COMPLIANCE COMMITTEE **CC/ERT/ARR/2020/8**
9 March 2020

Report of the individual review of the annual submission of Slovakia submitted in 2019

Note by the secretariat

The report of the individual review of the annual submission of Slovakia submitted in 2019 was published on 3 March 2020. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2019/SVK, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

United Nations FCCC/ARR/2019/SVK

Framework Convention on Climate Change

Distr.: General
3 March 2020

English only

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

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual inventory of emissions and removals of greenhouse gases for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2019 annual submission of Slovakia, conducted by an expert review team in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol". The review took place from 23 to 28 September 2019.

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

GE.20-03355(E)

2003355

Contents

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AAU	assigned amount unit
AD	activity data
Annex A source	source category included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
Article 8 review guidelines	"Guidelines for review under Article 8 of the Kyoto Protocol"
CER	certified emission reduction
CH_4	methane
CLRTAP	Convention on Long-Range Transboundary Air Pollution
CM	cropland management
CO	carbon monoxide
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
Convention reporting adherence	adherence to the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
COPERT	software tool for calculating road transport emissions
CPR	commitment period reserve
CRF	common reporting format
CSC	carbon stock change
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EUROCONTROL	European Organisation for the Safety of Air Navigation
Eurostat	the statistical office of the European Union
FAOSTAT	the statistical database of the Food and Agriculture Organization of the United Nations
FM	forest management
FMRL	forest management reference level
GE	gross energy intake
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
JRC	Joint Research Centre
KP-LULUCF activities	activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
MSW	municipal solid waste
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated

Nex	nitrogen excretion
NF_3	nitrogen trifluoride
NIR	national inventory report
NMVOC	non-methane volatile organic compound
NO	not occurring
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulfur hexafluoride
SWDS	solid waste disposal site(s)
UNFCCC Annex I inventory reporting guidelines	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
UNFCCC review guidelines	"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention"
VS	volatile solids
WDR	wetland drainage and rewetting
Wetlands Supplement	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*

I. Introduction[1]

1. This report covers the review of the 2019 annual submission of Slovakia organized by the secretariat in accordance with the Article 8 review guidelines (adopted by decision 22/CMP.1 and revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention" (decision 13/CP.20). The review took place from 23 to 28 September 2019 and was coordinated by Suvi Monni (secretariat). Table 1 provides information on the composition of the ERT that conducted the review of Slovakia.

Table 1
Composition of the expert review team that conducted the review of Slovakia

Area of expertise	*Name*	*Party*
Generalist	Takeshi Enoki	Japan
	Mikhail Gitarskiy	Russian Federation
Energy	Takashi Morimoto	Japan
	Inga Valuntiene	Lithuania
IPPU	Emma Salisbury	United Kingdom of Great Britain and Northern Ireland
	Sina Wartmann	Germany
Agriculture	Yu'e Li	China
	Etienne Mathias	France
LULUCF and KP-LULUCF activities	Doru Leonard Irimie	Romania
	Inge Jonckheere	Belgium
Waste	Qingxian Gao	China
	Hans Oonk	Netherlands
Lead reviewers	Takeshi Enoki	
	Qingxian Gao	

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

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

4. A draft version of this report was communicated to the Government of Slovakia, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

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

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

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

5. Annex I shows annual GHG emissions for Slovakia, including totals excluding and including the LULUCF sector, indirect CO_2 emissions, and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from KP-LULUCF activities, if elected by Slovakia, by gas, sector and activity.

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

II. Summary and general assessment of the 2019 annual submission

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

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

Assessment			*Issue or problem ID#(s) in table 3, 5 and/or 6*[a]
Dates of submissions	Original submission: 30 April 2019 (NIR), 11 April 2019, (CRF tables) version 4, 11 April 2019 (SEF tables) Revised submission: 16 October 2019 (CRF tables) version 6 Unless otherwise specified, the values from the latest submission are used in this report		
Review format	Desk review		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	No	
	(b) Selection and use of methodologies and assumptions?	Yes	G.5, E.17, E.21, A.13, L.14, L.15, L.16, KL.11
	(c) Development and selection of EFs?	Yes	L.1, A.15
	(d) Collection and selection of AD?	Yes	E.4, I.14, A.17
	(e) Reporting of recalculations?	Yes	I.13, L.11, W.5
	(f) Reporting of a consistent time series?	Yes	A.18, E.25, E.26
	(g) Reporting of uncertainties, including methodologies?	Yes	G.7, G.8, L.2, W.10
	(h) QA/QC?	QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below)	
	(i) Missing categories/completeness?[b]	Yes	L.6
	(j) Application of corrections to the inventory?	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	No	G.2, A.12

Assessment			*Issue or problem ID#(s) in table 3, 5 and/or 6[a]*
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes	
Supplementary information under the Kyoto Protocol	Have any issues been identified related to the following aspects of the national system:		
	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	No	
	(b) Performance of the national system functions?	No	
	Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry?	No	
	(b) Performance of the functions of the national registry and the technical standards for data exchange?	No	
	Have any issues been identified related to reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the standard independent assessment report?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	Yes	G.9
	Have any issues been identified related to the following reporting requirements for KP-LULUCF activities:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	Yes	KL.13
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	Yes	KL.4, KL.5
	(c) Reporting requirements of decision 6/CMP.9?	Yes	KL.6
	(d) Country-specific information to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34?	NA	
CPR	Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Did the Party submit a revised estimate to replace a previously applied adjustment?	NA	The Party does not have a previously applied adjustment
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the	Yes	

Assessment			*Issue or problem ID#(s) in table 3, 5 and/or 6[a]*
	UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?		
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	No	
Questions of implementation	Did the ERT list any questions of implementation?	No	

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

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

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

8. Table 3 compiles all the recommendations made in previous review reports that were included in the previous review report, published on 14 March 2018.[4] For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2019 annual submission and provided the rationale for its determination, which takes into consideration the publication date of the previous review report and national circumstances.

