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Report for the Stage 3 in-depth review of emission inventories submitted under the UNECE LRTAP Convention and EU National Emissions Ceilings Directive for:

EXAMPLE STAGE 3 REVIEW REPORT
ICELAND

CONTENT

INTRODUCTION

1.   The mandate and overall objectives for the emission inventory review process under the LRTAP Convention is given by the UNECE document '*Updated methods and procedures for the technical reviews of air pollutant emission inventories reported under the Convention*'[1] – hereafter referred to as the 'Review guidelines 2018'.

2.   In this annual review, all pollutants covered by LRTAP Convention and its protocols (SO_2, NOx, NMVOC, NH_3, plus PM_{10} $PM_{2.5}$, BC, 3 HMs and POP$_S$) have been checked for the time series years 1990 – 2018, reflecting current priorities of the EMEP Steering Body and the Task Force on Emission Inventories and Projections (TFEIP). HMs and POPs have been reviewed to the extent possible.

3.   This report covers the Stage 3 centralised review under the UNECE LRTAP Convention of Iceland, coordinated by the EMEP Centre on Emission Inventories and Projections (CEIP) acting as review secretariat. The remotely conducted review took place from 22nd June 2020 to 26th June 2020. The following team of nominated experts from the roster of experts performed the review: Generalists – Risto Saarikivi (CZ), Ben Richmond (UK), Energy – Erik Honig (NL), Marion Pinterits (EU), Garmt Jans Venhuis (NL) and Kristina Jurich (DE), Transport – Giannis Papadimitriou (EU) and Magdalena Zimakowska-Laskowska (PL), IPPU Mirela Poljanac (HR), Juan Luis Martin Ortega (ES), Michaela Titz (AT), Agriculture - Peder Gjølstad Røhnebæk (NO), Hakam Al-Hanbali (SE) and Gwenaëlle Le Borge (FR), Waste – Zuzana Jonacek (SK) and Sabino Del Vento (UK).

4.   Kristina Saarinen (FI) was the lead reviewer. The review was coordinated by Katarina Marečková (CEIP).

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[1] Decision 2018/1 adopted by EB: *Updated methods and procedures for the technical review of air pollutant emission Inventories reported under the Convention*. ECE/EB.AIR/142/Add.1
http://www.unece.org/fileadmin/DAM/env/documents/2002/eb/air/EB%20Decisions/Decision_2018_1.pdf

PART A: KEY REVIEW FINDINGS

5.   The ERT recognises the level of effort undertaken by Iceland in providing an inventory with a significant level of detail to enable a detailed review and thanks the Party for providing timely responses to the questions of the ERT during the review that enabled the ERT to give recommendations for further developments of the inventory.

6.   Iceland provided NFR tables for 1990-2018 on 19th February 2020 after the reporting deadline of 15th February, and a resubmission on 30th April 2020. The IIR was submitted on 30th April 2020 after the reporting deadline of 15th March. In 2017, the Party submitted LPS data on 22nd June after the reporting deadline of 1st May. Iceland did not submit gridded emissions for Gothenburg Protocol pollutants in 2017.

7.   The 2020 submission shows improvements for a number of issues since the last submission.

8.   The ERT found the inventory to be generally transparent. The use of notation keys generally follows the definitions in the Reporting Guidelines. The IIR has been prepared according to the template provided in Annex I to the Reporting Guidelines and includes a key category analysis but not yet an uncertainty analysis.

9.   The inventory is generally complete; however, the ERT noted that emissions from some sources were not included.

10.   The ERT identified some minor inconsistencies that were clarified by the Party.

11.   The inventory methodologies are in line with the *EMEP EEA Emission Inventory Guidebook* (hereafter Guidebook) and reporting is mainly in line UNECE Reporting Guidelines (hereafter Reporting Guidelines), thus the inventory is comparable with those of other reporting Parties.

12.   The Party applies Tier 2 methods to most but not to all key categories. The ERT has not identified any systematic under- or over-estimates.

13.   During the review, Iceland provided several revised estimates (REs) for the Energy, Transport, Industry and Waste sectors, which the ERT accepted.

14.   Transport emissions are calculated on basis of fuels sold.

15.   As a summary of the main findings, further need for improvement was identified for the following items:

    a) Transparency: correct use of notation keys, justifications for dips, jumps and drivers behind the emission trends, information on sector specific QA/QC, impact of recalculations

    b) Completeness: completion of missing estimates identified during the review

    a) Accuracy: use of T2 methods for all Key Categories, inclusion of an uncertainty analysis.

INVENTORY SUBMISSION

16. In the 2020 submission, Iceland has reported emissions for its Protocol base years (1990) and a full time series to 2018 (the latest year) for its protocol pollutants using the NFR 2019 format. In addition, Iceland has also provided a full NFR 1990 - 2018 time series for CO and a 1990 - 2018 time series for PM_{10} and $PM_{2.5}$, heavy metals and POPs. Iceland has also submitted a detailed IIR. Activity data are mostly presented in the NFR tables.

17. Emissions are reported by NFR categories; however, emissions from the following categories are reported as Not Estimated (NE): 2A5a (quarrying and mining of minerals other than coal), 2A5b (construction and demolition), 3Da2c (other organic fertilisers applied to soils(including compost)), 3Da4 (crop residues applied to soils), 3Db (indirect emissions from managed soils), 3Df (use of pesticides) and 5D (wastewater handling). For the following categories, the notation key Included Elsewhere (IE) has been used: 1A3eii (other energy), 1A4bii (residential: household and gardening (mobile)), 1A4cii (Agriculture/ Forestry/ Fishing: Off-road vehicles and other machinery). The reasoning behind the use of NE and IE is documented within the IIR; in some cases, the ERT recommends that Iceland address these notation keys for the next submission, details of which are outlined in this report.

18. The CLRTAP inventory submitted by Iceland is of good quality and is in general well documented in the informative inventory report (IIR).

19. National totals in row 141 are reported for the entire territory and transport emissions are based on fuel sold. Iceland does not provide information based on fuel used (rows 143 to 149). Iceland also reports a national total for compliance, which does not differ from the national total reported in row 141.

KEY CATEGORIES

20. Iceland has compiled and presented in its IIR a level Key Category Analysis (KCA) for the following pollutants: NO_x, CO, NMVOC, SO_x, NH_3, TSP, PM_{10}, $PM_{2.5}$, BC, Pb, Cd, Hg, PCDD/F, PAHs and PCBs. All sectors have been included. The level assessment is performed for 1990 and 2018 for all pollutants. Iceland has also compiled and presented a trend KCA within its IIR for all pollutants, covering 1990 to 2018.

21. The ERT notes that Iceland uses T2 or higher methods for most key categories as requested in paragraph 21 of the Reporting Guidelines. Regarding the key category 1A4ciii - Agriculture/Forestry/Fishing: National fishing (All pollutants) where T1 is used, there is work underway to change to T2.

22. The following key categories use a T1 method and there is no mention that there is a plan to upgrade this to T2, thus the ERT recommends that Iceland moves to T2 or higher methods in all key categories in line with paragraph 21 of the Reporting Guidelines:

- 1A3dii - National navigation (shipping) (NO_X)

- 2D3a - Domestic solvent use including fungicides (NMVOC)

- 2D3d – Coating applications (NMVOC)

- 3B – Manure management (NMVOC)
- 5A - Biological treatment of waste - Solid waste disposal on land (NMVOC)

23.   The ERT notes that the IIR does not explicitly mention how the results of the Key Category analysis are used, therefore the ERT recommends that Iceland use the results of the KCA to prioritise the development of the inventory.

QUALITY

Transparency

24.   The ERT recognises that according to the UNECE Reporting Guidelines (ECE/EB.AIR/125), the Parties should, to improve "Transparency", clearly explain which data sources, assumptions and methodologies are used for an inventory (para 12). Thus the submission of an IIR is strongly encouraged (para 43). As a lack of sufficient documentation in an IIR prevents the the ERT from performing a technical review, the Party would, in case of a missing or non-transparent IIR, be asked to provide the missing information during the review. For this reason, in this technical review report, recommendations are given instead of encouragements in cases where there is a need to improve the documentation of data, methods and assumptions used in the inventory.

25.   The ERT notes that the 2020 IIR submission follows the recommended structure in Annex II of the Reporting Guidelines and provides information on emissions, methodology and recalculations at sub-category level. Emission factors and activity data are almost always presented in detail, assumptions and methodologies are clearly documented, references are given and the fluctuations in the time series are explained.

26.   Iceland does not use zero values in the reporting tables and uses the appropriate notation keys for reporting where estimates are not available or necessary. The ERT encourages Iceland to ensure that IIR tables 1.5 and 1.6, where these are documented, are complete and up to date.

Completeness

27.   The ERT acknowledges the effort that Iceland has made to provide estimates of emissions for most of the sub-sectors and pollutants reviewed. Iceland's inventory for the pollutants reviewed is generally complete regarding years and geographical coverage.

28.   The ERT identified the following missing estimates in the 2020 submission:
- 1A2gvii – NH_3, Pb, Hg, HCB, PCBs
- 1A3a (aviation) – particles
- 1A3ai(i), 1A3aii(i) – NH_3, all heavy metals, all PAHs
- 1A3d (navigation) - PAHs
- 1A3bvi – BC
- 1A4bii/1A4cii – all emissions reported as IE or NE
- 1B2d – NH_3, Hg and As

- 2A5a, 2A5b, 2A5c – particles
- 2G – emissions from the use of shoes
- 5D1, 5D2 – NMVOC, NH$_3$

29.   During the review Iceland provided revised estimates for categories 1A2gviii, 1A2gvii,1A3bv, 1A3bvi, 2A5a, 2A5b, 5C2, 5C1biv, and 5C1bv as detailed in Annex I. The ERT accepted the revised estimates. The ERT recommends that Iceland includes emissions for which there are methods in the Guidebook as listed in paragraph 27 and include the revised estimates in the next submission.

30.   The ERT also recommends that Iceland report activity data in every instance where emissions have been reported within the NFR table where it is plausible. Where it would not make sense, e.g. where activities have different units, it is recommended that Iceland report the activity as 'NA' and write a note in the column AL to signpost how to find further details in the IIR.

31.   The ERT notes that Iceland has not filled out row 141, National Total for Activity Data, and recommends that Iceland complete this, where relevant, for the next submission.

32.   The ERT recommends that the Party performs additional reviews to identify potential gaps in the inventory. The usage of correct notation keys is highly recommended to support the finding of such gaps.

