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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:**

**STAGE 3 REVIEW REPORT  
ICELAND**

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## INTRODUCTION

1. The mandate and overall objectives for the emission inventory review process under the LRTAP Convention is given by the UNECE document '*Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols*' <sup>(1)</sup> – hereafter referred to as the 'Methods and Procedures' document.
2. This annual review has concentrated on SO<sub>2</sub>, NO<sub>x</sub>, NMVOC, NH<sub>3</sub>, plus PM<sub>10</sub> & PM<sub>2.5</sub> for the time series years 1990 – 2014 reflecting current priorities from 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 reviews of the UNECE LRTAP Convention and EU NEC Directive inventories of Iceland, coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 20<sup>th</sup> June 2016 to 25<sup>th</sup> June 2016 in Copenhagen, Denmark, and was hosted by the European Environment Agency (EEA). The following team of nominated experts from the roster of experts performed the review: Generalist – Ieva Sile (Latvia), Energy – Garnt Jans Venhuis (Netherlands), Transport – Jean-Marc Andre (France), Industry – Mirela Poljanac (Croatia), Solvents – Ardi Link (Estonia), Agriculture + Nature – Mette H Mikkelsen (Denmark), Waste – Katja Pazdernik (EC).
4. Kevin Hausmann was the lead reviewer. The review was coordinated by Katarina Marečková, (EMEP Centre on Emission Inventories and Projections - CEIP).

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<sup>1</sup> Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols. Note by the Task Force on Emission Inventories and Projections. ECE/EB.AIR/GE.1/2007/16 <http://www.unece.org/env/documents/2007/eb/ge1/ece.eb.air.ge.1.2007.16.e.pdf>

## **PART A: KEY REVIEW FINDINGS**

5. Iceland submitted full time series of air pollutant emissions reported in the most recent format of NFR tables (NFR 2014-2), containing NO<sub>x</sub>, NMVOC, SO<sub>x</sub>, NH<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, TSP, BC, CO, PCDD/PCDF, PAHs and HCB emissions; the UNECE notification form, as well as the Informative Inventory Report are of a high quality. In addition, the gridded data for the years 1990, 1995, 2000, 2005 and 2010 have been reported.
6. All information was submitted in the particular time frame set in the UNECE Reporting Guidelines.
7. The ERT notes that recalculations have been applied; however, there is no description of the recalculations in the IIR.
8. The 2016 submission shows an improvement with regard to a number of issues highlighted in the previous Stage 3 review. Nevertheless, the ERT has identified a need for further improvements regarding transparency and completeness.
9. Iceland provided support to the ERT during the 2016 centralised Stage 3 review, responding in a timely manner.

### **INVENTORY SUBMISSION**

10. Iceland's inventory is partly in line with the EMEP/EEA emission inventory guidebook and the UNECE Reporting Guidelines. In their 2016 submission, Iceland has provided a national inventory for the years 1990-2014 for NO<sub>x</sub>, NMVOC, SO<sub>x</sub>, NH<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, TSP, BC, CO, PCDD/PCDF, PAHs, and HCB. Emissions are reported for the following sectors: 1A1-1A4, 1B2, 2A, 2C, 2D, 2G, 2H, 3B, 3D, 5A-5C, 5E. No emissions are reported for the sectors 1A5, 1B1, 2B, 2I-2L, 3F, 3I, 5D, 6A.
11. The ERT encourages Iceland to report emissions for heavy metals in the future, even though the party has not signed all protocols under the CLRTAP.
12. To a question raised by the ERT on the omission of PCB emissions, Iceland responded that it is a priority to add PCB emissions in the next submission (2017).
13. The ERT commends Iceland for including gridded data for 1990, 1995, 2000, 2005, and 2010 in their 2016 submission, and encourages Iceland to further use the updated NFR templates and the new EMEP grid.

### **KEY CATEGORIES**

14. Iceland has compiled and presented, in its 2016 IIR, a level KCA for the following pollutants: PCDD/PCDF, PAH, HCB. The analysis performed by Iceland is consistent with the EMEP/EEA emission inventory guidebook for all reported pollutants of 2014.

15. The KCA shows that waste incineration dominates the PCDD/PCDF and HCB emissions, while PAH emissions mainly come from metal production.

16. In the KCA performed by CEIP for Iceland, fishing is the main source of NO<sub>x</sub> and BC emissions, while transport and agriculture dominate the emissions of NMVOC, and IPPU (metal production) is responsible for largest part of PM as well as CO emissions. For NH<sub>3</sub> emissions agriculture is the only key category. The ERT encourages Iceland to include a KCA for all pollutants reported in the NFR tables in the next submission.

17. The ERT commends Iceland for having applied Tier 2/3 methods for most key categories (waste, transport) and encourages Iceland to improve its methodology for key categories for other pollutants that currently still use a Tier 1 approach.

## QUALITY

### Transparency

18. Iceland has used the notation keys NE and IE in a number of areas, but there is only a very brief explanation in the 2016 IIR. The ERT suggests that Iceland includes a table with explanations of NE and IE to make the inventory more transparent.

19. The IIR includes key trends by pollutant over the reported time series. The ERT commends Iceland for providing the trends not only as total emissions but also as gridded emissions in the form of maps.

20. The 2016 IIR submitted by Iceland contains the activity data and methodology by subcategories. However, information on emission factors could be more detailed, not only including the source, but also the value. The ERT recommends that Iceland presents emission factors in the form of tables for all subsectors.

21. In the Icelandic inventory, all emissions from domestic aviation are included in national totals but all emissions from international aviation are excluded (in line with the reporting guidelines under the UNFCCC). When the ERT pointed out that this was not in line with UNECE Reporting Guidelines, Iceland responded that they were aware of this, but were hoping to be able to improve the estimates in future submissions. Data provided by Eurocontrol might be useful as a basis for improving Iceland's emission estimates from aviation. The ERT encourages Iceland to use these data in order to obtain the appropriate distribution of emissions.

### Completeness

22. Iceland has reported emissions for NO<sub>x</sub>, NMVOC, NH<sub>3</sub>, SO<sub>x</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, TSP, BC and POPs (excluding PCB). The ERT commends Iceland for having an inventory of additional pollutants despite the fact that Iceland has only ratified the Protocol on Persistent Organic Pollutants, and encourages Iceland to report emissions for missing pollutants in the future, especially PCB.