Table 3
Status of implementation of issues and/or problems raised in the previous review report of Slovakia

ID#	*Issue and/or problem classification[a, b]*	*Recommendation made in previous review report*	*ERT assessment and rationale*
General			
G.1	National system (G.5, 2017) Transparency	Improve the transparency of the reporting regarding the changes in the national system by including in the NIR all changes to the national system, including structural changes.	Resolved. In chapter 1.2.5 of the NIR, Slovakia indicated that there were no changes in the national system or inventory arrangements during the preparation of the 2019 national inventory submission. The previous review report noted that the Party had not included information on the establishment of the Department of Emissions and Biofuels, which has two main areas of responsibility: the emissions inventory and the national system of biofuels. The ERT noted that information on the establishment of that department is included in the NIR (pp.26–27). The Party further confirmed that its national system is fully operational and continues to perform its functions in accordance with the approved national action plans.
G.2	Notation keys (G.6, 2017) Transparency	Report all emissions considered insignificant as "NE" and justify that the likely level of those emissions is below the threshold indicated in paragraph 37(b) of the	Addressing. The use of the "NE" notation key has been reconciled by Slovakia following the previous review recommendation (see also ID# G.3 below). The information on notation keys used as well as rationales for their use were provided in tables A2.1–A2.7 in annex 2 to the

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

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
		UNFCCC Annex I inventory reporting guidelines.	NIR. CRF table 9 includes explanations for some of the categories reported as "NE" and "IE". The ERT noted that according to tables A2.3 and A2.5 in annex 2 to the NIR, the emissions that were not estimated (i.e. CO_2, CH_4 and N_2O from category 1.A.3.d, domestic navigation (gasoline for 1990–2015 and biomass for 2007–2015), and CO_2, CH_4 and N_2O from categories 1.A.5, other (military use of gasoline and diesel for 1990–2014 and biomass for 2007–2014) and 3.D.6, cultivation of organic soils) were reported as being below the threshold of significance. However, the 2019 annual submission of Slovakia did not include the quantitative justification that the categories reported as "NE" were below the significance threshold nor confirmation that the total national aggregate of estimated emissions for all gases of categories considered insignificant remained below 0.1 per cent of total national GHG emissions (see also ID# A.12 below). During the review, Slovakia confirmed that it annually undertook calculations of threshold values for not estimated categories, including the verification that the total national aggregate of estimated emissions for all gases of categories considered insignificant remains below 0.1 per cent of total national GHG emissions. The Party further provided threshold calculation spreadsheets to the ERT. Regarding the use of "NE" for gasoline and biomass for domestic navigation and military use of gasoline, diesel and biomass, the ERT noted that the provisions in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines regarding exclusion of emissions from categories below the threshold of significance are not applicable when only a part of the time series has not been estimated (see ID#s E.25 and E.26 in table 6).
G.3	Notation keys (G.6, 2017) Transparency	Review and, if necessary, revise the information in annex 2 to the NIR regarding the use of the notation key "NO" to report emissions that are considered negligible or outside the measurement range.	Resolved. The use of the notation key "NO" has been revised following the previous review recommendation. For example, CO_2 emissions from domestic navigation – gasoline for 1990–2015 are reported as "NE" in the 2019 submission, whereas they were reported as "NO" in the 2017 submission (see ID# G.2 above). The revised notation keys were provided in tables A2.1–A2.7 in annex 2 to the NIR along with the rationale for their use on page 419 of the same annex.
G.4	QA/QC and verification (G.7, 2017) Transparency	Increase transparency regarding the reporting of the general QA procedures and provide in the NIR more information on the sequence of the QA procedures as well on the experts/stakeholders involved.	Resolved. The outline for QA procedures was described in chapter 1.2.4.1, page 30, of the NIR. In chapter 1.2.4.4, page 33, of the NIR, Slovakia provided a description of the QA procedures applied to its national inventory, including a description of how and in which sequence they had been performed and by

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			which independent experts not involved in the preparation of the inventory.
Energy			
E.1	Fuel combustion – reference approach – liquid fuels – CO_2 (E.4, 2017) (E.5, 2016) (E.5, 2015) (23, 2014) Transparency	Conduct more detailed analysis of the reasons behind the discrepancies between the reference and the sectoral approach for each individual liquid fuel type and provide the numerical data obtained as a result of such an analysis in the NIR.	Resolved. The Party conducted a detailed analysis of the discrepancies between the reference approach and the sectoral approach for liquid fuels and provided the results in chapter 3.3 of the NIR. A comparison of the results obtained using the reference approach and those obtained using the sectoral approach for liquid fuel consumption and CO_2 emissions is provided in NIR table 3.45. The Party concluded that the main reason for the discrepancies is the use of different sources of AD for each approach and the uncertainty of net calorific values and EFs of liquid fuels.
E.2	Fuel combustion – reference approach – other fossil fuels, peat – CO_2 (E.5, 2017) (E.20, 2016) (E.20, 2015) Accuracy	Examine the data and reduce discrepancies between the reference and sectoral approach to the extent possible and report the outcome of such research in the NIR.	Resolved. The Party conducted a detailed analysis of the discrepancies between the reference approach and the sectoral approach for other fossil fuels and provided the results in chapter 3.3 of the NIR. The Party concluded that the discrepancies are caused by incorrect categorization between municipal waste and industrial waste in the energy statistics, which is used as the data source for the reference approach, the differences in waste composition, and the differences in accounting for peat consumption (peat consumption is reported as peat in the sectoral approach but as brown-coal briquettes in the reference approach (see ID# E.3 below)).
E.3	Fuel combustion – reference approach – peat – CO_2 (E.21, 2017) Convention reporting adherence	Report peat consumption and the associated emissions in the reference approach for 2011 onward.	Not resolved. The Party explained in the NIR (pp.102–103) that peat consumption is reported as briquettes in the energy statistics used for the reference approach. During the review, the Party confirmed that peat import is included under brown-coal briquettes in CRF table 1.A(b). The ERT noted that according to footnote 6 to that table, peat briquettes are to be reported under peat. However, peat import was reported as "NO" instead of "IE" in CRF table 1.A(b).
E.4	1.A.1.a Public electricity and heat production – other fossil fuels – CH_4 and N_2O (E.24, 2017) Accuracy	Implement the planned improvement highlighted in the NIR 2017 (chapter 3.2.6.1) regarding correcting identified inconsistencies in the reporting for industrial waste, validate the AD for municipal and industrial solid waste incineration and improve the estimation of the ratio of fossil fuel to biomass of the waste incinerated.	Addressing. The Party conducted a detailed analysis of the reporting of emissions from industrial solid waste incineration in the energy sector (NIR, chap. 3.2.4). Based on the results, the Party reallocated all the emissions from industrial solid waste incineration to category 1.A.2.f to avoid double counting (in the 2017 submission, emissions from industrial solid waste incineration were included in both 1.A.1.a and 1.A.2.f). The information on waste composition used for the estimation of emissions from industrial solid waste incineration in 1.A.2.f is based on plant-level data (for 2005–2017) and the Waste Yearbook provided by the Statistical Office of the Slovak Republic (for 1990–2004). During the review, Slovakia confirmed that the time-series consistency between the two data sources was