Consistency, including recalculations and time-series

33.   Iceland undertook a number of recalculations for their 2020 submission predominantly for the years 1990 and 2017 where appropriate. Descriptions of recalculations are provided on a sub-sector basis, mostly providing the rationale behind revisions. The ERT notes that some quantitative information on the impact of recalculations on the emissions has been presented in the IIR. The ERT recommends that Iceland provides justifications for all recalculations as well as quantitative detail on the impacts of the changes on the national estimates and time series in its future IIR submissions.

34.   The ERT identified some minor inconsistencies in the Energy and Transport sectors that were explained by the Party.

Comparability

35.   The ERT notes that Iceland uses methods in accordance with the latest version of the EMEP/EEA Emission Inventory Guidebook and that the allocation of source categories follows that of Annex I to the EMEP/UNECE Reporting Guidelines (NFR 2019 format), and that the inventory is thus comparable with those of other reporting Parties.

Accuracy and uncertainties

36.   The ERT has not identified any systematic under- or over-estimates of emissions.

37.   The ERT notes that the Party uses Tier 2 or higher tier methods for all key categories with the exception of those mentioned under paragraph 8, where the ERT

recommends that the Party move to Tier 2 or higher methods to increase the accuracy of the inventory.

38.   Iceland has not included an uncertainty analysis in the submission, but states in the IIR that an uncertainty analysis is being developed and will be included in the next submission. The ERT recommends that Iceland compile at least Tier 1 uncertainty estimates for future submissions in line with paragraph 31 of the Reporting Guidelines.

39.   The ERT notes that, on occasion, Iceland references superseded guidance, e.g. the Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases (UNEP, 2005). The ERT encourages Iceland to update this (UNEP, 2012), updating emission factors if required. With reference to paragraph 19 of the Reporting Guidelines, the ERT notes that when Iceland considers that the UNEP Toolkit better reflect their national situation than the Guidebook methods, this should be explained in the IIR.

Verification and quality assurance/quality control approaches

40.   Iceland has included a quality assurance/quality control (QA/QC) plan in accordance with the EMEP/EEA Guidebook Part A6 (Inventory Management). This includes general QC procedures (Tier 1), as well as source category specific procedures (Tier 2) for key categories and for those individual categories in which significant methodological and/or data revisions have occurred.

41.   The ERT commends Iceland on its general quality assurance/quality control (QA/QC) activities. However, sector specific checks are not documented in the IIR. ERT recommends that Iceland provide sector specific information on QA/QC procedures and results of the checks in future submissions.

42.   The Party provides limited information on verification of the inventory in the IIR. The ERT recommends that in future the Party establishes external and independent data comparisons e.g. with inventory estimates made by other bodies or through alternative methods, and report on these in the IIR.

Reporting of Condensable Particulate Matter

43.   Iceland has not provided information regarding the inclusion/exclusion of the condensable component of PM in the IIR. The ERT recommends that Iceland include this information in their next submission according to Annex II of the the Reporting Guidelines.

FOLLOW-UP TO PREVIOUS REVIEWS

44.   Iceland provided detailed responses to the questions identified in the Stage 2 review.

45.   The ERT notes that Iceland has implemented the following recommendations from the last S3 review:

> (a) Inclusion of PCB emissions in the inventory.

> (b) Inclusion of the reasons behind the recalculations in the IIR.

(c) Inclusion of NH$_3$ emissions from 3Da2a.

46.   The ERT recommends that the Party address issues that were raised in the previous 2012 and 2016 reviews and complete the recommendations not yet included in the 2020 submission (as detailed under Sub-sector specific recommendations).

AREAS FOR IMPROVEMENTS IDENTIFIED BY ICELAND

47.   Within the IIR, Iceland has identified several areas for improvement, which are either already in progress or planned; these include:

> (a) Reviewing and expanding sector specific QA/QC activities, including full documentation.
>
> (b) Finalising and implementing the uncertainty analysis.
>
> (c) Reviewing and updating emission factors according to the 2019 EMEP/EEA Guidebook.
>
> (d) Developing country specific fuel specifications, in particular for liquid fuels.
>
> (e) Harmonising the reporting of IPPU data between CLRTAP and E-PRTR.
>
> (f) Improving estimates for wastewater handling and reviewing the methodology used to calculate emissions from accidental fires.

TECHNICAL CORRECTIONS AND REVISED ESTIMATES CONSIDERED AND/OR CALCULATED BY THE ERT

48.   The ERT noted underestimations for which Iceland provided Revised Estimates during the review. The ERT accepted the Revised Estimates provided by Iceland for the Energy, Transport, Industry and Waste sectors as presented in Table 1 and in Annex I. The ERT recommends that the Party implement the revised estimates in the next submission.

Table 1 Summary of Revised Estimates calculated by Iceland and accepted by the ERT for Iceland

NFR	Pollutant	Years	Calculated by	Potential contribution to national total (%)
1A2gviii	SOx	1990-2018	Iceland	-6.3% (2010)
1A2gviii	Hg	1990-2018	Iceland	-3.6% (2010), -
1A3bvi	BC	1990-2018	Iceland	5.2%(2018), 3.6%(2015), 2.8%(2010), 2.2%(2005)
1AA3bvii	BC	1990-2018	Iceland	0.5%(2018), 0.3%(2015), 0.2%(2010), 0.2% (2005)
1A2gvii	NH3	1990-2018	Iceland	0.005%(2018), 0.005%(2015), 0.005%(2010), 0.01%(2005)
2A5a	PM2.5	1990-2018	Iceland	2.9%(2018), 1.2%(2015), 3.1%(2010), 4.1%(2005)
2A5a	PM10	1990-2018	Iceland	21.8%(2018), 9.8%(2015), 25.1%(2010), 32.8%(2005)
2A5a	TSP	1990-2018	Iceland	38.6%(2018), 17.7%(2015), 45.3%(2010), 59.5%(2005)
2A5b	PM2.5	1990-2018	Iceland	1.6%(2018), 2.2%(2015), 3.1%(2010), 2.9%(2005)5
2A5b	PM10	1990-2018	Iceland	12.6%(2018), 8.9%(2015), 25,0%(2010), 22.8&(2005)
2A5b	TSP	1990-2018	Iceland	36.5%(2018), 26.4%(2015), 73.8%(2010), 67.8%(2005)
5C1bv	I(1,2,3-cd)P	1990-2018	Iceland	-0.002%(2018), -0.005%(2015), -0.003%(2010), -0.002%(2005)
5C1bv	PAH-4	1990-2010	Iceland	-0.002%(2018), -0.004%(2010), -0.002%(2005)
5Cbiv	PAH-4	2015	Iceland	0.002%(2015)
5C2	PCDD/F	1990	Iceland	-7.3%(1990)

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

49.   The ERT identified the following cross-cutting issues for improvement and recommends that the Party:

(a)   Include in the IIR

−   justifications for all inconsistencies, outliers, dips and jumps and drivers behind emission trends by sector in the inventory

−   documentation of sector specific OA/QC procedures implemented and their results

−   missing activity data related to the emission calculations for IPPU and Agriculture sectors

−   missing information on the impact of recalculations on emission levels in the IPPU and Agriculture sectors

−   information on the inclusion/exclusion of the condensable component of PM in line with Annex II of the Reporting Guidelines

−   correct references throughout the report

b)   Include all emissions for which there are methods in the Guidebook. In the 2020 submission the ERT identified the following missing emissions:

−   1A2gvii – NH_3, Pb, Hg, HCB, PCBs

−   1A3a (aviation) – particles

−   1A3ai(i), 1A3aii(i) – NH_3, all heavy metals, all PAHs

−   1A3d (navigation) - PAHs

−   1A3bvi – BC

−   1A4bii/1A4cii – all emissions reported as IE or NE

−   1B2d – NH_3, Hg and As

−   2A5a, 2A5b, 2A5c – particles

−   2G – emissions from the use of shoes

−   5D1, 5D2 – NMVOC, NH_3

c)   Include all Revised Estimates provided during the 2020 review (Table 1 and Annex I) in the next inventory submission.

d)   Always use notation keys in line with paragraph 12 of the Reporting Guidelines.

e)   Report emissions separately in their default NFR source categories, or if not possible, justify reporting as IE in the IIR.

f)   Ensure that the 'National Total Activity' cells within the reporting template are complete.

g)   Use T2 or higher methods for all Key Categories in line with paragraph 21 of the Reporting Guidelines.

h)   Always use the latest version of the Guidebook and in cases where other methods or country specific emissions factors are used, justify in the IIR why the chosen methods are more accurate for Iceland.

i) Include an uncertainty analysis in the inventory in line with paragraph 31 of the Reporting Guidelines.

j) Implement the sub-sector specific detailed recommendations as indicated under Sub-Sector Specific Recommendations.

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

Code	Name	Reviewed	Not Reviewed	Recommendation Provided
Pollutants Reviewed		SO$_2$, NO$_x$, NMVOC, NH$_3$, PM$_{10}$ & PM$_{2.5}$, Cd, Hg, Pb, As, Dioxin, PAH		
Years		1990 – 2018		
1A1a	Public electricity and heat production	x		
1A1b	Petroleum refining	NO		
1A1c	Manufacture of solid fuels and other energy industries	NO		
1A2a	Iron and steel	x		x
1A2b	Non-ferrous metals	x		x
1A2c	Chemicals	x		x
1A2d	Pulp, Paper and Print	NO		x
1A2e	Food processing, beverages and tobacco	x		x
1A2f	Stationary combustion in manufacturing industries and construction: Non-metallic minerals	x		x
1A2gviii	Stationary combustion in manufacturing industries and construction: Other	x		x
1A3ei	Pipeline transport	NO		
1A3eii	Other	x		
1A4ai	Commercial/institutional: Stationary	x		x
1A4bi	Residential: Stationary	x		
1A4ci	Agriculture/Forestry/Fishing: Stationary	x		x
1A5a	Other stationary (including military)	x		x
1B1a	Fugitive emission from solid fuels: Coal mining and handling	NO		
1B1b	Fugitive emission from solid fuels: Solid fuel transformation	NO		
1B1c	Other fugitive emissions from solid fuels	NO		
1B2ai	Fugitive emissions oil: Exploration, production, transport	NO		
1B2aiv	Fugitive emissions oil: Refining / storage	NO		
1B2av	Distribution of oil products	x		
1B2b	Fugitive emissions from natural gas (exploration, production, processing, transmission, storage, distribution and other)	NO		
1B2c	Venting and flaring (oil, gas, combined oil and gas)	NO		
1B2d	Other fugitive emissions from energy production	x		x
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

<u>General recommendations on cross cutting issues</u>

Transparency

50.   Iceland has provided a detailed and generally transparent emissions inventory. Estimates are provided at the most detailed level for all energy sectors. Iceland's methodology and emission factors in the IIR are considered by the ERT to be transparent and well described for the Energy sector. The ERT encourages the Party to maintain this level of transparency.