23. Iceland has provided emissions for all time series for the main pollutants, particulate matter, CO and POPs, as well as gridded emissions for the years 1990, 1995, 2000, 2005 and 2010 for POPs.

### **Consistency, including recalculations and time-series**

24. The IIR does not provide any explanation for recalculations. However, during the review, Iceland stated that this would be improved in the next submission. The main reasons for recalculations are improved emission factors and updates on activity data. The ERT recommends to include the recalculations' rationales in the next submission.

### **Comparability**

25. Iceland's inventory is only partly comparable with those of other reporting parties due to activity data issues in aviation.

26. The ERT encourages Iceland to make available international and national navigation emissions as required by the UNECE Reporting Guidelines.

27. To ensure the comparability between inventories prepared by other Parties, the ERT recommends that Iceland calculates the emissions for the main pollutants (indirect GHGs) using an updated version of the guidelines instead of the 1996 IPCC Guidelines (preferably EMEP/EEA 2013).

### **CLRTAP/NECD comparability**

28. Iceland, as a non-EU member state, does not report emissions under the National Emission Ceilings (NEC) Directive. Iceland reports indirect greenhouse gases compiled under the UNFCCC to the CLRTAP. To a question raised by the ERT about differences between UNFCCC and LRTAP data, given that they had been stated to be the same, Iceland responded that some of the LRTAP data had been improved after the submission to UNFCCC, and that the data should be the same in the next submission.

### **Accuracy and uncertainties**

29. Iceland did not perform an uncertainty analysis. In response to the ERT's question regarding this issue, Iceland stated that they aim at performing the uncertainty analysis as part of the next submission (2017).

### **Verification and quality assurance/quality control approaches**

30. Iceland has described their QA/QC procedures in their IIR, and has an explicit QA/QC plan for the annual inventory. The ERT commends Iceland for their QA/QC manual.

## **FOLLOW-UP TO PREVIOUS REVIEWS**

31. Overall, Iceland has improved its inventory since the previous Stage 3 review in 2012. More pollutants have been provided, as well as full time series. However, there are some issues that should be improved, for example, the uncertainty analysis. The ERT has listed areas for improvements in Part B.

### **AREAS FOR IMPROVEMENTS IDENTIFIED BY ICELAND**

32. Iceland has identified the following improvements in its IIR:

33. Improvement of methodologies to estimate emissions from transportation using COPERT as well as aviation data from Eurocontrol.

34. At the moment, PM emission are only estimated for a few sources in the industrial processes sector, but there are ambitions to provide estimates for more sources. In addition, black carbon emissions were only estimated for 2013 and 2014, but it is planned to provide further estimates.

35. There are plans to review the digestible energy content for both cattle and sheep in order to reflect changes that have occurred in animal nutrition since 1990. Gross energy intake and average animal weight for cattle and sheep will also be reviewed and updated if necessary. This might have changed since data was last updated in view of changes in feed and breeding.

36. Emissions of POPs from agriculture are low; the subject will be inspected for potential miscalculation/error before the next submission. Revise emission factors for POPs pollutants in accidental fires.

## **PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY**

### **CROSS CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT**

37. The ERT encourages Iceland to report emissions of heavy metals in the future, even though the party has not signed all protocols under the CLRTAP.
38. The ERT recommends adding PCB emissions in the next submission (2017).
39. The ERT recommends that Iceland uses the updated NFR templates "NFR14-2" for all reporting.
40. The ERT encourages Iceland to include a KCA for all pollutants reported in the NFR tables.
41. The ERT suggests that Iceland includes a table with explanations of NE and IE in order to make the inventory more transparent.
42. The ERT recommends that Iceland presents emission factors in the form of tables for all subsectors.
43. The ERT recommends including a detailed description of recalculations in Iceland's next submission.
44. The ERT encourages Iceland to distribute international and national aviation and navigation emissions as required by the UNECE Reporting Guidelines.
45. The ERT recommends that Iceland reviews its use of the appropriate notation keys. In the NFR tables, in several cells "NO" is reported, whereas emissions are reported in the same subsector. This is not in line with the Reporting Guidelines, which state that "NO" is used "for categories or processes within a particular source category that do not occur within a Party". The ERT recommends that Iceland corrects these notation keys. There are also a few zero values reported in the NFR tables – the ERT suggests to insert an appropriate notation key for the next submission.
46. The ERT encourages Iceland to perform and present an uncertainty analysis. In the EMEP/EEA 2013 Guidebook, chapter "Uncertainties", there are approximate uncertainty values for activity data (Table 3-1 "Indicative error ranges for uncertainty analysis"). The 2006 IPCC Guidelines also contain information about uncertainty ranges for activity data in the sectoral chapters, as well as in the general chapters- Regarding the emission factors, an expert's judgement for the national emission factors can be used, but it should be well documented and archived (an expert judgement documentation form is available in the 2006 IPCC Guidelines, Volume 1 "General guidance and reporting", Chapter 2 "Approaches to data collection", Annex 2A.1 "A protocol for expert elicitation"). In the EMEP/EEA 2013 Guidebook, there are also rating definitions for emission factors that could help determine the uncertainty

for a particular source category. If a certain range is given, the mean value can be used. With these values, Iceland will be able to perform a Tier 1 uncertainty analysis.

## SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

### ENERGY

#### Review Scope

Pollutants Reviewed		NO <sub>x</sub> , NMVOC, SO <sub>x</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> , TSP, BC, CO, Dio <sub>x</sub> , PAH, HCB		
Years		1990 – 2014		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
1A1a	Public electricity and heat production	x		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		
1A2e	Food processing, beverages and tobacco	x		x
1A2f	Stationary combustion in manufacturing industries and construction: Non-metallic minerals	NO		
1A2gviii	Stationary combustion in manufacturing industries and construction: Other	x		x
1A3ei	Pipeline transport	NO		
1A3eii	Other	NO		
1A4ai	Commercial/institutional: Stationary	x		x
1A4bi	Residential: Stationary	x		x
1A4ci	Agriculture/Forestry/Fishing: Stationary	x		x
1A5a	Other stationary (including military)	NO		
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		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

## General recommendations on cross-cutting issues

47. The ERT commends Iceland for rapidly providing clear answers to the questions posed during the review process.

### **Transparency**

48. The ERT finds that Iceland has provided a detailed and generally transparent emissions inventory. The reported methodology, activity data and emission factors in the IIR are considered to be transparent and well described for the energy sector. The ERT encourages Iceland to maintain the level of transparency and to improve it, where needed.