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			ensured through the comparison of plant-level data, data from the Waste Yearbook and data in the National Emission Information System database. Regarding the incineration of MSW with energy recovery, emissions continue to be included under category 1.A.1.a, and information on the AD is provided in NIR section 7.7.1.1.1. The AD are based on the amount of waste delivered by waste collection companies to waste incineration plants. However, the Party did not report on AD validation activities. The ERT noted that the amount of waste (non-biomass fraction) reported in CRF table 1.A(b) is still less than that reported to IEA. The Party explained in NIR chapter 3.3 that the information on the biogenic/fossil part of waste used in the inventory is based on information from the waste incineration plants. During the review, the Party further explained that the amount of waste included in the IEA data is unrealistically high for some years, as the plants in the country did not have the capacity to incinerate such large amounts of waste. The Party explained that it is working with the Statistical Office to resolve the issue.
E.5	1.A.1.c Manufacture of solid fuels and other energy industries – all fuels – CO_2, CH_4 and N_2O (E.14, 2017) (E.25, 2016) (E.25, 2015) Comparability	Report emissions from coke production under manufacture of solid fuels (1.A.1.c.i) and report own-energy-use emissions from coal mines and oil and gas companies and possible emissions from charcoal production under other energy industries (1.A.1.c.ii), if they can be disaggregated from agriculture/forestry/fishing – stationary.	Resolved. The Party reported emissions from manufacture of solid fuels and other energy industries under manufacture of solid fuels (1.A.1.c.i) and oil and gas extraction (1.A.1.c.ii) appropriately. The Party explained in chapter 3.2.5 of the NIR that the revision had already been implemented in the 2017 submission but the information on this revision provided in table 3.7 in the NIR 2017 was incorrect.
E.6	1.A.1.c Manufacture of solid fuels and other energy industries – solid fuels – CO_2 (E.25, 2017) Transparency	Explain in the NIR the high value of the CO_2 IEF for this category and how it was obtained.	Not resolved. Although the Party provided in chapter 3.2.5 of the NIR a general explanation on the issue of fluctuating trends in the IEFs in response to recommendations in the previous review report, the reason for the high value of the CO_2 IEF (e.g. for 2017, 199.17 t CO_2/TJ, compared with the range of 42.84–199.17 t CO_2/TJ for all reporting Parties) for this category and how it was obtained was not provided. During the previous review, the Party indicated that the IEF for CO_2 is so high because blast furnace gas, which has a high carbon content, represents more than 95 per cent of total fuels in this category, and that the information about consumption of two main fuels in this category, coking gas and blast furnace gas, was obtained directly from the iron and steel producer. In addition, during the present review, the Party explained that the fluctuation of the CO_2 IEF was caused by the changing steel and electricity prices and the flexible operations of one company, which is continuously adapting its production and

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			assortment of products to the market situation. The Party also explained that the detailed data used in the emissions inventory for this category could not be included in the NIR because the information is confidential.
E.7	1.A.2.a Iron and steel – liquid fuels – CH_4 (E.26, 2017) Transparency	Explain the trend in the CH_4 IEF, especially for 2009 onward, by including information on the trends in LPG and residual fuel oil consumption or, if this is not possible because some of the data are confidential, explain which data are confidential and the specific domestic legislation that makes them confidential and the underlying reasons for the trend in the CH_4 IEF.	Resolved. The Party explained in chapter 3.2.5 of the NIR that the fluctuating trends in the IEFs are caused by fluctuations in individual fuel consumption because the fuel consumption is low and the number of sources limited. During the review, the Party further explained that the fluctuation of the CH_4 IEF is due to the change in the ratio of LPG to residual fuel oil and the difference in EFs between these two fuels (the CH_4 EF of residual fuel oil is three times higher than that of LPG).
E.8	1.A.2.e Food processing, beverages and tobacco – liquid fuels – CO_2, CH_4 and N_2O (E.27, 2017) Transparency	Explain in the NIR the trend in and sources of the CO_2, CH_4 and N_2O IEFs for 2008 onward and the fuel oil and LPG consumption or, if this is not possible because some of the data are confidential, explain which data are confidential and the specific domestic legislation that makes them confidential and the underlying reasons for the trends in the CO_2, CH_4 and N_2O IEFs.	Resolved. The Party provided a general explanation in chapter 3.2.5 of the NIR that the fluctuating trends in the IEFs are caused by fluctuations in the consumption of each fuel, because fuel consumption is low and the number of sources limited. It also provided the reason why the AD are confidential, including information on the domestic legislation related to fuel consumption statistics.
E.9	1.A.2.e Food processing, beverages and tobacco – – solid fuels – N_2O (E.28, 2017) Transparency	Explain the change in the N_2O IEF for 2015 by reporting the change in solid fuel consumption and the EF considered for each fuel or, if this is not possible because some of the data are confidential, explain which data are confidential and the specific domestic legislation that makes them confidential and the underlying reasons for the trend in the N_2O IEF.	Resolved. See ID# E.8 above.
E.10	1.A.2.f Non-metallic minerals – solid fuels – CH_4 (E.29, 2017) Transparency	Explain in the NIR the trend in the CH_4 IEF by detailing the different fuels and their consumption and the source of AD and EFs or, if this is not possible because some of the data are confidential, explain which data are confidential and the specific domestic legislation that makes them confidential and the underlying reasons for the trend in the CH_4 IEF.	Resolved. See ID# E.8 above.
E.11	1.A.2.g Other (manufacturing industries and construction) – – solid fuels – CH_4 and N_2O (E.30, 2017) Transparency	Explain in the NIR the trend in the CH_4 and N_2O IEFs by detailing the source of AD and EFs and the different fuels consumed in different years, particularly the changes observed starting at the end of 2012 or, if this is not possible because some of the data are confidential, explain which	Resolved. See ID# E.8 above.