51.   The ERT notes that Iceland is using the notation key NO for some pollutants for a specific source but not for all pollutants. According to paragraph 12(e) of the Reporting Guidelines, the notation key "NO" (not occurring) is used for categories or processes within a particular source category that do not occur within a Party's country; thus, the notation key "NO" should be used for all pollutants and activity data in a NFR category for an activity not occurring within the territory of Iceland. The ERT recommends that Iceland use the appropriate notation key NO for reporting sources which do not occur in Iceland.

Completeness

52.   The ERT considers the Energy sector to be complete with good levels of detail in the methodology descriptions.

53.   However, the ERT notes that Iceland has not always reported emissions for which activity data and default emission factors from the EMEP/EEA Guidebook are available, as listed below under "Sub-Sector Specific Recommendations", and recommends that Iceland also include these emissions in its future submissions or provide information in its IIR on why emissions from this source is considered to be not occurring or negligible.

Consistency including recalculation and time series

54.   The ERT concludes that the Icelandic inventory is consistent throughout the time series and between the reported pollutants. The ERT identified some minor inconsistencies during the review that were clarified by the country. The ERT recommends that Iceland enhance QA/QC checks to improve time series consistency and that it describe major outliers in its IIR.

55.   The ERT commends Iceland for providing information on recalculations in its IIR.

Comparability

56.   The ERT notes that the methods used by Iceland are mostly consistent with those proposed in the 2019 version of the Guidebook, apart from some cases where Iceland uses the 2016 version of the Guidebook. The ERT also notes that the emissions are reported in the NFR 2019 format. The ERT thus considers the Energy sector inventory comparable with the inventories of other reporting Parties.

57.   The ERT notes that Iceland, in some cases, uses country specific emissions factors, which is in line with paragraph 19 of the Reporting Guidelines as Parties can use national or international methodologies that they consider better as they reflect their national situation better, produce more accurate estimates than the default

methods, are based on scientific evidence, and documented in their IIR. The ERT recommends that Iceland provide justifications in the IIR for cases where units of default emission factors are considered as not appropriate for the country's circumstances.

Accuracy and uncertainties

58.   Iceland is not providing an uncertainty analysis in its current IIR. The ERT recommends that Iceland undertake an uncertainty analysis for the Energy sector in order to prioritise improvement needs and provide an indication of the accuracy of the inventory data in line with paragraph 31 of the Reporting Guidelines.

59.   The Party provides a general chapter on QA/QC procedures in its IIR. The ERT recommends that the Party document in the IIR the sector specific OA/QC procedures implemented for the Energy sector.

Condensable Particulate Matter

60.   The Party does not provide explanatory information on the condensable component of PM in the Energy sector. The ERT recommends that Iceland include such information in the next submission.

Improvement

61.   The ERT commends the Party for improvements made since the last review and on the inclusion of information regarding planned improvements in its IIR.

Potential Technical Corrections

62.   No technical corrections were identified in the review. Iceland provided revised estimates for category 1A2gviii as presented in Annex I.

Sub-Sector Specific Recommendations

Category issue 1: 1A4ci Agriculture/Forestry/Fishing: Stationary – Activity data

63.   The ERT noted that Iceland reports emissions from subcategory 1A4ci as not occurring, and that activity data from this source is reported as included elsewhere. In response to a question raised during the review, the Party clarified that this activity does not occur in Iceland and that they had applied the wrong notation keys erroneously. The ERT recommends that Iceland apply the correct notation key "NO" (not occurring) for emissions and activity data in the subcategory 1A4ci in its next submission.

Category issue 2: 1A4ai Commercial/Institutional: Stationary – TSP, PM_{10}

64.   The ERT noted that the PM10 emissions exceeded the TSP emissions in subcategory 1A4ai in the whole time series and that Tier 1 default emission factors from the EMEP/EEA Guidebook 2016 had been applied. In response to a question raised during the review, Iceland clarified that they had erroneously applied the wrong default emission factor for TSP emissions for this category. The ERT concludes that the correction is very small (around 0.000006 kt) and recommends that Iceland apply the correct default emission factor for estimating TSP emissions from the subcategory 1A4ai in its future submissions.

Category issue 3: 1A2 & 1A5a - PAH

65.   In response to a question raised during the review, Iceland confirmed that they had changed the unit of default emission factors provided in Guidebook 2016 Table 3-4 (Chapter 1.A.2) and Table 3-9 (Chapter 1A4 small combustion), to estimate PAH emissions from liquid fuels for subcategories 1A2 and 1A5a by a factor of 1000 from mg/GJ to µg/GJ. The Party states in its IIR that it assumes that the PAH emission factors given in the Table 3-4 of the Guidebook should be in µg/GJ rather than mg/GJ (after comparison with Table 3-37, Volume 1A4). The ERT acknowledges that there is an uncertainty about the units given in the Guidebook to estimate PAH emissions from liquid fuels in categories 1A2 and 1A5a, accepts the change of the unit for the time being until the issue is clarified, and encourages Iceland to provide the correct reference for the table in Chapter 1A4 - Small combustion in its IIR to justify the change in the unit of default emission factors to calculate PAH emissions from these sub-categories. The ERT also encourages the Party to contact the TFEIP Combustion and Industry Panel to clarify the question of the unit.

Category issue 4: 1B2d geothermal energy extraction – All Pollutants

66.   The ERT noted that Iceland does not estimate NH_3, Hg and As emissions from subcategory 1B2d - geothermal energy extraction and states in Table 1-5 of its IIR that no Tier 1 EFs are provided in the Guidebook. The ERT notes, however, that the Guidebook provides a Tier 1 methodology as well as default EFs for the mentioned pollutants (Table 3-1, Chapter 1B2d). In response to a question raised by the ERT during the review, Iceland clarified that ammonia emissions occur at geothermal sites, but in the form of NH_4, and that therefore the notation key should be 'NE' but not 'NA'. They also explained that NH_4 and Hg emissions occur in trace amounts (<0.001%), and that low concentrations of As are also emitted but that the geothermal power plants have not reported such emissions. The Party further states that it will check with the geothermal industry if improvements are necessary and that, if relevant, they will do updates before the next submission. The ERT recommends that Iceland provide emission data for NH_3, Hg and As emissions from geothermal energy, and notes that NH_4 may be converted into NH_3 in the same way as other sulphur or nitrogen compounds are converted into SO_2 and NO_2, and recommends using the correct notation key and providing an explanation for the outcome of such an assessment in the IIR. However, the ERT notes that according to paragraph 12(a) of the Reporting Guidelines, the Party may consider that a disproportionate amount of effort would be required to collect data for a pollutant from a specific category that would be insignificant in terms of the overall level and trend in national emissions and in such cases use the notation key NE. The Party should in this case provide in the IIR justifications for their use of NE notation keys, e.g. lack of robust data, lack of methodology, etc.

Category issue 5: 1A2gviii Stationary combustion in manufacturing industries and construction: Other – SO_x, Hg, Revised Estimates

67.   During the review the ERT detected an increase in SO_x emissions of 256 500% between the years 2009 (0.002kt) and 2010 (5.13kt) in subcategory 1A2gviii. Reported Hg emissions in this category showed an increase of +9167% in the same year. In response to a question raised during the review the Party detected

an error in fuel use data from the National Energy Authority. Iceland provided revised estimates for SO_x and Hg emissions from category 1A2gviii for the year 2010 and the ERT accepted these revised estimates. The ERT recommends that Iceland provide corrected activity data and correct SO_x and Hg emissions for the year 2010 in its next submission.

TRANSPORT

Review Scope

Pollutants Reviewed		All		
Years		1990 – 2018		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1A2gvii	Mobile Combustion in manufacturing industries and construction	x		x
1A3ai(i)	International aviation LTO (civil)	x		x
1A3ai(ii)	International aviation cruise (civil)	x		x
1A3aii(i)	Domestic aviation LTO (civil)	x		x
1A3aii(ii)	Domestic aviation cruise (civil)	x		x
1A3bi	Road transport: Passenger cars	x		
1A3bii	Road transport: Light duty vehicles	x		
1A3biii	Road transport: Heavy duty vehicles and buses	x		
1A3biv	Road transport: Mopeds & motorcycles	x		x
1A3bv	Road transport: Gasoline evaporation	x		x
1A3bvi	Road transport: Automobile tyre and brake wear	x		x
1A3bvii	Road transport: Automobile road abrasion	x		x
1A3c	Railways	NO		
1A3di(ii)	International inland waterways	NO		
1A3dii	National navigation (shipping)	x		x
1A4aii	Commercial/institutional: Mobile	NO		x
1A4bii	Residential: Household and gardening (mobile)	IE/NE		x
1A4cii	Agriculture/Forestry/Fishing: Off-road vehicles and other machinery	IE/NE		x
1A4ciii	Agriculture/Forestry/Fishing: National fishing	x		
1A5b	Other, Mobile (including military, land based and recreational boats)	NO		x
1A3di(i)	International maritime navigation	x		x
1A3	Transport (fuel used)	x		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been included and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency

69.   The ERT considers the Transport sector to be transparent and commends the good level of detail in the methodology descriptions for the whole Transport sector.

70.   Following recommendations from the previous Stage 3 review (2016), Iceland has been continuously improving the methodological chapter on emissions and has included the notation keys check, as well as the negative and zero values check as part of the QA/QC activities.

71.   As a result, the provided inventory and emission estimates are in general detailed and transparent for the various transport sub-sectors. The ERT considers

Iceland's methodology, activity data and emission factors in the IIR to be transparent and well described.

72. The ERT, however, notes that the Party reports some emissions as "IE", i.e. aggregated under a source category other than their default NFR source categories as explained under "Sub-sector Specific Recommendations".

Completeness

73. The ERT considers the transport sector of Iceland's inventory to be in general complete with enough details in the methodology descriptions. A significant update has been performed for road transport since the previous Stage 3 review (2016) with the usage of the COPERT methodology, which is part of the Guidebook and intended for the calculation of air pollutant emissions.

74. The ERT has found that the inventory does not cover all pollutants and sources and gives recommendations for improving the completeness of the inventory as discussed below under "Sub-sector specific recommendations".