49. The ERT encourages Iceland to include, in the IIR, a complete table with the results of the performed key source analysis for all pollutants to improve the transparency of the IIR.

50. The ERT recommends that Iceland includes, in the IIR, a table for IE to clearly indicate under which other sub-sector(s) emissions are included, and to include a table for NE to clearly indicate per sub-sector which emissions are not estimated and why.

51. The ERT recommends that Iceland uses the appropriate notation keys in the NFR (e.g. NO where emissions are “Not Occurring”, NE where emissions are “Not Estimated” and IE where emissions are “Included Elsewhere”) for reporting where estimates are not available or necessary. If, for instance, NO (not occurring) is used for all activity data, NO should be used for all pollutant emissions as well. The use of NA should be minimal, and explained in the text of the inventory. For most cases there are emission factors in the Guidebook.

### **Completeness**

52. The ERT considers the energy sector to be generally complete and comprehensive with good levels of detail in the methodology descriptions. The ERT encourages Iceland to report methodologies per sector in future submissions.

53. However, the ERT notes that Iceland has reported emissions for SO<sub>x</sub>, NO<sub>x</sub>, NMVOC, CO, PCDD/PCDF (dioxins/ furans), and POPs only. The ERT encourages Iceland to report emissions for PM<sub>10</sub>, PM<sub>2.5</sub>, TSP, NH<sub>3</sub> and HM (heavy metals) as well in future submissions. The ERT recognizes the fact that Iceland has ratified the Protocol on Persistent Organic Pollutants only. However, for environmental assessments, it is a great benefit if the coverage of reported data is as complete as possible for all pollutants.

54. The ERT notes that Iceland includes activity data and emissions for sector 1A2gviii, but that this sector is not described in the IIR. The ERT encourages Iceland to include, in future submissions of the IIR, descriptions for relevant subsectors with activity data and emissions that are mentioned in the NFR.

55. The ERT notes that Iceland has not included a chapter on projections in their inventory report. The ERT encourages Iceland to do so in future submissions.

### **Consistency including recalculation and time series**

56. The ERT concludes that the Icelandic inventory is consistent throughout the time series and between reported pollutants. No obvious breaks in the time series have been identified, and the trends for the different pollutants are comparable within each sub-sector and well described.

57. There is no information concerning recalculations in the Icelandic IIR. However, in the National Inventory Report (NIR) under the UNFCCC it is stated that no recalculations were made for the energy sector. The ERT encourages Iceland to include this information about recalculations in the IIR as well.

### **Comparability**

58. The ERT notes that the methods used by Iceland are mostly consistent with those proposed in the Guidebook. The ERT commends Iceland on following up on the recommendation to use the EMEP/EEA 2013 Guidebook. The ERT encourages Iceland to review the methodologies used and to update them where necessary and possible.

59. The ERT notes that the inventory of Iceland is comparable with those of other reporting parties. The ERT encourages Iceland to continue providing comparable inventory data.

### **Accuracy and uncertainties**

60. The ERT notes that Iceland has included, in the IIR, a general paragraph on QA/QC. The ERT encourages Iceland to implement sector-specific QA/QC procedures and report them per (sub)sector.

61. The ERT notes that Iceland has not yet prepared an uncertainty evaluation for the energy sector. The ERT encourages Iceland to undertake an uncertainty analysis in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

### **Improvement**

62. The ERT commends Iceland for the improvements made since the previous review, and for following up on proposed recommendations.

63. The ERT notes that Iceland included, in their IIR, a general paragraph on planned improvements. The ERT encourages Iceland to include a paragraph on planned improvements per sub-sector, where specific planned improvements can be reported where needed.

## Sub-Sector Specific Recommendations

### **Category issue 1: Various sectors – Additional heavy metals**

64. The ERT notes that Iceland has not included additional heavy metals in the key source analysis, but in the NFR table, however, for some sectors the notation key IE is used, and it is not clear where they are included and with what values. The ERT asked Iceland to provide the ERT with additional information on whether or not these heavy metals were included, to what extent and where. During the review week, Iceland responded that there was an error in the notation key, because Iceland did not report any heavy metals. The ERT encourages Iceland to use the appropriate notation keys in future submissions.

### **Category issue 2: Various sectors – Various pollutants**

65. The ERT notes that Iceland used the notation key NR for various pollutants in various sectors in the NFR. The ERT asked Iceland to provide the ERT with additional information on the use of the notation key NR. During the review week, Iceland responded that they will have to go through all notation keys before the next submission.

### **Category issue 3: Energy sector – Various pollutants**

66. In paragraph 3.4.1 of its IIR on electricity and heat, Iceland states that there are some facilities for waste incineration with energy recovery and that emissions are reported. Asked about the consistency of this information during the review week, Iceland responded that waste incineration with energy recovery was not occurring anymore and that therefore all emissions from waste incineration had been included in sector 5C. The ERT recommends that Iceland adjusts the text of the inventory accordingly for future submissions.

### **Category issue 4: 1B2av, 1A2d, 1A2f, 1B2ai, 1B2b, 1A4ci – Various pollutants**

67. The ERT notes that Iceland uses the notation key NO in the NFR table for most pollutants, but that NA (not applicable) is used for some activity data and NO for others. The ERT encourages Iceland to report actual values for AD and emissions preferably in their own sub-sector, using the emission factors of the Guidebook where needed.