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		data are confidential and the specific domestic legislation that makes them confidential and the underlying reasons for the trends in the CH_4 and N_2O IEFs.	
E.12	1.A.2.g Other (manufacturing industries and construction) – – liquid fuels – CO_2 and CH_4 (E.31, 2017) Transparency	Explain in the NIR the trend in the CO_2 and CH_4 IEFs by detailing the different fuels consumed in different years.	Resolved. See ID# E.8 above.
E.13	1.A.3.a Domestic aviation – aviation gasoline – CH_4 (E.32, 2017) Consistency	Demonstrate that the time series is consistent in accordance with the 2006 IPCC Guidelines.	Resolved. The Party explained in the NIR (pp.79–80) that it estimated emissions for the period 2005–2017 using data on the share of national and international activities from EUROCONTROL. To estimate the emissions for 1990–2004, the Party estimated the share of national and international activities based on the average EUROCONTROL data for 2005–2015 because the Party has only data on the total number of landing and take-off cycles and fuel sold at Slovak airports for 1990–2004. During the review, the Party further explained that the share of national and international activities is stable and contributes to the time-series consistency. The Party also explained in the NIR (p.80) that the CH_4 EF for 1990–2004 was calculated as the average of the EFs for 2005–2015, which are based on EUROCONTROL data. The ERT considers that this information was sufficient to justify consistency in the time series.
E.14	1.A.3.b.i Cars – LPG – N_2O (E.33, 2017) Transparency	Review and explain in the NIR the N_2O IEF for LPG for cars in road transportation.	Resolved. The Party recalculated the N_2O emissions using the COPERT model in the 2018 submission. The N_2O IEFs for LPG for cars in road transportation in this submission are lower than those in the 2017 submission. According to the previous review report, the N_2O IEF for LPG for cars was among the highest reported by all Parties in the 2017 submissions, which is no longer the case: the IEF of Slovakia reported for 2017 is 1.37 kg N_2O/TJ, while the range of the IEFs of all reporting Parties is from 0.09 to 3.26 kg N_2O/TJ.
E.15	1.A.3.b.ii Light-duty trucks – liquid fuels – CH_4 and N_2O (E.34, 2107) Transparency	Clarify the trend in the CH_4 and N_2O IEF by explaining that changes in the vehicle fleet resulted in fewer hydrocarbon emissions (including CH_4) but more N_2O emissions (as a result of the reduction in NO_X emissions).	Resolved. The Party provided in chapter 3.2.7.1 of the NIR an explanation of the trends in the CH_4 and N_2O IEFs for light-duty trucks in road transportation.
E.16	1.A.3.b.v Other (road transportation) – CO_2 (E.35) Comparability	Ensure that the proper notation key "IE" is reported for urea-based catalysts and that use of the notation keys is explained in the NIR and CRF table 9.	Resolved. The Party reported emissions from urea-based catalysts as "IE" for 2010–2017 (category 1.A.3.b.v in CRF table 1.A(a)s3) and explained in CRF table 9 that the emissions are included in category 2.D.3 other. The reporting is explained in the NIR (p.86).

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
E.17	1.A.4 Other sectors – solid fuels – CH_4 (E.36, 2017) Accuracy	Estimate and report CH_4 emissions from solid fuels for category 1.A.4 using at least a tier 2 methodology (in accordance with the 2006 IPCC Guidelines) if the emissions are identified as key, and if this is not practical, explain in the NIR any national circumstances that may affect this issue.	Addressing. The Party estimated and reported CH_4 emissions from other sectors – solid fuels (1.A.4) using a tier 1 methodology although 1.A.4 was identified as a key category. The Party explained in the NIR (p.438) and during the review that data from a Eurostat research project are currently being compiled and that results would be included in the 2020 NIR.
E.18	1.A.4.c.i Stationary – biomass – CO_2 (E.37, 2017) Transparency	Explain in the NIR the trend in the CO_2 IEF by detailing the consumption trends for the different biomass types or, if this is not possible because some of the data are confidential, explain which data are confidential and the specific domestic legislation that makes them confidential and the underlying reasons for the trend in the CO_2 IEF.	Resolved. See ID# E.8 above.
E.19	1.B.2.a Oil – liquid fuels – CO_2 and N_2O (E.38, 2017) Comparability	Report CO_2 and N_2O emissions from oil refining/storage (1.B.2.a.4) as "NE" and explain in the NIR that the activities occur in Slovakia but emissions were not estimated because the 2006 IPCC Guidelines do not include methodologies to estimate them.	Resolved. The Party reported CO_2 and N_2O emissions from oil refining/storage (1.B.2.a.4) as "NE" and explained in CRF table 9 and page 423 of the NIR that emissions were not estimated because the 2006 IPCC Guidelines do not include methodologies to estimate them.
E.20	1.B.2.a Oil – liquid fuels – CO_2, CH_4 (E.38, 2017) Comparability	Report CO_2 and CH_4 emissions from distribution of oil products (1.B.2.a.5) as "NE" and explain in the NIR that the activities occur in Slovakia but emissions were not estimated because the 2006 IPCC Guidelines do not include methodologies to estimate them.	Not resolved. The Party reported CO_2 and CH_4 emissions from distribution of oil products (1.B.2.a.5) as "NO" although the activity occurs in Slovakia. During the review, the Party explained that there was an error in the CRF table and indicated its plans to correct it.
E.21	1.B.2.b Natural gas – – gaseous fuels – CH_4 (E.20, 2017) (E.31, 2016) (E.31, 2015) Accuracy	Move to a higher-tier approach in accordance with the decision tree in the 2006 IPCC Guidelines (vol. 2, figure 4.2.1).	Addressing. The Party continued to use a tier 1 approach even though CH_4 emissions from this category were identified as key. The Party compared the emission estimates calculated using a tier 1 method with those calculated using a country-specific approach, and reported the results in chapter 3.5.3 of the NIR. The emission estimates using the country-specific method for 2003–2008 were much lower than those using tier 1 and the trend thereafter had high inter-annual fluctuations which did not correspond to the trend of AD. The Party also explained that there are large uncertainties in the country-specific method because of uncertainties in the measured data, and that there is a lack of available data before 2003. Based on this analysis, the Party decided to continue to use the tier 1 method in this submission. During the review, the Party explained that possible future improvements include an implementation of new methodologies in the *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse*