75. During the review, Iceland provided revised estimates for categories 1A2gvii, 1A3bv and 1A3bvi as presented in Annex I.

Consistency including recalculation and time series

76. Iceland performed some recalculations, the most significant of which are identified in the road transport sector due to the usage of COPERT methodology. Detailed information is provided in Chapter 1.9, in the respective sector chapters, as well as in Annex V of the IIR. The ERT commends Iceland for the details provided concerning the recalculations in the transport sector; the impact of these recalculations is presented in detail in Annex V of the IIR.

77. Some recommendations for improving the consistency of time series are discussed below under "Sub-sector specific recommendations". These include particulate matter emissions from the aviation sector and all pollutants from mopeds and motorcycles in 2017.

Comparability

78. The ERT notes that Iceland uses methods that comply with the Guidebook for the Transport sector, namely that emissions are reported in the NFR 2019 format and that the inventory of Iceland is comparable with those of other reporting Parties. However, the ERT notes that for some sub-sectors Iceland mentions that emission factors from the 2016 version of the Guidebook are used. In addition, there is a mixed use of the 2016 vs. 2019 version terminology in the IIR, which is not helpful for the ERT when it attempts to clearly identify if the 2019 version of the Guidebook emission factors are used. The ERT therefore recommends that Iceland clearly state in the IIR which version of the Guidebook emission factors is used and, in any case, that Iceland update all transport sub-sectors to the 2019 version.

79. A discrepancy with CRF tables was identified in the aviation sector and, in response to a question on the issue, Iceland stated that they were aware of this and had an improvement plan to check, update and correct the whole methodology for the aviation sector for the next submission.

Accuracy and uncertainties

80.   The ERT did not identify any over- or under-estimates in the transport sector inventory.

81.   The ERT notes that Iceland uses T1 emission factors for some key categories, for example 1A4ciii (national fishing) and 1A3dii (national navigation). The ERT recommends that Iceland update the methods for all key categories to T2 or higher methods and clearly state in the IIR the Tier of the method used for each key category.

82.   The ERT commends Iceland for the QA/QC procedures implemented and described in Annex II of the IIR and recommends that Iceland implement the improvements already identified and presented in the same Annex for the QA/QC checks. These mainly include improvements in the recalculation and notation keys checks, as well as a possible expansion of sub-sector specific QA/QC activities.

83.   Iceland is currently developing an uncertainty analysis and will be including it in its next submission, as reported in Chapter 1.7 of the IIR. The ERT reiterates its recommendation from the previous review that Iceland undertake an uncertainty analysis in line with paragraph 31 of the Reporting Guidelines.

Condensable Particulate Matter

84.   Iceland did not provide explanatory information on the inclusion of the condensable component of PM for the transport sector emissions. In the IIR there is no clear information as to whether PM2.5 includes or excludes the condensable component. The ERT recommends that Iceland provides this information in the next submission, following the recommended structure for IIR in Annex II of the Reporting Guidelines.

Improvement

85.   The ERT commends Iceland for the improvements implemented in the Transport sector since the previous Stage 3 review (2016). The most significant improvement in road transport sector is the implementation of COPERT methodology, which is part of the Guidebook and used for the calculation of air pollutant emissions. The description of the activity data and emission factors for the various transport sub-sectors has also been improved in the IIR.

86.   The ERT acknowledges Iceland's intention to review all 1A2gvii (mobile combustion in manufacturing industries and construction) and 1A3a (aviation) input data in order to improve time series consistency and also the intention to include emission estimates for specific pollutants which are not yet reported for some categories (see paragraph 3.4.2.4 on p.71 and paragraph 3.5.1.4 on p.74 of the IIR).

87.   The ERT encourages Iceland to upgrade the calculation to higher Tier methodologies instead of using Tier 1 for some transport sub-sectors and, in general, to implement all planned improvements as described in the IIR. Particular attention should be given to the aviation sector where the whole methodology needs to be

checked, updated and corrected[2]. In addition, some of the non-road subsectors have some issues that need to be addressed, i.e. missing emissions and emissions aggregated (IE) under 1A2gvii (mobile combustion in manufacturing industries and construction), see "Sub-sector specific recommendations".

Potential Technical Corrections

88.   No potential technical corrections were made during the review. Iceland provided revised estimates for categories 1A2gvii, 1A3bv and 1A3bvi as presented in Annex I.

Sub-Sector Specific Recommendations

Category issue 1: 1A3bvi - automobile tyre and break wear and 1A3bvii - automobile road abrasion – BC

89.   Following up on a question from the previous Stage 3 review (2016), the ERT noted that BC emissions from categories 1A3bvi and 1A3bvii are reported as NA. In response to a question on the issue, Iceland mentioned that this was due to the emission calculation tool COPERT and provided revised estimates using the Guidebook, which caused an 1.5% - 5.5% increase in BC emissions over the time series. The ERT confirms that the provided calculations are correct and recommends that Iceland include these emission estimates in the next submission in order to improve the quality, completeness and accuracy of the inventory.

Category issue 2: 1A3aii(i), 1A3aii(ii) – All PMs (PM$_{2.5}$, PM$_{10}$, TSP, BC)

90.   Following up on a question from the previous Stage 3 review (2016), the ERT noted that all PM emissions from 1A3aii(i) (domestic aviation LTO (civil)) and 1A3aii(ii) (domestic aviation cruise (civil)) are reported as NE prior to 2004, as NO between 2005-2009, and that the trend has significant peaks and dips after 2010, which is inconsistent with corresponding activity data. In response to a question on the issue, Iceland mentioned that this was due to the usage of Eurocontrol data (in lack of better data), which does not cover all domestic flights, and that the impact of this under-estimate on total emissions was expected to be smaller than 0.005% (LTO and cruise together).

91.   The ERT recommends that Iceland change the notation keys from NO (not occurring) to NE (not estimated) for years after 2005 according to paragraph 12 of the Reporting Guidelines, and, in any case, implement in the next submission the already planned improvement, which involves reassessing the emission factors and activity data in the aviation sector, in order to improve the quality and accuracy of the emission estimates and to ensure consistency of the time series.

Category issue 3: 1A3ai(i), 1A3ai(ii) – All PMs (PM$_{2.5}$, PM$_{10}$, TSP, BC)

92.   Following up on a question from the previous Stage 3 review (2016), the ERT noted that all PM emissions from 1A3ai(i) (international aviation LTO (civil)) and

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[2] In this context, the ERT encourages Iceland to contact aviation experts and search for any relevant information that might be useful, i.e., https://www.isavia.is/en/corporate/about-isavia/reports-and-statistics/passenger-statistics/annual-aviation-fact-file

1A3ai(ii) (international aviation cruise (civil)) are reported as NE prior to 2004. In response to a question on the issue, Iceland mentioned that this was due to the absence of necessary data and that it was aiming to address this issue in the next submission.

93.   The ERT notes that the impact of this under-estimate on total emissions is about 0.1% - 0.3% for 1A3ai(i) and about 1.4% - 6.2% for 1A3ai(ii), which is a memo item. This impact has been estimated considering the reported PM2.5 emissions for the years 2004-2018.

94.   Considering the above, the ERT recommends that Iceland calculates and reports all PM emissions from 1A3ai(i), 1A3ai(ii) for years prior to 2004 in the next submission, in order to improve the completeness and accuracy of the emission estimates and to ensure consistency of the time series.

Category issue 4: 1A3biv – All pollutants

95.   The ERT observed a significant decrease in all pollutant emissions from 1A3biv (mopeds and motorcycles) from 2016 to 2017, especially for NMVOC. In response to a question raised during the review, Iceland mentioned that this was due to an unusually low number of registered L-category vehicles in 2017 and that it would be corrected in the next submission.

96.   The ERT notes that the impact of this under-estimate on total emissions is about 1%. This impact has been estimated by taking the difference in reported NMVOC emissions for the years 2016-2017 into account (the period for which the issue has been identified).

97.   Considering the above, the ERT recommends that Iceland checks again and updates all pollutant emission values from 1A3biv for all years after 2017 until the next submission in order to improve the accuracy of the emission estimates and to ensure consistency of the time series.

Category issue 5: 1A3dii, 1A3di(i) – PAHs

98.   Following up on a question from the previous Stage 3 review (2016), the ERT noted that all PAH emissions from 1A3dii (national navigation (shipping)) and 1A3di(i) (international maritime navigation) are reported as NE for all years. In response to a question on the issue, Iceland mentioned that this was due to a lack of data needed for using a higher than methodology than Tier 1 which does not provide emission factors for PAHs (Table 3-2, p. 15 of the Guidebook).

99.   The ERT notes that the impact of this under-estimate on total emissions is about 0.4% for 1A3dii and about 2.5% for 1A3di(i), which is a memo item. This impact has been estimated by taking the reported PAHs emissions (total 1-4) for the year 2016 (based on the 2018 NFR tables submitted byIceland) into account.

100.   Considering the above, the ERT recommends that Iceland calculates and reports all PAH emissions from 1A3dii, 1A3di(i) for all years in the next submission, using a higher methodology than Tier 1 in order to improve the completeness and accuracy of the emission estimates.

Category issue 6: 1A4bii, 1A4cii – All pollutants

101.   The ERT observed that the emissions from 1A4bii (residential: household and gardening (mobile)) and 1A4cii (agriculture/forestry/fishing: off-road vehicles and other machinery) are either reported as NE (NH_3, all HMs, HCB, and PCBs) or as IE for all other pollutants included under 1A2gvii (mobile combustion in manufacturing industries and construction) according to the IIR. In response, Iceland mentioned that this was due to a lack of the necessary data and that there was a plan to report the emissions from these sources separately, starting from 2019, in the next submission.

102.   The ERT welcomes this plan and recommends that Iceland calculates and reports all emissions for all pollutants and for all years from 1A4bii and 1A4cii in the next submission in order to improve the consistency, completeness and accuracy of the emission estimates, and that it separates those currently included in 1A2gvii. If input data are not available for years prior to 2019, the ERT encourages Iceland to make an effort to estimate these emissions e.g. using assumptions and surrogate parameters to report the emissions on their appropriate scale for the years 2018 and backwards.

Category issue 7: 1A4aii, 1A5b – All pollutants

103.   The ERT observed that emissions from 1A4aii (commercial/institutional: mobile) and 1A5b (other, mobile (including military, land based and recreational boats)) are reported as NO. In response to a question on the issue, Iceland mentioned that for 1A4aii it might be more appropriate to report emissions as IE since all mobile machinery is reported under 1A2gvii, and that for 1A5b there is no military activity in Iceland and all other fuel used is accounted for in other categories, hence, NO is the correct notation key.