## TRANSPORT

### Review Scope

Pollutants Reviewed		NO <sub>x</sub> , NMVOC, SO <sub>x</sub> , BC, CO, PAHs		
Years		1990 – 2014		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
1A2gvii	Mobile Combustion in manufacturing industries and construction	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		
1A3bvi	Road transport: Automobile tyre and brake wear	x		x
1A3bvii	Road transport: Automobile road abrasion	x		
1A3c	Railways		NO	
1A3di(ii)	International inland waterways		NO	
1A3dii	National navigation (shipping)	x		
1A4aii	Commercial/institutional: Mobile		NO	
1A4bii	Residential: Household and gardening (mobile)		NR	
1A4cii	Agriculture/Forestry/Fishing: Off-road vehicles and other machinery		IE	
1A4ciii	Agriculture/Forestry/Fishing: National fishing	x		
1A5b	Other, Mobile (including military, land based and recreational boats)		NO	
1A3di(i)	International maritime navigation	x		x
1A3	Transport (fuel used)	x		

### General recommendations on cross-cutting issues

#### **Transparency**

68. Since the last inventory review, Iceland has provided an IIR in which the methodology used to estimate the mandatory pollutants according to protocols signed by the Iceland is described. Detailed estimates are provided at for most emitters in the transport sectors. The ERT encourages Iceland to include more details in the IIR including detailed activity data, detailed used emissions factors and all hypotheses which could enhance transparency.

69. Iceland has used inappropriate notation keys in a number of areas in the reporting tables. The ERT encourages Iceland to use the appropriate notation keys

(e.g. NO where emissions are “Not Occurring”, NE where emissions are “Not Estimated” and IE where emissions are “Included Elsewhere”) for reporting, where estimates are not available or necessary.

### **Completeness**

70. Iceland has only ratified the Protocol on POPs and therefore mainly describes POPs in the IIR. The calculation method is described and the relevant EFs for POPs are presented for the main categories. Since the last review, Iceland has included BC in reported emissions. The ERT encourages Iceland to provide descriptions of the calculation method and BC EFs. The ERT notes that the transport sector could be completed by estimating the emissions at the most detailed level. Iceland could also provide separated emissions from the domestic and international aviation sector, and more pollutant emissions such as PM, NH<sub>3</sub> and HM. Iceland plans to use the COPERT methodology for road transport, EU-ETS and Eurocontrol data for aviation. The ERT encourages Iceland to implement those planned improvements in the next submissions.

### **Consistency including recalculation and time series**

71. Iceland has recalculated its inventory in the year 2015. However, the IIR does not include all the necessary explanations. The ERT encourages Iceland to provide more a detailed explanation of the recalculations, including the rationale, the impact on the sector and implication on trends for the transport sector.

### **Comparability**

72. The ERT notes that the inventory of Iceland is comparable with those of other reporting parties for the reported pollutants and sub-sectors. The ERT commends Iceland for using methodologies in accordance with the Guidebook for the transport sector and recommends that Iceland provides complete NFR tables with a minimal and appropriate use of notation keys.

### **Accuracy and uncertainties**

73. The ERT encourages Iceland to undertake an uncertainty analysis for the Transport Sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

74. The ERT has detected errors in reporting data in the NFR tables. The ERT encourages Iceland to implement sector-specific QA/QC procedures to eliminate the reported errors.

### **Improvement**

75. The ERT commends Iceland for its improvement in providing an IIR.

76. The ERT notes Iceland’s intention to improve reporting by using Eurocontrol data to be able to split between cruise and LTO in aviation and road transport emissions with the use of the COPERT model.

## Sub-Sector Specific Recommendations

### **Category issue 1: 1A3ai(i), 1A3ii(i) 1A3ai(ii), 1A3aii(ii) – All Pollutants**

77. The ERT notes that Iceland does not report the same values in the IIR and the NFR tables for jet kerosene activity data. During the review Iceland explained that the reporting in the NFR tables was wrong. The ERT encourages Iceland to improve the check of reported data in the next submissions.

### **Category issue 2: 1A3bvi, 1A3a – BC**

78. Iceland did not describe how BC emissions were estimated in the IIR. During the review, Iceland provided the methodology report and emission factors (a Norwegian report "Emissions from BC & OC in Norway 1990-2011"). The ERT recommends that Iceland includes such information in the IIR for the next submissions.

### **Category issue 3: 1A3biv – SO<sub>x</sub>**

79. The ERT has detected SO<sub>x</sub> emissions for this sector in 2014 only, although it is explained in the IIR (p47) that 2W activity data are provided for the 2006-2014 time series. Iceland explained during the review that SO<sub>x</sub> emissions for this sector had been calculated from 2006 but was not included in the NFR table. Iceland explained that this would be corrected in future submissions. The ERT encourages Iceland to improve the check of reported data in the next submissions.

### **Category issue 4: 1A3di(i) – total PAHs, 1A3ai(ii) – BC**

80. The ERT has detected a 0 (zero) PAHs emission value in the NFR tables for 2014 in the navigation sector and BC emissions in the NFR tables for 2013 and 2014 in the aviation sector. Iceland explained during the review that the value of total PAHs was calculated but not included in the NFR sheet by mistake, and BC values were added to the wrong NFR sector. The ERT encourages Iceland to improve the check of reported data in the next submissions.

## INDUSTRIAL PROCESSES

### Review Scope

Pollutants Reviewed		All pollutants		
Years		1990 – 2014		
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	x
2A6	Other mineral products	x		x
2B1	Ammonia production		NO	
2B2	Nitric acid production		NO	
2B3	Adipic acid production		NO	
2B5	Carbide production		NO	
2B6	Titanium dioxide production		NO	
2B7	Soda ash production		NO	x
2B10a	Chemical industry: Other	x		x
2B10b	Storage, handling and transport of chemical products		NO	
2C1	Iron and steel production		NO	
2C2	Ferroalloys production	x		
2C3	Aluminium production	x		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		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	x
2L	Other production, consumption, storage, transportation or handling of bulk products		NO	

## General recommendations on cross-cutting issues

### **Transparency**

81. 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. Still, the ERT encourages Iceland to include, in the IIR, the reasons for dips and jumps in the pollutant emission trends for more transparency.

82. Iceland uses zero-values in a few areas in the reporting tables. The ERT encourages Iceland to use the appropriate notation keys (e.g. NO where emissions are "Not Occurring", NE where emissions are "Not Estimated" and IE where emissions are "Included Elsewhere") for reporting where estimates are not available or necessary.

83. During the review, the ERT noted that reported activity data are not always consistent between the NFR tables and the IIR. The ERT recommends that Iceland includes all activity data provided in the NFR tables in its IIR and implements consistency checks.