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			Gas Inventories and the preparation of a new methodology for measuring fugitive emissions from the oil and gas industry. See also ID# E.27 in table 6.
IPPU			
I.1	2.A Mineral industry – CO_2 (I.2, 2017) Convention reporting adherence	Correct the errors identified in the reporting for CO_2 emissions from lime (for 2015, reported as 638 kt but also as 648 kt in 2017 NIR chapter 4.6.3.2) and for magnesium carbonate used (for 2014, 2017 NIR table 4.15 reported 4.33 kt instead of 8.33 kt).	Resolved. The amount of magnesium carbonate used in 2014 reported in NIR table 4.12 has been corrected to 8.33 kt. The numerical values for CO_2 emissions from lime production obtained using the Monte Carlo simulation are no longer presented. The CO_2 emissions from lime presented in table 4.9 for 2015 (534.30 kt CO_2) are the same as the values in CRF table 2(I).A-Hs1.
I.2	2.B.1 Ammonia production – CO_2 (I.4, 2017) Accuracy	Revise the AD and emissions and removals associated with urea production and use and explain in the NIR the reasons for the difference between the CO_2 recovered in category 2.B.1 ammonia production (recovered for urea production) and CO_2 emissions from urea use reported in categories 2.D.3 and 3.H.	Resolved. The AD and emissions and removals associated with urea production and use have not been revised, but the Party included information in the NIR that confirmed that the CO_2 recovery had not been overestimated. Specifically, the Party provided information regarding the difference between the CO_2 recovered in ammonia production reported in category 2.B.1 and CO_2 emissions from urea use reported in categories 2.D.3 and 3.H (NIR, chap. 4.4). See ID# I.3 below.
I.3	2.B.1 Ammonia production – CO_2 (I.4, 2017) Transparency	Include information in the NIR on the import-export-production-use balance of urea.	Addressing. Some information regarding the import-export-production-use balance of urea for 2017 has been provided (NIR, chap. 4.4), but this does not include all import and export data, and includes only the balance for one year rather than the whole time series. The ERT noted that the information in the NIR was not sufficiently transparent to conclude whether all CO_2 emissions from urea use were included in the inventory. During the review, Slovakia provided additional information regarding the import and export of mixtures of urea and ammonium nitrate in aqueous or ammoniacal solution to account for the remaining recovered CO_2 in urea, which is subtracted from the emission estimates under category 2.B.1. The ERT concluded that this information verified that the emissions had not been underestimated.
I.4	2.B.8 Petrochemical and carbon black production – CO_2 (I.5, 2017) Transparency	Provide in the NIR more information on the origin of input and output carbon flows of the ethylene process to ensure consistency with the energy balances in the energy sector and the correct allocation of feedstocks in CRF table 1.A(d).	Resolved. More information on the origin of input and output carbon flows of the ethylene process has been provided in chapter 4.8.9.1.
I.5	2.B.8 Petrochemical and carbon black production – CO_2 (I.6, 2017) Transparency	Explain the meaning of the amounts of ethylene dichloride production reported in the NIR by clarifying that there is only one producer of ethylene dichloride and vinyl chloride monomer in the country and that negative values for the production indicate that the	Resolved. An explanation for the reported negative value of ethylene dichloride production in NIR table 4.23 has been provided in chapter 4.8.10.2.

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		plant needed to add ethylene dichloride not produced at the plant.	
I.6	2.B.10 Other (chemical industry) – CO_2 (I.7, 2017) Transparency	Justify the inter-annual variability of the CO_2 IEF for hydrogen production by explaining that the only hydrogen production plant in the country was revamped in 2010, which resulted in a higher IEF in 2010, and that the IEF fluctuates because CO_2 emissions from the CO (from the hydrogen production) combusted with the unsold hydrogen are reported under this category.	Resolved. The justification for the inter-annual variability of the CO_2 IEF for hydrogen production has been included in chapter 4.8.11.2 of the NIR. The Party explained that it was caused by the 2010 revamp of the hydrogen production plant and the inclusion of CO_2 emissions from CO combusted with unsold hydrogen.
I.7	2.C.2 Ferroalloys production – CO_2 (I.8, 2017) Transparency	Remove the reference to subscripts when explaining the formula used for estimating uncertainties for this category.	Resolved. Chapter 4.9.2.2 of the NIR no longer includes a reference to subscripts.
I.8	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2 (I.9, 2017) Transparency	Report the AD used in the estimation of CO_2 emissions from urea used in catalytic converters (i.e. equal to 5 – 7 per cent of fuel consumption for EURO 5 and 3 – 4 per cent for EURO 6 diesel oil passenger and heavy-duty vehicles) and explain in the NIR how those CO_2 emissions are estimated.	Addressing. The Party did not report the AD used. It explained in chapter 3.2.7.1 of the NIR that the COPERT model is used to estimate CO_2 emissions from urea used in catalytic converters and that the default values in the COPERT model are used. The ERT noted that the COPERT default values correspond to the default values in the *EMEP/EEA Air Pollutant Emission Inventory Guidebook 2016* referred to in the previous review report. During the review, Slovakia explained that it is not possible to extract the amount of urea used (AD) in road transportation owing to the technical characterization of the COPERT model, by which these emissions are calculated automatically from diesel oil consumption. The Party reported AD as "NA" for 2010–2017 in CRF table 2(I).A-Hs2. The ERT considers that "NE" would be a more appropriate notation key, should the Party continue to be unable to report the AD in the next submission.
I.9	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2 (I.10, 2017) Transparency	Explain that no large combustion plants use urea-based treatments to comply with NO_X limits and that the Party is monitoring annually this potential use.	Resolved. The Party explained in chapter 4.10.3 of the NIR that large combustion plants did not use urea-based treatments prior to 2016 and that annual questionnaires have identified that seven plants used DeNOx technologies from 2016, with four of them using urea. Emissions from these plants are accounted for in the inventory.
I.10	2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.11, 2017) Transparency	Increase the transparency of the reporting of AD and emissions for categories 2.F.1 and 2.F.3 by explaining in the NIR that exports of filled products are considered in the calculations but this information cannot be included in the CRF tables.	Resolved. The Party explained in chapter 4.12.9.1 of the NIR that exports of filled products are considered in the calculations but this information cannot be included in the CRF tables.
I.11	2.F Product uses as substitutes for ozone-depleting substances –	Improve the explanation of the methodology applied to estimate emissions and stocks for categories	Addressing. Chapter 4.12.12.1 of the NIR provides the equations used to estimate emissions and stocks, but the explanation has