104.   The ERT recommends reporting all emissions belonging to 1A4aii separately from those under 1A2gvii in the next submission, in order to improve the transparency of the inventory. If this is not possible, the ERT recommends that Iceland change the notation key to IE for 1A4aii and provide an explanation of the allocation in the IIR.

Category issue 8: National total/1A3ai(ii)/1A3aii(ii) – NO_x, CO, NMVOC, SO_2

105.   The ERT observed a significant difference in reported emissions totals between the CRF and NFR tables, in particular for CO emissions from international aviation bunkers. In response to a question on the issue, Iceland mentioned that this was due to the fact that for the CRF table the T1 CO emission factor of 1,200 kg/t fuel (from Table 3-3 of the Guidebook) was used, while for NFR Eurocontrol data was used. Iceland also mentioned that it was aware of this discrepancy and that it had an improvement plan to review the methodology for the aviation sector in the next submission.

106.   The ERT recommends that Iceland checks, updates and corrects the whole methodology for the aviation sector for the next submission.

Category issue 9: 1A2gvii – NH_3, Pb, Hg, HCB, PCBs

107.   The ERT observed that NH_3, Pb, Hg, HCB, and PCBs emissions from 1A2gvii (mobile combustion in manufacturing industries and construction) are reported as

NE. In response to a question raised during the review, Iceland provided emission estimates for NH_3 and Pb, following the advice of the ERT to use the T1 emission factors and the methodology of the Guidebook.

108.   For NH_3, the ERT confirms that the calculations are correct and the impact on the national total ranges from 0.004%-0.010% over the time series. For Pb, since only diesel is used in 1A2gvii (as clarified in Category issue 12 below), no Pb emissions are expected and the notation key should be NA.

109.   The ERT recommends that Iceland calculates and includes where possible NH_3, Hg, HCB, and PCBs emission estimates from 1A2gvii in the next submission, by updating the current methodology to a higher methodology than T1, in order to improve the quality, completeness and accuracy of the inventory. Iceland should also check that the correct emission factors (related to diesel fuel) are used for the emission calculations of all pollutants.

Category issue 10: 1A3ai(i), 1A3aii(i) – NH_3, all HMs, all PAHs

110.   The ERT observed that NH_3, all HMs, and all PAHs emissions from 1A3ai(i) (international aviation LTO (civil)) and 1A3aii(i) (domestic aviation LTO (civil)) are reported as NE as no T1 emission factors are available in the 2016 Guidebook, as mentioned in the IIR. In response to a question on the issue, Iceland mentioned that since no T1 emission factors are available, these emissions could not be calculated; however, there is a plan to review and improve emission calculations from aviation for the next submission.

111.   The ERT recommends that Iceland calculates and reports NH3, all HMs, and all PAHs emissions from the aviation sector for the next submission by upgrading the calculations to a higher methodology than T1 in order to improve the completeness and accuracy of the inventory.

Category issue 11: 1A3bv – Zn, dioxins, all PAHs, PCBs

112.   The ERT observed that Zn, dioxins, all PAHs, and PCBs from 1A3bv (road transport: gasoline evaporation) are reported as NE. The ERT understands that this is due to COPERT. However, the ERT believes that only NMVOC emissions are relevant for NFR 1A3bv and, therefore, all other pollutants should be reported as NA, since there are no emission factors provided in the Guidebook. In response, Iceland mentioned that in the Tables 3.1-3.4 in Chapter 1A3bv of the Guidebook these pollutants (except Zn) are listed as NE.

113.   The ERT explained that the notation keys presented in the Guidebook emission factor tables were not those that Parties are requested to use in the NFR tables according to the definition of notation keys given in paragraph 12 of the Reporting Guidelines. If a Party reports emissions as NE in the NFR tables, it means (according to the definition of the Reporting Guidelines) that the Party has not estimated these pollutants. However, in this case, as there is no method provided in the Guidebook, the notation key NA (not applicable) should be used in order to avoid a misunderstanding.

Category issue 12: 1A2gvii – Activity data

114. The ERT observed on p. 71 of the IIR that activity data for Gas/Diesel Oil for 1A2gvii (mobile combustion in manufacturing industries and construction) covers both gasoline and diesel. In response to a question raised during the review, Iceland clarified that only diesel was used in 1A2gvii.

115. The ERT recommends that Iceland clearly states in the IIR that only diesel and no gasoline is used in 1A2gvii, as the ERT finds the information provided in Table 3.7 on p. 71 of IIR misleading. Iceland should also check that the correct emission factors for diesel fuel are used for the emission calculations of all pollutants.

INDUSTRY

Review Scope

Pollutants Reviewed	SO$_2$, NO$_x$, NMVOC, NH$_3$, PM$_{10}$, PM$_{2.5}$		
Years	1990 – 2018+ (Protocol Years)		

Code	Name	Reviewed	Not Reviewed	Recommendation Provided
2A1	Cement production	x		
2A2	Lime production	NO		
2A3	Glass production	NO		
2A5a	Quarrying and mining of minerals other than coal	NE		X
2A5b	Construction and demolition	NE		X
2A5c	Storage, handling and transport of mineral products	NE		
2A6	Other mineral products	X		
2B1	Ammonia production	IE		X
2B2	Nitric acid production	NO		
2B3	Adipic acid production	NO		
2B5	Carbide production	NO		
2B6	Titanium dioxide production	NO		
2B7	Soda ash production	NO		
2B10a	Chemical industry: Other	X		X
2B10b	Storage, handling and transport of chemical products	NE		
2C1	Iron and steel production	X		
2C2	Ferroalloys production	X		
2C3	Aluminium production	X		
2C4	Magnesium production	NO		
2C5	Lead production	NO		
2C6	Zinc production	NO		
2C7a	Copper production	NO		
2C7b	Nickel production	NO		
2C7c	Other metal production	NO		
2C7d	Storage, handling and transport of metal products	NO		
2D3b	Road paving with asphalt	x		
2D3c	Asphalt roofing	NO		
2H1	Pulp and paper industry	NO		
2H2	Food and beverages industry	X		X
2H3	Other industrial processes	NO		
2I	Wood processing	NO		
2J	Production of POPs	NO		
2K	Consumption of POPs and heavy metals (e.g. electrical and scientific equipment)	NO		
2L	Other production, consumption, storage, transportation or handling of bulk products	NO		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been included and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency

116.   Iceland has submitted a generally transparent emissions inventory. Estimates are provided at the most detailed level for all industry sectors that occur in the country. Iceland's methodology and emission factors in the IIR are considered to be transparent and well described for the Industry sector and notation keys used in accordance with the Reporting Guidelines. Still, the ERT recommends that Iceland include, in the IIR, the reasons for the dips and jumps in pollutant emission trends for more transparency.

Completeness

117.   The ERT considers the Industry sector to be complete for most of the source categories. Still, there are a few areas where completeness could be improved in the future, including

NFR 2A5a "Quarrying and mining of minerals other than coal" TSP, PM_{10}; $PM_{2.5}$

NFR 2A5b "Construction and demolition" TSP, PM_{10}; $PM_{2.5}$

NFR 2A5c "Storage, handling and transport of mineral products" TSP, PM_{10}; $PM_{2.5}$

118.   During the review, Iceland provided revised estimates for the missing emissions from categories 2A5a and 2A5b. The ERT accepted the revised estimates and recommends that Iceland include them in the next submission.

Consistency including recalculation and time series

119.   The ERT noted during the review that in some cases the time series are not consistent and identified some outliers: 2 G Other product use. To a question on the issue, Iceland provided a justification for the outliers and the ERT recommends that Iceland include the details of their response in the IIR.

120.   Iceland provides information on recalculations at sector level in the IIR, including justifications of the recalculations, and the ERT commends the Party for this.

121.   The ERT notes that no information is provided on the impacts of recalculations on emission trends and recommends that Iceland provide in the IIR quantitative information on the impact of the changes on the last submission (e.g.-0.02 kt NMVOC in 2017) in line with paragraphs 33-34 and 38 of the Reporting Guidelines.

Comparability

122.   The methods used by Iceland in the Industrial Processes inventory are mostly consistent with the Guidebook, and country specific methods are sufficiently described in the IIR and the emissions are reported in the NFR 2019 format. The ERT notes that the inventory of Iceland is comparable with those of other reporting Parties.

Accuracy and uncertainties

123.   The ERT did not identify any systematic over- or under-estimates.

124.	Iceland did not provide a quantitative uncertainty analysis for the Industrial Processes sector. The ERT recommends that Iceland include an uncertainty analysis in the next submission in line with paragraph 31 of the Reporting Guidelines.

125.	Iceland provides information on QA/QC procedures mainly on a general level. As the QA/QC plan is in progress, the ERT recommends that Iceland include information in the IIR on sector specific QA/QC procedures and examples of the results of the QA/QC checks.

Condensable Particulate Matter

126.	The ERT did not find clear information on whether particle emissions include or exclude the condensable component. The ERT recommends that the Party include the information in the next IIR in line with Annex II to the Reporting Guidelines.

Improvement

127.	The ERT commends the Party for including information on implemented improvements and planned improvements in a sectorial sub-chapter.

Potential Technical Corrections

128.	No technical corrections were made in the Industrial Processes sector. During the review, Iceland provided revised estimates for categories 2A5a and 2A5b as presented in Annex I.

Sub-Sector Specific Recommendations

Category issue 1: 2B1 Ammonia production / 2B10a Fertilizer production – NOx, activity data

129.	In the IIR, the Party mentioned that ammonia production is described under "Other chemical industry". In response to a question on the issue, the Party stated that this information was misleading and provided a proper explanation e.g. that the activity existed until 2001. The ERT recommends that Iceland provide information on the level of detail in the IIR 2021 and collect data, and and that it calculates emissions for the years the activity existed.

130.	In the overview table on p. 28 in the IIR, the Party mentions that activity data on fertiliser production are missing. During the review the Party explained that only the information on different types of fertiliser is missing and that the emission data are plant specific. The ERT recommends including this information in the IIR 2021 and reporting emissions from ammonia production under NFR 2B1.

Category issue 3: 2B5a Quarrying and mining of minerals other than coal TSP, PM_{10}; $PM_{2.5}$

131.	In response to a question on missing estimates, the Party provided a revised estimate for this category during the review. The ERT appreciates the efforts of the Party and accepts this estimate. The ERT recommends that the Party include these emission estimates in the next inventory, including also the information on the level of detail as provided during the review in the IIR 2021. As the information on the quality of the minerals is limited and the time series incomplete, the ERT recommends

further investigation and providing checked emission data for the whole time series in the next submission.