### **Completeness**

84. The ERT considers the industry sector to be complete and comprehensive with good levels of detail in the methodology descriptions for most of the source categories. Still, there are a few areas where completeness could be improved in the future, including NFR 2.A.5.a "Quarrying and mining of minerals other than coal", NFR 2.A.5.b "Construction and demolition" and NFR 2.A.5.c "Storage, handling and transport of mineral products".

### **Consistency including recalculation and time series**

85. The ERT notes that in some cases the time series are not consistent. Outliers have been identified, and Iceland justified them in answer to the ERT's questions.

86. The Icelandic IIR does not contain any information on the recalculations performed for the industrial sector. The ERT encourages Iceland to always provide information on whether recalculations are performed or not for all source categories. The ERT also recommends that Iceland, in case recalculations are performed, provides a detailed explanation in the IIR, including the rationale for the performed recalculation, the impact on the industrial sector and its implication on emission trends.

### **Comparability**

87. The ERT notes that the inventory of Iceland is comparable with those of other reporting parties. The ERT commends Iceland for using methodologies in accordance with the Guidebook for the industry sector and for providing completed

NFR tables. The allocation of most source categories is in line with the EMEP/UNECE Reporting Guidelines.

### **Accuracy and uncertainties**

88. Iceland did not provide a quantitative uncertainty analysis for the industrial sector.

89. Iceland prepared a QA/QC plan for its GHG inventory in 2007. During the review, Iceland informed the ERT about their intention to update the QA/QC plan in 2016 or 2017 and to include the Informative Inventory Report in the QA/QC plan. Iceland also informed the ERT about QA/QC procedures that were implemented during the preparation of the inventory for the industry sector, e.g. that all data for the industry sector is compared with EU ETS, Green Accounting and E-PRTR data, and that trends and changes between years are checked. The ERT commends Iceland for providing this information and encourages Iceland to include this information in the IIR for the next year (submission in 2017).

### **Improvement**

90. Iceland does not list any improvement planned for the industrial sector in the IIR. However, during the review, Iceland provided the information that it is currently working towards reorganizing the inventory calculations and improving calculations/emission estimates and QA/QC for the NFR 2 industrial sector. The ERT commends Iceland for providing this information and encourages Iceland to include that information in the IIR for the next year (submission in 2017).

## **Sub-Sector Specific Recommendations**

### **Category issue 1: 2B10a Chemical industry: Other**

91. The ERT notes that Iceland has reported two activities under this source category: silicon(Si) and fertiliser production on the aggregated level and with no information on emission factors used. During the review, Iceland provided separate activity data for fertiliser production and silicon production from 1990 onward and an NO<sub>x</sub> emission factor for silicon production; for the fertiliser production Iceland uses direct emissions data provided by the plants. The ERT commends Iceland for providing information and recommends to include all provided information in the IIR for the next submission in 2017.

92. The ERT noted that in the NFR tables (1990-2004) Iceland provided activity data for the liquid fuel used and asked Iceland whether this was an error. Iceland responded that the activity data for liquid fuel was "0" and that it was an error. Iceland indicated that this would be corrected in the next submission (2017) and that the appropriate notation key NO would be used.

93. The ERT notes that for the NO<sub>x</sub> emissions and for the activity data since 2005 Iceland has used "0" instead of the appropriate notation key NO. Iceland

indicated that this would be correct in the next submission (2017) and that the appropriate notation key NO would be used.

94. The ERT notes that in the scope of NFR 2.B.10.a Iceland reports emissions that belong to source category NFR 2.B.7 "Soda ash production" and that the information on activity data and emission factor used has not been provided in the IIR. In response to the review, Iceland indicated that emissions from soda ash production would be allocated to NFR 2.B.7 for the next submission. Iceland provided the ERT all information requested on activity data for soda ash production and the EF used.

### **Category issue 2: 2H2 Food and beverages industry**

95. The ERT has found that there is no activity data in the NFR tables 1990-2014 for NFR code 2.H.2. In the IIR 2016, however, there is a figure for the total production of food and drink products for the whole period .. The ERT recommends that Iceland includes this activity data in the NFR tables for the next submission in 2017.

96. The ERT has noted a drop in NMVOC emission in 2009 and asked for an explanation. Iceland provided a comprehensive explanation and ERT commends the party for that. The ERT recommends that Iceland includes this explanation in the next IIR 2017.

### **Category issue 3: 2D3b Road paving with asphalt**

97. The ERT has noted that there are three peaks in the trend of asphalt consumption for road paving activity (2001, 2004, and 2008) and asked Iceland for an explanation. Iceland provided an explanation and the ERT commends Iceland for that and recommends that Iceland includes the provided explanation in the next IIR 2017.

### **Category issue 4: 2C3 Aluminium production**

98. The ERT found that the NFR tables for the years 2010, 2012, 2013, and 2014 only contain the values for primary aluminium production, while the IIR provides information on both primary and secondary aluminium production. In response to a question raised by the ERT, Iceland indicated that this was an error and that secondary aluminium had not been added to the NFR tables for the years mentioned and that that would be correct in the next submission.

## SOLVENTS

### Review Scope

<b>Pollutants Reviewed</b>		NO <sub>x</sub> , NMVOC, PM <sub>2.5</sub> , PM <sub>10</sub> , TSP, BC, PCDD/PCDF, PAHs		
<b>Years</b>		1990 – 2014		
<b>Code</b>	<b>Name</b>	<b>Reviewed</b>	<b>Not Reviewed</b>	<b>Recommendation Provided</b>
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		x
2G	Other product use	x		x

### General recommendations on cross-cutting issues

#### **Transparency**

99. Iceland's methodology and emission factors in the IIR are considered by the ERT to be generally transparent and well described for the solvents sector. For that, the ERT commends Iceland.

100. The ERT encourages Iceland to include more detail in the IIR when describing the reasons behind emission trends.

101. The ERT notes that Iceland has not presented activity data for emissions calculations in its IIR. During the review, Iceland provided the ERT with the used activity data. The ERT encourages Iceland to present the used activity data in the next IIR for better transparency.

#### **Completeness**

102. The ERT considers the solvents sector to be generally complete and comprehensive with good levels of detail in the methodology descriptions for key sources.

103. Some minor remarks for improving overall completeness of the solvents sector are presented in the Sub-Sector Specific Recommendations chapter.