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	HFCs (I.13, 2017) Transparency	2.F.4 (especially for 2000 onward) and 2.F.5 (especially for 1997–2006) for example by providing a numerical example clarifying the applied approach and applied lifetime factor.	not been improved. The ERT considers that the provision of a numerical example, as suggested by the previous ERT, would further clarify the approach used.
I.12	2.F.3 Fire protection – HFCs (I.12, 2017) Accuracy	Correct the emission estimation for HFC-134a stocks for 1995 and revise the time series for HFC-134a for 1995 onward and explain the recalculation.	Resolved. The Party revised the time series for HFC-134a and described in chapter 4.11.7 of the 2018 NIR (p.208) the recalculation.
Agriculture			
A.1	3. General (agriculture) – CH_4 and N_2O (A.4, 2017) Transparency	Explain in detail in the NIR the cattle subcategories used in the estimations and the source of the population data and the methodologies used to estimate the emissions from each subcategory.	Resolved. The NIR is now clear regarding the subcategories used for cattle. A complete time series of the livestock numbers at the regional level was provided by the Statistical Office of the Slovak Republic for 2017, as explained in chapter 5.7.2 of the NIR. AD for the cattle population were revised by Slovakia and simplified by the use of a single data source for cattle. Because of regionalization changes, Slovakia reallocated the data for 1990–1996 into current regions. Methodologies and parameters used are presented by subcategory (e.g. in tables 5.17 and 5.18).
A.2	3. General (agriculture) – CH_4 and N_2O (A.5, 2017) Transparency	Explain in the NIR how the swine population was estimated for 1990–2005, including procedures for gap filling using extrapolation.	Resolved. It is explained in NIR chapter 5.7.2 that the swine population figures were revised in the 2017 submission. The Statistical Office of the Slovak Republic provided a complete time series with official data, consistent with Eurostat and FAOSTAT. It is also explained in the NIR that for gap filling, linear extrapolation was applied and reallocation made for 1990–1996 because of regionalization changes.
A.3	3.A.1 Cattle – CH_4 (A.6, 2017) Transparency	Correct NIR table 5.22 to show the correct CH_4 emissions from dairy cattle for the entire time series and ensure that NIR tables 5.18 and 5.22 show consistent values for CH_4 emissions.	Resolved. The tables have been changed and there is no longer any inconsistency as there is just one table in the NIR, table 5.20, for the enteric fermentation emissions from dairy cattle.
A.4	3.B.2 Sheep – CH_4 (A.7, 2017) Convention reporting adherence	Report the correct value for VS daily excretion for other mature sheep in CRF table 3.B(a), ensuring the consistency of this value with the value reported in the NIR.	Resolved. The correct value for VS daily excretion is now reported in CRF table 3.B(a) for other mature sheep. The value is consistent with the value in NIR table 5.27.
A.5	3.B.3 Swine – CH_4 (A.8, 2017) Accuracy	Estimate CH_4 emissions from manure management for swine using a tier 2 methodology, including a country-specific EF in accordance with the 2006 IPCC Guidelines, and, until this recommendation can be implemented, give details in the NIR of the national circumstances that explain why the Party was unable to implement this recommendation.	Resolved. It is explained in chapter 5.8.1 of the NIR that Slovakia implemented a tier 2 methodology for swine on the basis of IPCC principles and included specific elements from scientific literature. However, the ERT considers that the method could be improved (see ID# A.13 in table 5).

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
A.6	3.D.a.2.b Sewage sludge applied to soils – N_2O (A.9, 2017) Completeness	Estimate and report N_2O emissions for 1990–2009 (the ERT noted that the 2006 IPCC Guidelines provide several techniques for completing the time series of AD).	Resolved. Slovakia has estimated and reported N_2O emissions from sewage sludge application on agricultural lands for the entire time series (i.e. including 1990–2009). Sewage sludge application is based on the data provided by the Water Research Institute (NIR, chap. 5.12.3.2). Data are not available for the years prior to 2010 and the missing data were extrapolated by the inventory experts.
A.7	3.D.a.2.b Sewage sludge applied to soils – N_2O (A.9, 2017) Transparency	Explain that the AD and N_2O emissions for 2015 were reported as "NO" because no sewage sludge was applied to soils in that year.	Resolved. Slovakia confirmed that sewage sludge has not been applied since 2015 and therefore notation key "NO" is used (NIR, chap. 5.12.3.2).
A.8	3.D.a.2.b Sewage sludge applied to soils – N_2O (A.9, 2017) Transparency	Report consistently information on the amount of sewage sludge applied to soils for the agriculture and waste sectors, correcting the information for the waste sector in the NIR that there was 9,819 t sludge applied to soils in 2015.	Resolved. Reporting of sewage sludge is now consistent between the agriculture and the waste sector. "NO" is reported for both sectors for 2015 and values are consistent for the preceding years for which statistical information is available (tables 5.48 (agriculture sector) and 7.19 (waste sector)).
A.9	3.D.a.2.c Other organic fertilizers applied to soils – N_2O (A.10, 2017) Completeness	Estimate and report N_2O emissions from other organic fertilizers applied to soils.	Resolved. Slovakia estimated and reported emissions from compost applied to agricultural soils in CRF table 3.D. It is explained in chapter 5.12.4.2 of the NIR that compost consumption is based on data provided by a national institute (Central Control and Testing Institute in Agriculture). According to this data source, compost was not applied in 2012 and 2014, and therefore emissions from other organic fertilizers are reported as "NO" for these years. Before 2005, compost was applied to soil, but there are no available statistics for this period. Missing data were extrapolated by the inventory experts.
A.10	3.D.a.4 Crop residues – N_2O (A.11, 2017) Transparency	Clearly report, and explain in the NIR the differences between total agriculture land, land for crop cultivation and land for N-fixing crops.	Resolved. The methodology for crop residues was modified and the NIR no longer mentions the categories of land for crop cultivation and land for N-fixing crops. Only the harvested area for crops is presented in NIR table 5.51.
A.11	3.D.a.4 Crop residues – N_2O (A.11, 2017) Transparency	Correct the values reported for N_2O emissions in the NIR by indicating that the values in NIR table 5.50 are in t (not in kg) and that N_2O emissions from total crop residues reported in the last column in NIR 2017 table 5.51 are only from N-fixing crops.	Resolved. The methodology for crop residues was modified (see ID# A.10 above). Table 5.51 in the 2019 NIR presents input parameters and EFs for the category crop residues and the units of measurement are correct. Table 5.51 in the 2017 NIR (input parameters and EFs for N-fixing crops) is not included in the 2019 NIR.
A.12	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N_2O (A.12, 2017) Transparency	Estimate and report N_2O emissions from cultivation of organic soils, or, if the Party considers them insignificant, report them as "NE" and justify that the likely level of emissions is below the threshold indicated in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Addressing. Slovakia reported the emissions as "NE". The NIR (chap. 5.12.8) indicated that an estimate of the histosols area was built from several databases giving a constant value of 2,303 ha histosols, and that it was concluded that the emissions are below the threshold of significance referred to in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines for all years. The NIR did not include the calculation of the likely level of emissions