Category issue 4: 2B5b Construction and Demolition - TSP, PM$_{10}$; PM$_{2.5}$

132.   In response to a question during the review on missing emissions, the Party provided revised estimates for this category. The ERT appreciates the efforts of the Party and accepts the estimates. The ERT recommends that the Party include the revised estimates for the whole time series in the next submission, including also information on the level of detail (e.g. silt content, abatement efficiency, activity data split by categories, etc.) as provided during the review in the IIR 2021.

Category issue 5: 2H2 Food and beverages industry - NMVOC

133.   In the 2016 review, a drop in NMVOC emissions was identified in 2009 and Iceland provided a comprehensive explanation and stated that it would include this explanation in the IIR 2017. The ERT notes that the information is not yet included and recommends that the Party include the information in the IIR 2021.

Category issue 6: 2D3b Road paving with asphalt – NMVOC, PCDD/F, TSP, PM$_{10}$; PM$_{2.5}$

134.   In the review in 2016, three peaks were identified in the trend in asphalt consumption for road paving activities (2001, 2004, and 2008). Iceland provided an explanation; however, the ERT notes that the explanation is not yet included in the IIR and recommends that Iceland include it in the IIR 2021.

SOLVENT AND OTHER PRODUCT USE

Review Scope

Pollutants Reviewed	SO$_2$, NO$_x$, NMVOC, NH$_3$, PM$_{10}$, PM$_{2.5}$		
Years	1990 – 2018+ (Protocol Years)		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**

Code	Name	Reviewed	Not Reviewed	Recommendation Provided
2D3a	Domestic solvent use including fungicides	X		x
2D3d	Coating applications	X		
2D3e	Degreasing	X		
2D3f	Dry cleaning	X		
2D3g	Chemical products	X		X
2D3h	Printing	X		
2D3i	Other solvent use	X		
2G	Other product use	X		X

Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been included and which have not in the respective columns.

General recommendations on cross-cutting issues

Transparency

135. The ERT considers Iceland's methodology and emission factors in the IIR to be generally transparent and well described for the Solvents sector. The ERT commends Iceland for that.

136. The ERT notes that the information provided in the IIR is not detailed enough for reasons behind emission trends and recommends that Iceland include this information in the next submission.

137. The ERT notes that Iceland has not presented activity data for emissions calculations in its IIR. The ERT reiterates the previous recommendation that Iceland present the used activity data in the next IIR for better transparency.

Completeness

138. The ERT considers the Solvents sector to be generally complete. However, the ERT notes that there are pollutants missing from the inventory as detailed in the Sub-Sector Specific Recommendations chapter.

Consistency including recalculation and time series

139. The ERT finds the time series of the Solvents sector to be generally consistent. The ERT found some issues in the "Other Product Use" sectors as detailed in the Sub-Sector Specific Recommendations chapter.

140. Iceland provides information on recalculations at sectorial level in the IIR and the ERT commends the Party for this. The ERT notes that the IIR does not provide quantitative information on the changes to the last submission (e.g.-0.02 kt NMVOC in 2017) and recommends including this information as well as justifications for the recalculations.

Comparability

141. The ERT notes that Iceland uses methodologies in accordance with the EMEP/EEA 2016 Guidebook and reports emissions in the NFR 2019 format and that the inventory of Iceland is thus comparable with those of other reporting Parties.

Accuracy and uncertainties

142. The ERT did not identify any systematic over- or under-estimates.

143. The ERT notes that Iceland uses a Tier 1 method for NMVOC emissions from domestic solvent use as described under Sector Specific Recommendations. The ERT recommends that Iceland use Tier 2 or higher tier methods for all key categories in line with paragraph 21 of the Reporting Guidelines.

144. The ERT notes that no uncertainty analysis has been performed by Iceland for the Solvents sector. The ERT recommends that Iceland undertake an uncertainty analysis for the Solvents sector in line with paragraph 31 of the Reporting Guidelines and use the results to prioritise improvements to the inventory and that Iceland provide an indication of the reliability of the inventory data.

145. According to the IIR, Iceland performs general QA/QC procedures according to the greenhouse gas QA/QC plan. The ERT has not been able to deduce from the IIR whether Iceland carries out any specific QA/QC procedures for the Solvents sector. The ERT recommends that Iceland implement sector-specific OA/QC procedures in line with paragraph 32 of the Reporting Guidelinesfor the Solvents sector and include a description of these procedures in the next submission.

Improvement

146. The ERT notes that no specific improvements for the Slvents sector have been reported in the IIR.

147. In response to a question on the issue during the review, Iceland stated that a revision of the acquisition of data from Statistics Iceland was underway and that the Party hoped to improve data quality for future submissions. The ERT commends Iceland for updating the data flow and recommends that Iceland include an improvement plan in the IIR while alsoreporting on implemented and future improvements in the Solvents sector in the next submission.

Condensable Particulate Matter

148. The Party provided no explanatory information on the inclusion or exclusion of the condensable component of particulate matter on category level. The ERT recommends that the Party provide information in line with Annex II to the Reporting Guidelinesin the next submissions.

Potential Technical Corrections

149. No technical corrections were made in the Solvent and other product use sector.

Sub-Sector Specific Recommendations

Category issue 1: 2D3e and 2D3f Dry cleaning & Degreasing

150.   Iceland provides information on these two categories in one chapter in the IIR. As this integration of information decreases the transparency of these sub-categories in the otherwise very well structured IIR, the ERT recommends following the general chapter structure presented in Annex I to the Reporting Guidelines and preparing separate chapters for both Dry cleaning and Degreasing.

Category issue 2: 2D3g Chemical products – NMVOC

151.   During the review, the ERT asked Iceland if inks and glues manufacturing also occurs in Iceland, because the IIR does not mention it, which might result in an underestimation of NMVOC emissions under NFR 2.D.3.g. Iceland replied to the ERT that this particular data was been taken into account, but that a holistic review of the data collected by Statistics Iceland was underway and that this particular data would be asked for, among other data. According to Iceland, and based on a preliminary judgment, a negligible amount of manufacturing of inks and glues occurs in Iceland and once this data becomes available, Iceland will include NMVOC emissions from this activity in the inventory. The ERT recommends that Iceland follow this plan and include this information in the inventory improvement plan with a clear schedule, and that Iceland report on progress with the work in the annual submissions.

Category issue 3: 2G Other product use – NO_x, NMVOC, SO_x, NH_3, $PM_{2.5}$, PM_{10}, TSP, BC, CO, Pb, Cd, Hg, As, Cr, Cu, Ni, Se, Zn, PCDD/F, benzo(a) pyrene, benzo(b) fluoranthene,   benzo(k), fluoranthene, Indeno (1,2,3-cd) pyrene, PAH

152.   The ERT asked the Party for an explanation of the dips in 2005 and 2006 caused by the activity data for fireworks. Iceland provided a proper explanation for these cases where firework imports vary over the time series and follow in general the economic development of the country. The ERT recommends that the Party include the information on the level of detail provided during the review, in the IIR 2021.

153.   The ERT notes that the use of shoes also falls under NFR 2.G and that these emissions are not included in Iceland's inventory at the moment. The ERT recommends that Iceland investigates possibilities for including emissions from these activities in the inventory and uses emission factors that are provided in the last version of the EMEP/EEA Guidebook, and that Iceland includes these emissions in the next submissions, or includes them in the inventory improvement plan with a clear schedule and reports on progress with the work in the annual submissions.

Category issue 4: 2D3a Domestic solvent use including fungicides - NMVOC

154.   The ERT notes that domestic solvent use is a key category for NMVOC emissions in Iceland and that Iceland uses a Tier 1 methodology for the estimates. The ERT recommends that the Party use a Tier 2 or a higher methodology for the estimates as this is mandatory for key categories under paragraph 21 of the Reporting Guidelines.

AGRICULTURE

Review Scope

Pollutants Reviewed	SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years	1990 – 2018 + (Protocol Years)		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
---	---	---	---	---
3B1a	Dairy cattle	X		
3B1b	Non-dairy cattle	X		
3B2	Sheep	X		
3B3	Swine	X		
3B4a	Buffalo		NO	
3B4d	Goats	X		
3B4e	Horses	X		
3B4f	Mules and asses		NO	
3B4gi	Laying hens	X		
3B4gii	Broilers	X		
3B4giii	Turkeys	X		
3B4giv	Other poultry	X		
3B4h	Other animals	X		X
3Da1	Inorganic N fertilisers (includes also urea application)	X		X
3Da2a	Animal manure applied to soils	X		X
3Da2b	Sewage sludge applied to soils	X		
3Da2c	Other organic fertilisers applied to soils (including compost)		NE	
3Da3	Urine and dung deposited by grazing animals	X		X
3Da4	Crop residues applied to soils		NE	
3Db	Indirect emissions from managed soils		NE	
3Dc	Farm-level agricultural operations including storage, handling and transport of agricultural products	X		
3Dd	Off-farm storage, handling and transport of bulk agricultural products		NA	
3De	Cultivated crops	X		X
3Df	Use of pesticides		NE	X
3F	Field burning of agricultural residues		NO	
3I	Agriculture other		NO	
11A	Volcanoes		X	
11B	Forest fires		X	
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been included and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency

155.   The ERT notes that the inventory of Iceland is generally transparent. Iceland provides sufficient information in the IIR on activity data, emission factors and emission trends. The ERT recommends that the Party further improve the IIR by introducing some more information on activity data under NFR 3D and by including the methodology description for NMVOC emissions from NFR 3B.

156.   Regarding the use of notation keys, the ERT recommends using the appropriate notation keys in line with paragraph 12 of the Reporting Guidelinesand

notes the following need for improvement: Iceland uses the notation key NE in a number of areas in the reporting tables. For some pollutants for which there is no estimation method in the Guidebook and for which Iceland reports the notation key NE, the ERT recommends the use of the notation key NA, for example NFR 3De - Cultivation of soils and pollutants NH_3 and NO_x.

157.   3.   The ERT notes that Iceland does not report activity data from NFRs 3Da3, 3De and 3Dc. For NFR 3Da3 the ERT recommends reporting « Urine and dung (t N/year) » as AD, for NFR 3De the amount of fertiliser used and for NFR 3Dc "agricultural land area" in the next submission.

Completeness

158.   The ERT considers the agriculture inventory to be complete. It includes all important sources of emissions (livestock production, emissions from the use of inorganic fertilisers, particle matter emissions from farm-level agricultural operations).