#### **Consistency including recalculation and time series**

104. The ERT finds the time series of the solvents sector to be generally consistent. The issues with the "Other Solvent Use" and "Other Product Use" sectors are presented in the Sub-Sector Specific Recommendations chapter.

105. The ERT notes that no recalculations have been reported.

## **Comparability**

106. The ERT notes that Iceland does not use country specific methodology to calculate pollutant emissions from the solvents sector and commends Iceland for using methodologies in accordance with the EMEP/EEA 2013 Guidebook.

107. The ERT notes that the inventory of Iceland is comparable with those of other reporting parties.

## **Accuracy and uncertainties**

108. The ERT notes that no uncertainty analysis has been performed by Iceland for the solvents sector. The ERT encourages Iceland to undertake an uncertainty analysis for the solvents sector in order to prioritize their improvement activities and to provide an indication of the reliability of the inventory data.

109. According to the IIR, Iceland performs general QA/QC procedures according to the GHG QA/QC plan. The ERT was not able to deduce from the IIR whether Iceland carries out any specific QA/QC procedures for the solvents sector. The ERT encourages Iceland to implement sector-specific QA/QC procedures for the NMVOC emissions of the solvents sector and give an overview description of it in the future IIRs.

## **Improvement**

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

111. During the review, Iceland stated that a revision of the data acquisition from Statistics Iceland was underway and the party hoped to improve the data quality for future submissions. The ERT commends Iceland for updating the data flow and encourages Iceland to include information about future improvements in the solvents sector in the IIR.

## **Sub-Sector Specific Recommendations**

### **Category issue 1: 2D3a Domestic solvent use including fungicides – NMVOC**

112. The ERT notes that in the IIR Iceland has stated that the emission factor used for NMVOC emission calculations is 1 kg/inhabitant/year. Iceland replied to the ERT that the information given in the IIR was outdated and that, actually, the EMEP/EEA 2013 Guidebook NMVOC emission factor of 2.7 kg NMVOC/person/year had been used in the emission calculations and that this would be corrected for the next submission.

### **Category issue 2: 2D3g Chemical products – NMVOC**

113. During the review, the ERT asked Iceland if inks and glues manufacturing is also occurring 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 has not been taken into account, but a holistic review of the data collected by Statistics Iceland is underway at the moment and that this particular data will be asked for, among other data. Based on a preliminary judgment, a negligible amount of manufacturing of inks and glues occurs in Iceland. Once this data becomes available, Iceland will include NMVOC emissions from this activity into the inventory.

### **Category issue 3: 2D3i Other solvent use – NMVOC, PAHs**

114. According to the activity data Iceland provided to the ERT during the review period, the "Other Solvent Use" sector should include emissions from wood preservatives. Although PAHs emissions from wood preservatives are presented under NFR 2.D.3.i, NMVOC emissions are reported under NFR 2.G. For better transparency, comparability and consistency the ERT recommends that Iceland reports all the emissions from wood preservatives under NFR 2.D.3.i.

115. Also during the review Iceland stated that there had been a miscalculation of NMVOC emissions from the organic solvent-borne preservative. Iceland said that this error would be corrected for the next submission and the ERT encourages Iceland to do so.

### **Category issue 4: 2G Other product use – NO<sub>x</sub>, NMVOC, PM<sub>2.5</sub>, PM<sub>10</sub>, TSP, BC, PCDD/F, PAHs**

116. Iceland reports emissions from the use of tobacco under NFR 2.G. During the review, Iceland replied to the ERT that the wrong unit of NMVOC emission factor was used in the emission calculations (g/ton tobacco instead kg/ton tobacco) which resulted in an underestimation of NMVOC emissions. Iceland said that this error would be corrected for the next submission.

117. The ERT notes that the use of shoes and fireworks also fall under NFR 2.G which are not included in Iceland's inventory at the moment. The ERT suggests that Iceland investigates the possibilities to include emissions from these activities in the inventory and to use emission factors that are provided in the last version of the EMEP/EEA Guidebook.

## AGRICULTURE

### Review Scope

Pollutants Reviewed		All Pollutants		
Years		1990 – 2014		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
3B1a	Dairy cattle	x		x
3B1b	Non-dairy cattle	x		x
3B2	Sheep	x		x
3B3	Swine	x		x
3B4a	Buffalo		NO	
3B4d	Goats	x		x
3B4e	Horses	x		x
3B4f	Mules and asses		NO	
3B4gi	Laying hens	x		x
3B4gii	Broilers	x		x
3B4giii	Turkeys	x		x
3B4giv	Other poultry	x		x
3B4h	Other animals	x		x
3Da1	Inorganic N-fertilizers (includes also urea application)	x		
3Da2a	Animal manure applied to soils		NE	x
3Da2b	Sewage sludge applied to soils		NE	
3Da2c	Other organic fertilisers applied to soils (including compost)		NE	
3Da3	Urine and dung deposited by grazing animals		NE	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		NA	
3Dd	Off-farm storage, handling and transport of bulk agricultural products		NA	
3De	Cultivated crops		NA	x
3Df	Use of pesticides		NE	
3F	Field burning of agricultural residues		NO	
3I	Agriculture other		NO	
11A	Volcanoes		x	
11B	Forest fires		x	

### General recommendations on cross-cutting issues

118. The ERT notes significant improvements in the number of reported emission sources since the last inventory review and commends Iceland for including additional pollutants, despite the fact that Iceland has only ratified the Protocol on Persistent Organic Pollutants.

119. The ERT encourages Iceland to further improve its submission by including emission sources related to the cultivation of soils (NFR 3D).

## **Transparency**

120. Iceland has provided sufficient information in the IIR on activity data, emission factors and emission trends and the IIR is generally transparent. The ERT encourages the party to continue to improve the IIR by introducing some more information on activity data regarding the NFR 3D.

## **Completeness**

121. The agricultural inventory includes emissions of NH<sub>3</sub>, NO<sub>x</sub>, NMVOC and PM<sub>2.5</sub>, PM<sub>10</sub> and TSP from livestock production, emission from use of inorganic fertilisers and particle matter emission from farm-level agricultural operations (NFR 3Dc). The ERT encourages Iceland to provide a key source analysis and to implement planned improvements for the agricultural sector in next submissions.