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			based on the area, but that calculation was provided during the review, verifying that the emissions level is under the threshold of significance. The ERT further noted that CRF table 9 does not contain an explanation for the use of notation key "NE". See also ID# G.2 above.
LULUCF			
L.1	4. General (LULUCF) – CO_2 (L.1, 2017) (L.1, 2016) (L.1, 2015) (66, 2014) (44, 2013) Accuracy	Continue the ongoing technical research in order to provide reliable data for estimating CSC in living biomass, dead organic matter and soil organic matter.	Addressing. Progress since the 2017 submission is described in chapter 6.2 of the NIR. In addition, it is indicated in chapter 6.4 that research to provide reliable data for estimating CSC in living biomass, dead organic matter and soil organic matter is a long-term process and the results of the related research will be implemented in future submissions.
L.2	4. General (LULUCF) – CO_2 (L.10, 2017) Convention reporting adherence	When using default uncertainty values for parameters, use default values from the 2006 IPCC Guidelines and not from the IPCC good practice guidance for LULUCF, and reference the source of those values.	Addressing. The work to improve the uncertainty estimates is ongoing. Information is included in the NIR (chap. 6.5 and annex 3).
L.3	4.A.1 Forest land remaining forest land – CO_2 (L.11, 2017) Accuracy	Apply different root-to-shoot ratios for different species and according to above-ground biomass (t dm/ha) instead of using only one value for all species.	Resolved. Information on the application of different root-to-shoot ratios for different species is included in chapter 6.6.1.1 of the NIR.
L.4	4.A.1 Forest land remaining forest land – CO_2 (L.11, 2017) Accuracy	If using default values from the 2006 IPCC Guidelines, use the middle of the range values for the carbon fraction of above-ground forest biomass (all, broadleaves and conifers) (vol. 4, chap. 4, table 4.3), or justify why the Party used values from the range but not the middle thereof.	Resolved. Middle-range values for above-ground biomass for both conifers and broadleaves are used and related information is included in chapter 6.6.1.1 of the NIR.
L.5	4.B.1 Cropland remaining cropland – CO_2 (L.7, 2017) (L.10, 2016) (L.10, 2015) (75, 2014) Accuracy	Estimate and report the CSCs by disaggregating this category into annual cropland converted to perennial woody cropland and perennial woody cropland converted to annual cropland.	Resolved. CSCs were estimated for the subcategories annual cropland converted to perennial cropland and perennial cropland converted to annual cropland, and reported in CRF table 4.B. The methodologies are described in chapter 6.7 of the NIR.
L.6	4.B.1 Cropland remaining cropland – CO_2 (L.12, 2017) Completeness	Report the area and associated stock changes of carbon in organic soils for cropland in CRF table 4.B, replacing the "NO" currently reported.	Addressing. Slovakia continues to report "NO" for both area and associated stock changes. However, the Party investigated the occurrence of organic soils in cropland and is consequently considering moving the relatively small area of organic soils (3,057 ha peatland, as per the information provided during the review) to wetlands, since it is not managed, but mostly included under protected areas.
L.7	4.C.2.2 Cropland converted to grassland – CO_2 (L.9, 2017) (L.3,	Use default carbon stock values before conversion not only for the annual crops but also for the perennial woody crops, in	Resolved. The current estimates used default carbon stock values before conversion not only for the annual crops but also for the perennial woody crops. Nevertheless, the Party indicated

