				
Base year	NA				NA	NA	-347.70	NA
2013		-185.45	0.16	-79.83	NA	NA	-547.52	NA
2014		-206.28	0.11	-83.02	NA	NA	-556.98	NA
2015		-227.43	0.65	-86.76	NA	NA	-567.34	NA
2016		-232.85	0.27	-91.68	NA	NA	-575.53	NA
2017		-258.85	0.46	-86.78	NA	NA	-592.84	NA
Per cent change base year–2017					NA	NA	70.5	NA

Note: Values in this table include emissions from land subject to natural disturbances, if applicable.

^a The base year for RV under Article 3, para. 4, of the Kyoto Protocol is 1990 for Iceland. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

^b The value reported in this column refers to 1990.

2. Table 5 provides an overview of key relevant data from Iceland's reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 5

Key relevant data for Iceland under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the 2019 annual submission

<i>Key parameters</i>	<i>Values</i>
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: commitment period accounting (g) WDR: not elected
Election of activities under Article 3, paragraph 4	RV
Election of application of provisions for natural disturbances	Yes, for AR and FM
3.5% of total base-year GHG emissions, excluding LULUCF	127.175 kt CO ₂ eq (1 071.396 kt CO ₂ eq for the duration of the commitment period) (see ID# KL.21 in table 6 of this report)
Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for:	
1. AR	NA
2. Deforestation	NA
3. FM	NA
4. CM	NA
5. GM	NA
6. RV	NA
7. WDR	NA

Annex II

Information to be included in the compilation and accounting database

Tables 1–5 include the information to be included in the compilation and accounting database for Iceland. Data shown are from the original annual submission of the Party, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table 1

Information to be included in the compilation and accounting database for 2017, including on the commitment period reserve, for Iceland

(t CO₂ eq)

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
CPR	13 794 496	–	–	13 794 496
Annex A emissions for 2017	–	–	–	–
CO ₂ ^a	3 614 496	–	–	3 614 496
CH ₄	581 102	584 405	–	584 405
N ₂ O	283 797	291 680	–	291 680
HFCs	204 905	–	–	204 905
PFCs	68 037	–	–	68 037
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF ₆	2 307	–	–	2 307
NF ₃	NO	–	–	NO
Total Annex A sources	4 754 644	4 765 830	–	4 765 830
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2017	–	–	–	–
AR	–258 847	–	–	–258 847
Deforestation	462	–	–	462
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2017	–	–	–	–
FM	–86 777	–	–	–86 777
RV	–592 836	–	–	–592 836
RV for the base year	–347 705	–	–	–347 705

^a The Party did not report indirect CO₂ emissions in CRF table 6.

Table 2

Information to be included in the compilation and accounting database for 2016 for Iceland

(t CO₂ eq)

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
Annex A emissions for 2016	–	–	–	–
CO ₂ ^a	3 489 974	–	–	3 489 974
CH ₄	593 569	597 089	–	597 089
N ₂ O	271 273	279 091	–	279 091
HFCs	191 962	–	–	191 962
PFCs	91 858	–	–	91 858
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF ₆	1 275	–	–	1 275
NF ₃	NO	–	–	NO

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
Total Annex A sources	4 639 913	4 651 250	–	4 651 250
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2016	–	–	–	–
AR	–232 854	–	–	–232 854
Deforestation	269	–	–	269
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2016	–	–	–	–
FM	–91 677	–	–	–91 677
RV	–575 526	–	–	–575 526
RV for the base year	–347 705	–	–	–347 705

^a The Party did not report indirect CO₂ emissions in CRF table 6.

Table 3
Information to be included in the compilation and accounting database for 2015 for Iceland
(t CO₂ eq)

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
Annex A emissions for 2015	–	–	–	–
CO ₂ ^a	3 533 375	–	–	3 533 375
CH ₄	598 739	602 294	–	602 294
N ₂ O	272 980	280 585	–	280 585
HFCs	204 764	–	–	204 764
PFCs	103 704	–	–	103 704
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF ₆	1 531	–	–	1 531
NF ₃	NO	–	–	NO
Total Annex A sources	4 715 093	4 726 253	–	4 726 253
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015	–	–	–	–
AR	–227 432	–	–	–227 432
Deforestation	647	–	–	647
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015	–	–	–	–
FM	–86 755	–	–	–86 755
RV	–567 339	–	–	–567 339
RV for the base year	–347 705	–	–	–347 705

^a The Party did not report indirect CO₂ emissions in CRF table 6.

Table 4
Information to be included in the compilation and accounting database for 2014 for Iceland
(t CO₂ eq)

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
Annex A emissions for 2014	–	–	–	–
CO ₂ ^a	3 461 716	–	–	3 461 716
CH ₄	598 793	601 726	–	601 726
N ₂ O	292 258	299 277	–	299 277
HFCs	180 477	–	–	180 477
PFCs	99 034	–	–	99 034
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF ₆	2 216	–	–	2 216
NF ₃	NO	–	–	NO

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
Total Annex A sources	4 634 494	4 644 447	–	4 644 447
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014	–	–	–	–
AR	–206 279	–	–	–206 279
Deforestation	111	–	–	111
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014	–	–	–	–
FM	–83 020	–	–	–83 020
RV	–556 979	–	–	–556 979
RV for the base year	–347 705	–	–	–347 705

^a The Party did not report indirect CO₂ emissions in CRF table 6.