## **Consistency including recalculation and time series**

122. The ERT concludes that the agricultural emissions are generally consistent throughout the time series. No outliers have been identified and the trends for the different pollutants are described in the IIR. The ERT notes that no recalculations have been reported and encourages Iceland to include information on recalculations in its next submission.

## **Comparability**

123. The ERT notes that the methods used by Iceland are mostly inconsistent with the methodology given in the EMEP/EEA 2013 Guidebook. During the review, Iceland agreed to adjust the NMVOC emission factor for cultivated crops (NFR 3De) in accordance with the updated emission factor in the 2013 GB. The ERT encourages the party to include more information for values which are very different from the GB default values, e.g. N-excretion for dairy cattle, in the IIR.

## **Accuracy and uncertainties**

124. Iceland has not provided an uncertainty analysis for the agricultural sector and the ERT encourages the party to provide an uncertainty analysis in order to focus attention on the emission sources which have the most significant impact on the total emission.

125. No description of the QA/QC activities performed for the agricultural sector is provided in the IIR. The ERT encourages Iceland to implement a sector-specific plan on OA/QC procedures and to include this plan in the IIR.

## **Improvement**

126. The ERT commends Iceland for following up on the recommendations from the previous Stage 3 review in 2011 by estimating emissions of main pollutants from livestock production. Some recommendations have been made during the review process and the ERT recommends that Iceland either implements these or at least includes them in the chapter on planned improvements.

## Sub-Sector Specific Recommendations

### **Category issue 1: 3B Manure management - NH<sub>3</sub>, NO<sub>x</sub>, PM**

127. In response to a question raised by the ERT Iceland provided information on milk production, animal weight and housing type, which is helpful to explain why the NH<sub>3</sub> emissions from dairy cattle are lower than the default value. The ERT recommends that Iceland includes this information in the next submission.

128. The emissions from the livestock production depend on the allocation of manure type. Iceland has stated that manure allocation for goats and sheep will be included in the next submission's IIR. Additionally, no PM emission has been estimated for sheep and goats. Iceland indicated that they planned to include these emissions in future submissions.

129. The ERT recommends that Iceland checks the estimate of NO<sub>x</sub> emissions from manure management. The emission in IS NFR 2014 from dairy cattle is estimated to amount to 308 kg NO<sub>x</sub>, which is higher than using both Tier1 and Tier2 calculation. A Tier 1 approach estimates the emission from dairy cattle to amount to 281 kg NO<sub>x</sub> (26159 cattle x 0.0007 kg NO/AAP x 46/30), while the Tier 2 approach results in 216 kg NO<sub>x</sub> (26159 cattle x 89.7 kg N x 0.6 TAN x 0.0001 kg NO/AAP x 46/30).

### **Category issue 2: 3D Agricultural Soils - NH<sub>3</sub>, NMVOC**

130. During the review, Iceland has stated that NH<sub>3</sub> emissions from animal manure applied to soils are included in the NFR categories 3B. Tier 2 methodology was used to calculate the NH<sub>3</sub> emission based on a mass flow approach, which makes it possible to estimate NH<sub>3</sub> from manure applied explicitly. Therefore, the ERT recommends that Iceland registers NH<sub>3</sub> emissions from application of animal manure in 4Da2a and NH<sub>3</sub> from grazing animals in 3Da3.

131. The production of sheep is the most important animal category due to the overall NH<sub>3</sub> emission from manure management in Iceland. The ERT recommends to include more information on the subcategories (ewes, rams, animal for replacement and lambs), since this would improve the transparency and the understanding of the difference from the default values. The NH<sub>3</sub> IEF is estimated at 2.5 kg NH<sub>3</sub>/AAP, which is much higher than the Tier 1 default value of 1.4 kg NH<sub>3</sub>/AAP.

132. The notation key "NO" is used for NH<sub>3</sub> emission from the cultivation of crops (NFR 3De). During the review, Iceland agreed to correct this key in its next submission.

133. The ERT compliments Iceland on calculating NMVOC emissions from the cultivation of crops (NFR 3De) and recommends that the party updates the emission factor based on GB 2013.

## WASTE

### Review Scope

Pollutants Reviewed		All pollutants		
Years		1990 – 2014		
Code	Name	Reviewed	Not Reviewed	Recommendation Provided
5A	Solid waste disposal on land	x		x
5B1	Biological treatment of waste - Composting	x		x
5B2	Biological treatment of waste - Anaerobic digestion at biogas facilities		x	
5C1a	Municipal waste incineration	x		x
5C1bi	Industrial waste incineration	x		x
5C1bii	Hazardous waste incineration	x		x
5C1biii	Clinical waste incineration	x		x
5C1biv	Sewage sludge incineration	x		x
5C1bv	Cremation	x		x
5C1bvi	Other waste incineration		x	
5C2	Open burning of waste	x		x
5D1	Domestic wastewater handling	x		x
5D2	Industrial wastewater handling	x		x
5D3	Other wastewater handling		x	
5E	Other waste	x		x

### General recommendations on cross-cutting issues

134. The submission of Iceland under CLRTAP is to a large extent complete, accurate, consistent and comparable. Some pollutants, however, are missing, especially particulate matter and heavy metals. Moreover, there is a need for improving transparency in the reporting on waste incineration, by reporting emissions and related activity data in the format as stipulated in the reporting guidelines, i.e. by splitting data up into the respective sub-categories instead of reporting all emissions under 5.C.1.a municipal waste incineration.

#### **Transparency**

135. Iceland submitted a good and transparent Informative Inventory Report, providing information on emission sources as well as activity data and EFs. The ERT commends the party for giving detailed background information, especially on waste incineration and other waste. Regarding 5.A and 5.B it is however recommended that Iceland improves its methodological information, e.g. by adding details on sources of data.

136. According to the reporting guidelines (Annex I - recommended structure IIR, Annex II - NFR format) emissions from waste incineration are to be reported under the respective sub-categories (e.g. incineration of municipal, industrial, hazardous, clinical waste, sewage sludge, open burning of waste). Iceland, however, reports them entirely under 5.C.1.a municipal solid waste. The ERT recommends that Iceland improves transparency by reporting emissions from the sources covered under the respective sub-categories.