Consistency including recalculation and time series

159.   The ERT concludes that the agriculture emissions inventory is generally consistent throughout the time series and that no outliers have been identified.

160.   Iceland has recalculated its inventory for NFRs 3B and 3D e.g. due to changes in livestock production, animal characterisation data for cattle and sheep, Nex calculations for dairy cattle and EF changes to the 2019 version of the Guidebook for NOx emissions. The ERT notes that the IIR includes all the necessary explanations of the recalculations, but also recommends that the Party include more quantitative information on impacts on emission levels and the time series.

Comparability

161.   The ERT notes that the Party does not always include enough information in the IIR on methods that differ from the Guidebook. The ERT recommends that Iceland include information on values which are very different from the Guidebook's default values, e.g. N excretion for dairy cattle, milk production, animal weight and housing type, which would be helpful to explain why the NH_3 emissions from dairy cattle are lower than the default value and would help to justify the values. The ERT notes that the issue was already raised during the 2016 S3 review.

Accuracy and uncertainties

162.   Iceland has not provided an uncertainty analysis for the Agricultural sector. In the IIR, it is stated that an uncertainty analysis is being developed and will be included in next submission. The ERT recommends that the Party provide an uncertainty analysis in order to prioritise improvements in the inventory for emission sources which have the most significant impact on the total emissions, in line with paragraph 31 of the Reporting Guidelines.

163.   No description of the current QA/QC activities performed for the Agricultural sector is provided in the IIR. However, it is stated that a review and a possible expansion of sector specific QA and QC activities are planned for the 2021 submission. The ERT recommends that Iceland implement a sector-specific plan on OA/QC procedures, in line with paragraph 32 of the Reporting Guidelines, and include this plan in the IIR.

Condensable Particulate Matter

164.   Iceland has not provided any information on the condensable component of particle emissions. The ERT recommends that Iceland provide information on whether particle emissions include or exclude the condensable component in line with Annex II of the Reporting Guidelines.

Improvement

165.   The ERT commends Iceland for following up on the recommendations from the previous Stage 3 review in 2016 by estimating emissions of the main pollutants from manure management and animal manure applied to soils, using a Tier 2 methodology from the Guidebook to calculate the NH_3 emissions based on a mass flow approach. Some corrections and recommendations were made during the review process as explained in detail under Sector-Specific Recommendations. The ERT recommends that Iceland either implements these in the next submission or includes them in the inventory improvement plan with clear steps and schedules and reports on progress in annual submissions.

166.   The ERT notes that Iceland is planning to revise and harmonise the estimation methodologies currently used with the methodologies, parameters and emission factors proposed in the 2019 Guidebook for all the chapters where such changes have not been performed for the current submission. The ERT welcomes these planned improvements and recommends implementing them.

Potential Technical Corrections

167.   No technical corrections were made during the review.

Sub-Sector Specific Recommendations

Category issue 1: 3.B - Manure management - NH_3, Transparency, Consistency

168.   The ERT noted with reference to 3B Manure management for NH_3 and NO_x emissions for all years that there is a lack of transparency regarding the parameters used to complete the N flow, including emissions of N_2, N leached, the process of mineralisation during storage and the EF N_2O-N storage. During the review Iceland sent an excel sheet providing calculations for the N flow, with the 2016 Guidebook parameters. The ERT thanks Iceland for facilitating the review process by providing such detailed information for checking the calculations. For the next submission, the ERT encourages Iceland to update the calculations in line with the 2019 Guidebook and to state clearly the sources of the EFs in the IIR, and to use only one version of the Guidebook as the source of all emission factors. The ERT also recommends that Iceland undertake a revision of the description of the methodology for future submissions to improve transparency regarding the parameters used for calculating emissions and to reflect the changes made in the methodology.

Category issue 2: 3Da2a – Animal manure applied to soils - NH_3, Transparency

169.   During the review, Iceland stated that NH_3 emissions from fur animal manure applied to soils were assumed to be zero. In the Guidebook the EF is noted as NA and Iceland does not have a country specific EF for NH_3. Iceland assumes that there are no emissions from the spreading of manure of this animal and uses the emission

factor of 0 for NH_3. The ERT considers that this is a correct assumption but recommends that Iceland provide similar justifications in the IIR on the EF used for fur animals and for each animal category.

Category issue 3: 3B – Manure management – NMVOC, Transparency & Accuracy

170.   The ERT notes, with reference to NFR 3B Manure management for NMVOC emissions for all years, that there is a lack of transparency regarding the methodology and the parameters used (feeding with or without silage). During the review, Iceland stated that NMVOC emissions were calculated using the Tier 1 methodology from the 2019 Guidebook Table 3.4. Where default emission factors with silage feeding are available, these are used. The ERT encourages Iceland to provide a description of the methodology and EFs used in the next submission. Since this is a key category, the ERT notes that according to paragraph 21 of the Reporting Guidelines, Parties should make every effort to use a Tier 2 or higher (detailed) methodology, including country-specific information, and recommends that Iceland move to a higher tier method in the next submission, or, if this is not possible, that Iceland include the issue in the inventory improvement plan with clear steps and schedules and report on progress in the next submissions.

171.   The ERT notes, with reference to NFR 3B Manure management for NMVOC emissions for all years, that emissions from rabbits are calculated with the default EF for fur animals (1,9410 kg AAP-1). The 2016 version of the Guidebook Table 3.4 provides a EF for rabbits: 0.0590 kg AAP-1. The ERT notes that this could result in an over-estimate of emissions, an impact which the ERT estimates to be around 0.004%. Iceland explained during the review that they calculated emissions from rabbits together with fur animals and that due to time constraints they were not able to improve this for the 2020 submission. The ERT recommends that Iceland use the proper EF and correct the emissions in the next submission.

Category issue 4: 3B - Manure management, 3D – Agricultural soils – SO_x, Transparency

172.   The ERT noted that emissions of SO_x from manure management (NFR 3B) and from agricultural soils (NFR 3D) are reported using the notation key NE. As SO_x emissions are not expected from this source (e.g. there are no EFs for SO_x in the Guidebook), the ERT recommends that Iceland corrects the notation key to NA in line with paragraph 12 of the Reporting Guidelines for the next submission.

Category issue 5: 3De – Cultivation of crops, NH_3 and NO_x, Transparency

173.   The notation key "NE" is used for NH_3 and NO_x emissions from the cultivation of crops (NFR 3De). The ERT notes that there are no methods provided in the Guidebook for these pollutants and recommends that Iceland use the proper notation key NA in line with paragraph 12 of the Reporting Guidelines for the next submission.

Category issue 6: 3Df – Use of pesticides, All pollutants, Transparency

174.   The review team noted that emissions of SO_x, NO_x, NMVOC and NH_3 from the use of pesticides are reported using the notation key NE. The ERT notes that there are no methods provided in the Guidebook for these pollutants and recommends that Iceland use the proper notation key NA or alternatively NO in case

the activity does not occur in Iceland, in line with paragraph 12 of the Reporting Guidelines for the next submission.

Category issue 7: 3Db – Indirect emissions from managed soils, All pollutants, Transparency

175.   The review team noted that emissions of NO_x, SO_x, NMVOC and NH_3 from indirect emissions from managed soils are reported as NE "not estimated". The ERT notes that there are no methods provided in the Guidebook for these pollutants and recommends that Iceland use the proper notation key "NA" in line with paragraph 12 of the Reporting Guidelines for its next submission.

Category issue 8: 3Da1 – Inorganic fertilizers, Activity data

176.   The ERT noted that in the NFR tables Iceland reports activity data for the use of inorganic fertilisers (11743 kg N in 2018); however, this is not consistent with the activity data that are provided in IIR Table 5.10 where it is stated that a value of 11.74 kt is applied. During the review week, Iceland confirmed that this was a typographical error in the NFR tables and that the correct amount for 2018 is 11 743 kt = 11 743 000 kgN. The ERT recommends that Iceland uses correct and consistent activity data in the IIR and in the NFR and that Iceland review their current QA/QC procedures to ensure consistency between data presented in the IIR and in the NFR tables for future submissions.

WASTE

Review Scope

Code	Name	Reviewed	Not Reviewed	Recommendation Provided
Pollutants Reviewed		SO$_2$, NO$_x$, NMVOC, NH$_3$, PM$_{10}$ & PM$_{2.5}$		
Years		1990 – 2018 + (Protocol Years)		
5A	Solid waste disposal on land	X		
5B1	Biological treatment of waste - Composting	X		
5B2	Biological treatment of waste - Anaerobic digestion at biogas facilities	NA		
5C1a	Municipal waste incineration	X		
5C1bi	Industrial waste incineration	X		
5C1bii	Hazardous waste incineration	X		
5C1biii	Clinical waste incineration	X		
5C1biv	Sewage sludge incineration	X		
5C1bv	Cremation	X		
5C1bvi	Other waste incineration	NA		
5C2	Open burning of waste	X		
5D1	Domestic wastewater handling	X		X
5D2	Industrial wastewater handling	X		X
5D3	Other wastewater handling	NA		
5E	Other waste	X		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been included and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency

177.   Iceland has provided a detailed and generally transparent emissions inventory. Iceland's methodology and emission factors in the IIR are considered by the ERT to be transparent and well described for the Waste sector.

178.   The ERT notes that Iceland does not always use the appropriate notation keys as explained under Sub-Sector Specific Recommendations and recommends that the Party use notation keys in line with paragraph 12 of the Reporting Guidelines.

Completeness

179.   The ERT considers the Waste sector inventory to be complete regarding the activities, pollutants and years included.

180.   The ERT noted that Iceland uses the notation key "NO" for the four indicator PAHs from category 5C1biv; however, during the review, Iceland provided revised estimates for these emissions (Annex I) and the ERT accepted them.

Consistency, including recalculation and time series

181.   The ERT considers the Waste sector time series to be internally consistent for all the reported years.

182.   The ERT notes that Iceland has recalculated emissions from categories 5C1 and 5C2. All the necessary explanations and emissions factors are included in the

IIR. The impact of the recalculations on the emissions from those sources is explained in detail in the respective sections of the IIR.

Comparability

183. The inventory is reported using NFR 2019 templates and the methods used by Iceland are in line with the Guidebook with the exception of PCDD/F from NFR 5C2, thus the ERT considers Iceland's waste sector inventory to be mainly comparable with the inventories of other reporting Parties.