Table 5

Information to be included in the compilation and accounting database for 2013 for Iceland(t CO₂ eq)

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
Annex A emissions for 2013	–	–	–	–
CO ₂ ^a	3 481 785	–	–	3 481 785
CH ₄	581 146	584 363	–	584 363
N ₂ O	265 272	271 644	–	271 644
HFCs	179 145	–	–	179 145
PFCs	88 165	–	–	88 165
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF ₆	3 202	–	–	3 202
NF ₃	NO	–	–	NO
Total Annex A sources	4 598 715	4 608 304	–	4 608 304
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013	–	–	–	–
AR	–185 447	–	–	–185 447
Deforestation	155	–	–	155
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013	–	–	–	–
FM	–79 832	–	–	–79 832
RV	–547 520	–	–	–547 520
RV for the base year	–347 705	–	–	–347 705

^a The Party did not report indirect CO₂ emissions in CRF table 6.

Annex III

Additional information to support findings in table 2 in this report

Missing categories that may affect completeness

The categories for which methods are included in the 2006 IPCC Guidelines that were reported as “NE” or for which the ERT otherwise determined that there may be an issue with the completeness of the reporting in the Party’s inventory are the following:

- (a) 1. A.4 Other sectors – use of charcoal (CH₄ and N₂O) (see ID# E.18 in table 3 in this report);
- (b) 2.F Product uses as substitutes for ozone-depleting substances – fire extinguishers and other aerosol products (HFCs, PFCs and SF₆) (see ID# I.3 in table 3 in this report);
- (c) 2.D.2 Paraffin wax use – other sources (CO₂) (see ID# I.9 in table 6 in this report);
- (d) 2.D.2 Paraffin wax use – candle production (CO₂) (see ID# I.10 in table 6 in this report);
- (e) 2.F.1 Refrigeration and air conditioning – disposal of commercial refrigeration equipment (HFC-23) (see ID# I.11 in table 6 in this report);
- (f) 2.G.3 N₂O from product uses – whipped cream containers (N₂O) (see ID# I.12 in table 6 in this report);
- (g) 3.D.a.2 Organic N fertilizers – emissions from sewage sludge applied to soils (N₂O) (see ID# E.18 in table 3 in this report);
- (h) 4.A Forest land – CSC in the deadwood and litter carbon pools (CO₂) (see ID# E.8 in table 3 in this report);
- (i) 4.C Grassland – degraded areas (CO₂) (see ID# L.15 in table 3 in this report);
- (j) 4.C.1 Grassland remaining grassland – CSC in mineral soils (CO₂) (see ID# L.16 in table 3 in this report);
- (k) 4.E.2 Land converted to settlements – CSC in mineral soils (CO₂) (see ID# L.20 in table 3 in this report);
- (l) 4(IV) Indirect N₂O emissions from managed soils (excluding those from agricultural lands that are reported in CRF table 3.D) (N₂O) (see ID# L.23 in table 3 in this report);
- (m) 4(V) Biomass burning – cropland and grassland (CO₂, CH₄ and N₂O) (see ID# 41 in table 6 in this report);
- (n) 5.A.1 Managed waste disposal sites – emissions from combustion of landfill gas for energy for 2002–2009 (CH₄ and N₂O) (see ID# W.11 in table 6 in this report);
- (o) Deforestation – N from mineralization/immobilization (N₂O) (see ID# KL.18 in table 6 in this report);
- (p) FM – CSC in below-ground biomass (CO₂) (see ID# KL.10 in table 3 in this report);
- (q) FM – CSC in litter of natural birch forest (CO₂) (see ID# KL.19 in table 6 in this report).

Annex IV

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 1997. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. JL Houghton, LG Meira Filho, B Lim, et al. (eds.). Paris: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency. Available at <https://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html>.

IPCC. 2000. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. J Penman, D Kruger, I Galbally, et al. (eds.). Hayama, Japan: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency/Institute for Global Environmental Strategies. Available at <https://www.ipcc.ch/publication/good-practice-guidance-and-uncertainty-management-in-national-greenhouse-gas-inventories/>.

IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. J Penman, M Gytarsky, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at <https://www.ipcc.ch/publication/good-practice-guidance-for-land-use-land-use-change-and-forestry/>.

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IPCC. 2014. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/kpsg>.

IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva: IPCC. Available at <http://www.ipcc-nggip.iges.or.jp/public/wetlands/>.

B. UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2013, 2014, 2015, 2016 and 2017 annual submissions of Iceland, contained in documents FCCC/ARR/2013/ISL, FCCC/ARR/2014/ISL, FCCC/ARR/2015/ISL, FCCC/ARR/2016/ISL and FCCC/ARR/2017/ISL, respectively.

Other

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at <https://unfccc.int/sites/default/files/resource/AGI%202019.pdf>.

Annual status report for Iceland for 2019. Available at https://unfccc.int/sites/default/files/resource/asr2019_ISL.pdf.

C. Other documents used during the review

Responses to questions during the review were received from Nicole Keller (EA), including additional material on the methodology and assumptions used. The following references are reproduced as received:

- Aradóttir, Ó., Svavarsdóttir, K., Jónsson, T., & Guðbergsson, G. (2000). *Carbon accumulation in vegetation and soils by reclamation of degraded areas*. Icelandic Agricultural Science, 13, 99113.
- Arnalds, Ó., Guðbergsson, G., & Guðmundsson, J. (2000). *Carbon sequestration and reclamation of severely degraded soils in Iceland*. Búvísindi, 13, 89-97.
- Baldvinsson, Í., Þórisdóttir, Þ., & Ketilsson, J. (2011). *Gaslosun jarðvarmavirkjana á Íslandi 1970-2009. Orkustofnun (Gas emissions of geothermal power plants in Iceland 1970-2009)*. National Energy Authority. Available at <http://www.os.is/gogn/Skyrslur/OS-2011/OS-2011-02.pdf>.
- Environment Agency of Iceland. 2019. *Country Specific Emission Factor for N₂O from Organic Soils in Iceland. Justification and documentation following the request of the Saturday Paper – UNFCCC desk review 2019*.
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