## **Completeness**

137. The submission of Iceland regarding the sector waste is quite complete. Emissions of major pollutants and major activities are presented. However, some gaps in reporting were identified. Emissions of heavy metals are missing, as well as largely PM emissions. During the review, Iceland informed the ERT that PM emissions will be considered in future submissions provided that activity data as well as EMEP/EEA 2013 Guidebook default EFs are available. The ERT commends Iceland for that plan and recommends to report on emissions or on its progress in future submissions.

## **Consistency, including recalculation and time series**

138. The ERT considers emissions and methodologies applied to be consistent over the time series.

139. Iceland does not provide an explanation for its recalculations. The ERT encourages the party to include detailed information on any recalculations that have been carried out as well as the reasons for these recalculations in future IIRs.

## **Comparability**

140. Methodologies and underlying emission factors are to a large extent well described. The methods applied by Iceland to estimate emissions are in accordance with the EMEP/EEA 2013 Guidebook. Emissions reported on 5.C, however, could not be compared as incineration of all waste types is currently reported under only one category. The ERT recommends that Iceland improves its transparency of reporting in future submissions.

## **Accuracy and uncertainties**

141. Iceland has not provided an uncertainty analysis for the waste sector. The ERT reiterates its encouragement from the 2011 Stage 3 review to estimate uncertainties for the activity data and EF to support the improvement process and to provide an indication of the reliability of the inventory data.

142. No description of the QA/QC activities performed for sector waste is included in the IIR. The ERT encourages Iceland to implement sector-specific QA/QC procedures and report on them in its future submissions.

## **Improvement**

143. The ERT commends Iceland for following up on most of the recommendations from the previous Stage 3 review in 2011 and encourages the party to proceed in this way.

144. Iceland has a section on planned improvements at the end of the overall waste chapter in its IIR. The ERT commends Iceland for this documentation and encourages the party to continue to provide information about category-specific improvement plans for future submissions.

145. During the review, some suggestions for improvement were given and the ERT encourages Iceland to implement them in its next submission or to include them as planned improvements.

## Sub-Sector Specific Recommendations

### **Category issue 1: 5A Solid Waste disposal – NMVOC, TSP, PM<sub>10</sub>, PM<sub>2.5</sub>**

146. NMVOC emissions from solid waste disposal are reported for the whole time series, but no PM emissions, although default EF are provided in the EMEP/EEA 2013 Guidebook. In response to a question raised by the ERT, Iceland informed about its plan to include PM emissions in future submissions provided that relevant activity data can be made available. The ERT commends Iceland for this plan.

147. It was not quite clear to the ERT whether the calculation of NMVOC is based on kilotons waste annually deposited or m<sup>3</sup> landfill gas emitted as reported under the UNFCCC. This would make a difference as the generation of landfill gas applying the first order decay method is affected also by historical depositions and different parameters (DOC and half life times of different waste fractions, oxidation, recovery, etc). In response to a question raised during the review, Iceland explained that NMVOC emissions from this category are calculated using the emission factor related to landfill gas (5.65 g/m<sup>3</sup> landfill gas) considering the specific density of methane and concentration in the landfill gas. The ERT commends Iceland for this explanation and encourages the party to extend the methodological description in the IIR accordingly to improve transparency.

### **Category issue 2: 5B Biological Treatment, composting – NH<sub>3</sub>**

148. NH<sub>3</sub> emissions from composting are reported under category 5.B.1. Methodology and applied emission factor are in accordance with the EMEP/EEA 2013 Guidebook. Transparency could, however, be enhanced by providing more details on the source of activity data and types of composted waste considered.

### **Category issue 3: 5C waste incineration - all pollutants**

149. All incineration activities and emissions are currently reported under 5.C.1.a municipal waste incineration. Hence, the structure of reporting does not follow the reporting format. In response to a question raised during the review Iceland explained that the incineration plants reported under 5.C.1.a cover incineration of municipal, industrial, hazardous, clinical waste as well as sewage sludge. The party explained that activity data (waste incinerated in tons) is available for each type of waste and emissions could be split up into the respective sub-categories for IIR and NFR reporting. The ERT recommends that Iceland reports emissions from each type of waste incinerated separately under the respective sub-category to increase transparency and enable the ERT to make a comparison with other Parties. Furthermore, the ERT encourages the party to include emission data for all pollutants under this category, where the EMEP/EEA 2013 Guidebook provides emission factors.

150. Iceland has provided emissions of POPs from 5.C.1.b.v Cremation. The ERT commends Iceland for this improvement made since the previous Stage 3 review, but encourages the Party to include emissions data for all relevant pollutants that can be expected by this activity.

151. Iceland does not report emissions from open pit burning under NFR 5.C.2 ("NO"), but under 5.C.1, together with emissions from incineration devices without combustion control. In response to a question raised during the review, the party confirmed that emissions from open pit burning should rather be reported under 5.C.2, whereas emissions from incineration devices are to be reported under 5.C.1. The ERT recommends that Iceland reports emissions under the respective NFR sub-categories in future submissions.

#### **Category issue 4: 5D Wastewater handling - NMVOC, NH<sub>3</sub>**

152. No emissions are reported under category 5.D. The notation key "NE" is used for NMVOC as well as NH<sub>3</sub>. According to the IIR this is justified by the fact that most wastewater is discharged into the sea either untreated or after primary treatment and that latrines are not occurring in Iceland. Nevertheless, there are some wastewater treatment plants with secondary treatment in the country, so NMVOC emissions could not be fully ruled out. The ERT recommends that Iceland estimates NMVOC emissions from biological wastewater treatment and reports on them in future submissions.

153. Regarding NH<sub>3</sub> emissions from latrines, the ERT encourages Iceland to change the notation key to "NO".

#### **Category issue 5: 5E. Other waste - all pollutants**

154. Iceland reports emissions from vehicle and building fires under 5.E. The methodology and the country-specific emission factors are well described. However, neither particulate matter nor heavy metals are estimated. The ERT encourages Iceland to provide a justification for this "NR" in its next submission or calculate emissions applying the default emissions factors from the EMEP/EEA 2013 Guidebook.

## **LIST OF ADDITIONAL MATERIALS PROVIDED BY ICELAND DURING THE REVIEW**

1. Activity data for the whole solvent sector