Accuracy and uncertainties

184. The ERT did not find any systematic under- or over-estimates.

185. The Party uses T2 or higher methods for the source categories 5C1 and 5E, which are key categories.

186. The ERT notes that Iceland has not performed an uncertainty analysis for the Waste sector and recommends that Iceland undertake an uncertainty analysis in order to help inform the improvement process and to provide an indication of the reliability of the inventory data in line with paragraph 31 of the Reporting Guidelines.

187. The Party has a QA/QC system in place which was started in fall 2019 and is not yet fully in operation; it is expected that it will be fully implemented for the next submission. The ERT recommends that the Party implement sector specific OA/QC procedures for the Waste sector in line with paragraph 32 of the Reporting Guidelines.

Condensable Particulate Matter

188. In the IIR, there is no information on whether particle emissions include or exclude the condensable component. The ERT recommends that the Party include such information in the next submission.

Improvement

189. The ERT notes Iceland's intention to update the uncertainty analysis for the Waste sector and to include further information on the methodologies used to calculate emissions from solid waste disposal (5A), to undertake a detailed technology stratification to account for abatement technologies in source category 5C1a, acquire data for the years 1990-2013 and review the emission factors currently used for source category 5C1bi as well as existing historical data on sewage sludge for source category 5C1biv and the data used for source category 5E. The ERT welcomes these improvements.

Potential Technical Corrections

190. No technical corrections were made during the review. The Party provided revised estimates for categories 5C2, 5C1biv and 5C1bv as presented in Annex I.

Sub-Sector Specific Recommendations

Category issue 1: 5C1biv Sewage sludge incineration –PAH-4

191. The ERT noted that the notation key "NO" was used for emissions of PAH-4, which did not seem consistent with the activity data available and emissions reported for other pollutants in this source category. Since an EF is available in the Guidebook, Iceland provided a revised estimate for PAH-4 from this sector using the Tier 1 emission factor as presented in Annex I of this report. The ERT accepted the revised estimate.

Category issue 2: 5C1bv – Indeno(1,2,3-cd)pyrene and PAH-4

192. The TERT noted that emissions of Indeno(1,2,3-cd)pyrene for category source 5C1bv represented a thousand fold increase in the 2020 submission compared to the 2019 submission, possibly due to a unit error. During the review Iceland identified the error and provided revised estimates as presented in Annex I for Indeno(1,2,3-cd)pyrene and PAH-4, which the ERT accepted.

Category issue 3: 5C2 – PCDD/F

193. The ERT noted that for source category 5C2 Iceland is using an EF for PCDD/F from the 2005 Toolkit, instead of the updated values from the 2012 Toolkit. During the review, Iceland provided revised estimates of PCDD/F using the 2012 Toolkit EFs as presented in Annex I. The ERT accepted the revised estimates. Iceland confirmed that it would review the method for PCDD/F and improve its explanations for the choice of EFs in the next submission. The ERT recommends that Iceland justifies the use of the UNEP Toolkit (instead of the Guidebook) to estimate these emissions, in line with paragraph 19 of the Reporting Guidelines.

Category issue 4: 5D1 and 5 D2 – Wastewater handling

194. The ERT noted that in the submission template, AD is reported for sector 5D1 (Domestic wastewater handling) and 5D2 (Industrial wastewater handling); however, no emissions are reported for any pollutant. During the review, Iceland explained that the activity data is provided as a total organic product, while the Tier 1 method requires data in m3 of wastewater handled. The ERT recommends that Iceland explore the possibility to obtain the volume of wastewater handled from other sources (i.e. operators) or to develop methods to match AD and EFs and meanwhile include a detailed explanation for reporting the emissions as "NE" in the IIR. The ERT also recommends that Iceland put the issue on the inventory improvement plan with clear steps and schedules and report on progress in the next submissions.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

1. Iceland's IIR 2020 (pdf)
2. Iceland Annex 1 NFR tables 1990 – 2018
3. Iceland Stage 1 report 2020
4. Iceland Stage 2 S&A report 2020
5. Responses to questions raised prior to the S3 review 2020 (online excel)
6. Responses to questions raised during the S3 review 2020 (online excel)
7. Revised estimates provided by the Party during the S3 review 2020

ANNEX I REVISED ESTIMATES

195. Revised estimates have been proposed by the Party during the review and detailed related information is provided separately in the MSExcel file:

- IC-RE-Energy-2020.xlsx
- IC-RE-Transport-2020.xlsx
- IC-RE-Industry-2020.xlsx
- IC-RE-Waste-2020.xlsx

	Description	Reference	Pollutant estimates (kt)			
			2018	2015	2010	2005
TC|REVISED ESTIMATES	**SOx**					
	National total as reported 2020 (row 141)	**Annex I, 30/04/2020**			**81.76**	
	Difference between original estimate and revised estimates provided by Party and accepted by the ERT					
	1A2gviii Stationary combustion in manufacturing industries and construction: Other				-5.13	
	Difference between original estimate and technical correction deemed necessary by the ERT					
	National total (row 141) including revised estimates and technical corrections accepted by MS	Calculated using data above			**76.629**	
	Hg					
	National total as reported 2018 (row 141)	**Annex I, 30/04/2020**	**0.0000385**	**0.0000385**	**0.0000385**	**0.0000385**
	Difference between original estimate and revised estimates provided by Party and accepted by the ERT					
	1A2gviii Stationary combustion in manufacturing industries and construction: Other				-0.0000014	
	Difference between original estimate and technical correction deemed necessary by the ERT					
	National total (row 141) including revised estimates and technical corrections accepted by MS	Calculated using data above			**0.0000371**	

	Description	Reference	Pollutant estimates (kt)			
			2018	**2015**	**2010**	**2005**
TC|REVISED ESTIMATES	**BC**					
	National total as reported 2020 (row 141)	**Annex I, 30/04/2020**	**0.194**	**0.222**	**0.271**	**0.326**
	Difference between original estimate and revised estimates provided by Party and accepted by the ERT					
	1A3bvi RT Tyre and brake wear	kt	0.010	0.008	0.008	0.007
	1A3bvii RT road abrasion	kt	0.001	0.001	0.001	0.001
	Difference between original estimate and technical correction deemed necessary by the ERT					
	National total (row 141) including revised estimates and technical corrections accepted by MS	Calculated using data above	**0.205**	**0.231**	**0.279**	**0.334**
	NH3					
	National total as reported 2020 (row 141)	**Annex I, 30/04/2020**	**5.247**	**5.507**	**5.306**	**5.197**
	Difference between original estimate and revised estimates provided by Party and accepted by the ERT					
	1A2gvii Mobile Machinery	kt	0.00025	0.00027	0.00026	0.00054
	Difference between original estimate and technical correction deemed necessary by the ERT					
	National total (row 141) including revised estimates and technical corrections accepted by MS	Calculated using data above	**5.247**	**5.507**	**5.306**	**5.198**

Description	Reference	Pollutant estimates (kt)			
		2018	**2015**	**2010**	**2005**
PM2.5					
National total as reported 20120 (row 141)	**Annex I, 30/04/2020**	**1.151**	**1.395**	**1.521**	**1.379**
Difference between original estimate and revised estimates provided by Party and accepted by the ERT					
2A5a Quarrying and mining of minerals other than coal	kt	0.033	0.017	0.048	0.057
2A5b Construction and demolition	kt	0.019	0.015	0.048	0.039
Difference between original estimate and technical correction deemed necessary by the ERT					
National total (row 141) including revised estimates and technical corrections accepted by MS	Calculated using data above	**1.203**	**1.427**	**1.617**	**1.475**
PM10					
National total as reported 20120 (row 141)	**Annex I, 30/04/2020**	**1.510**	**1.730**	**1.908**	**1.728**
Difference between original estimate and revised estimates provided by Party and accepted by the ERT					
2A5a Quarrying and mining of minerals other than coal	kt	0.329	0.169	0.479	0.566
2A5b Construction and demolition	kt	0.190	0.154	0.476	0.394
Difference between original estimate and technical correction deemed necessary by the ERT					
National total (row 141) including revised estimates and technical corrections accepted by MS	Calculated using data above	**2.029**	**2.053**	**2.863**	**2.688**
TSP					
National total as reported 20120 (row 141)	**Annex I, 30/04/2020**	**1.739**	**1.955**	**2.158**	**1.939**
Difference between original estimate and revised estimates provided by Party and accepted by the ERT					
2A5a Quarrying and mining of minerals other than coal	kt	0.671	0.345	0.977	1.155
2A5b Construction and demolition	kt	0.635	0.515	1.592	1.315
Difference between original estimate and technical correction deemed necessary by the ERT					
National total (row 141) including revised estimates and technical corrections accepted by MS	Calculated using data above	**2.374**	**2.470**	**3.750**	**3.254**

TC|REVISED ESTIMATES

Description	Reference	Pollutant estimates (kt)				
		2018	2015	2010	2005	1990
I(1,2,3-cd)P						
National total as reported 2018 (row 141)	**Annex I, 23/03/2020**	**0.01051**	**0.02195**	**0.01359**	**0.01824**	**0.01051**
Difference between original estimate and revised estimates provided by Party and accepted by the ERT						
5C1bv cremation		-1.90E-06	-4.33E-06	-3.16E-06	-2.45E-06	-3.4147E-06
Difference between original estimate and technical correction deemed necessary by the ERT						
National total (row 141) including revised estimates and technical corrections accepted by MS	Calculated using data above	**0.01051**	**0.02195**	**0.01359**	**0.01824**	**0.01051**
PAH-4						
National total as reported 2018 (row 141)	**Annex I, 23/03/2020**	**0.0864**	**0.08273**	**0.1177**	**0.15406**	**0.08636**
Difference between original estimate and revised estimates provided by Party and accepted by the ERT						
5C1bv cremation		-0.000002	-0.000004	-0.000003	-0.000002	
5C1biv		NO	1.31E-06	NO	NO	NO
Difference between original estimate and technical correction deemed necessary by the ERT						
National total (row 141) including revised estimates and technical corrections accepted by MS	Calculated using data above	**0.08640**	**0.08273**	**0.11770**	**0.15406**	**0.08636**
Pollutant estimates (g I-TEQ)						
PCDD_PCDF						
National total as reported 2018(row 141)	**Annex I, 23/03/2020**	**0.369**	**0.376**	**0.786**	**0.949**	**11.588**
Difference between original estimate and revised estimates provided by Party and accepted by the ERT						
5C2 Open burning of waste						-0.850
Difference between original estimate and technical correction deemed necessary by the ERT						
National total (row 141) including revised estimates and technical corrections accepted by MS	Calculated using data above	**0.369**	**0.376**	**0.786**	**0.949**	**10.738**

TC|REVISED ESTIMATES