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	2016) (L.3, 2015) (68, 2014) (60, 2013) Accuracy	accordance with the 2006 IPCC Guidelines, for carbon stocks in a range of climate regions for generic perennial woody cropland and considering the area converted from annual crops and perennial woody crops, respectively.	in chapter 6.8.2 of the NIR that conversion from perennial cropland to grassland does not currently occur (only conversion from perennial to annual cropland and vice versa occurs).
L.8	4(V) Biomass burning – CO_2 and CH_4 (L.13, 2017) Transparency	Do not include the mass available for combustion and the combustion factor as separate parameters (19.8 t dm/ha and a combustion factor of 1, as reported in the NIR) to use in equation 2.27 (2006 IPCC Guidelines, vol. 4, chap. 2, table 2.4) but include the value of their product (obtained from the 2006 IPCC Guidelines, vol. 4, chap. 2, table 2.4).	Resolved. The Party presented in chapter 6.6.4 of the NIR the estimation method for wildfires using values obtained from the 2006 IPCC Guidelines (equation 2.27 and table 2.4).
L.9	4(V) Biomass burning – CO_2 and CH_4 (L.14, 2017) Transparency	Explain the use of the default IPCC value for the available mass of fuel for combustion (19.8 t dm/ha) in forest land remaining forest land to estimate emissions from forest wildfires instead of using the available country-specific regional data.	Resolved. As reported in chapter 6.6.2 of the NIR, Slovakia used the country-specific average stock per hectare (248 m^3/ha in 2017) and the reported burned area (292.8 ha in 2017) to estimate emissions from biomass burning in forest land.
L.10	4(V) Biomass burning – CO_2 (L.15, 2017) Transparency	Report CO_2 emissions from controlled burning in forest land remaining forest land consistently in NIR table 6.8 and in CRF table 4(V).	Resolved. CO_2 emissions from controlled burning in forest land remaining forest land were reported as "IE" in both NIR table 6.9 and CRF table 4(V). Information on the estimation method is included in chapter 6.6.2 of the NIR.
Waste			
W.1	5.A Solid waste disposal on land – CH_4 (W.4, 2017) Transparency	Improve the description in the NIR of the mass flows for the different waste types, from generation to the different treatment options, including recycling and landfilling.	Resolved. Slovakia provided overview information on the waste types generated and mass flows for the different waste types in 2017 in NIR table 7.3.
W.2	5.A.1 Managed waste disposal sites – CH_4 (W.5, 2017) Transparency	Explain in detail the methodology used to estimate emissions from non-MSW in managed waste disposal sites, in particular for the period 1995–2014.	Resolved. Slovakia used the waste model from the 2006 IPCC Guidelines, using default parameters and country-specific AD, as explained in chapter 7.5.2 of the NIR.
W.3	5.A.1.a Anaerobic – CH_4 (W.6, 2017) Completeness	Estimate and report CH_4 emissions from anaerobic managed waste disposal sites for 1990–1994 and explain any recalculations in the NIR.	Resolved. CH_4 emissions from anaerobic managed waste disposal sites continue to be reported as "NO" for 1990–1994. The Party explained in the 2018 NIR, chapter 7.4, that the first managed landfills were constructed in Slovakia in 1993 and waste disposal to these landfills started in 1994. Therefore, CH_4 generation at these landfills is reported from 1995 onwards in accordance with the waste model from the 2006 IPCC Guidelines.
W.4	5.D.2 Industrial wastewater – N_2O (W.7, 2017) Transparency	Report on the progress of the planned improvements reported in the NIR (chap. 7.4), including what type of data validation and evaluation of databases is planned.	Resolved. The 2017 NIR included a planned improvement stating that the estimation of N_2O emissions from discharged industrial wastewater requires further research, validation of AD and evaluation of Slovak Hydrometeorological

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			Institute databases on wastewater to assess the possibility for including direct emissions from industrial wastewater. The Party explained in the 2018 NIR (p.374) that the Slovak Hydrometeorological Institute collects data on wastewater treatment by individual plant and records the type of treatment. The Party also identified an error in the calculation of N_2O emissions from industrial wastewater and carried out a recalculation in the 2018 submission. The 2018 and 2019 NIRs no longer include the planned improvement mentioned in the 2017 NIR. The ERT noted that there is no method in the 2006 IPCC Guidelines for calculating direct N_2O emissions from industrial wastewater.
KP-LULUCF activities			
KL.1	General (KP-LULUCF activities) – CO_2 (KL.5, 2017) Accuracy	Justify the EFs used to estimate gains and losses for the above-ground biomass carbon pool for AR being lower than the EFs used for FM, by, for example, explaining the Party's analysis of the NIRs or comparison of the yield tables of other Parties.	Resolved. The Party provided adequate information in chapter 11.3.1.1 of the NIR, which, together with additional explanations provided during the review, was sufficient to justify the EFs used for AR being lower than those used for FM activities, namely the lower growth figures characterizing the young AR stands, regardless of the AD used. See also ID# KL.10 in table 6.
KL.2	General (KP-LULUCF activities) – CO_2, CH_4 and N_2O (KL.6, 2017) Transparency	Enhance the information reported in the NIR related to obtaining land-use maps and land-transition maps for KP-LULUCF and LULUCF and demonstrate how the two systems are consistent.	Resolved. The Party provided comprehensive information on the methodology used to develop land-use maps and a transition matrix in chapter 11.2 of the NIR, including information on how method 1 and approaches 2 and 3 have been applied to obtain both land-use maps and a land-transition matrix.
KL.3	Deforestation – CO_2 (KL.8, 2017) Accuracy	Demonstrate that deforestation occurs only in forests with more than 150 t dm/ha to demonstrate that the root-to-shoot ratio for coniferous (0.20) and broadleaves (0.24) used in the estimates of below-ground biomass stocks before conversion are in accordance with the 2006 IPCC Guidelines or use country-specific ratios.	Resolved. Slovakia explained in chapter 11.3.1.1 of the NIR and during the review that the average figures on growing stock available for eight regions of the country, varying from 132 to 183 t dm/ha for conifers and from 153 to 194 t dm/ha for broadleaves, stratified at the regional level, and in connection with the default root-to-shoot ratios for forest with more than 150 t dm/ha, have been used to estimate biomass losses from deforestation. The ERT considers that this approach of using regional growing stock values and average root-to-shoot values is appropriate to conservatively estimate biomass losses from deforestation.
KL.4	FM – general (KL.1, 2017) (KL.6, 2016) (KL.6, 2015) Transparency	Make the improvements required to ensure methodological consistency between the FMRL and the reporting of emissions and removals from FM, particularly in the methodological approach used to estimate the contribution of HWP, including the application of a technical correction to the FMRL.	Addressing. Slovakia calculated a technical correction of the FMRL and included information on it in chapter 11.5.2.3 of the NIR and CRF table 4(KP-I)B.1.1 (i.e. an addition to the original FMRL –1,084 kt CO_2 eq/year of a removal figure of –1,164 kt CO_2 eq/year). However, chapter 11.5.2.3 of the NIR did not include information on the methodological approach used to estimate the contribution of HWP. During the review, Slovakia provided a further explanation regarding the methodological framework used in the FMRL

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			calculation and that used to report emissions and removals in the 2018 submission, including information on HWP. See also ID# KL.5 below.
KL.5	FM – CO_2 (KL.9, 2017) Accuracy	Explain the main factors responsible for the reporting of a greater sink during the commitment period compared with the FMRL, with the aim of showing that the accounting quantity can be explained by deviations in policy assumptions compared with those included in the FMRL, rather than differences in the factors/parameters, including increments, used in the FMRL and in the actual estimates of emissions and removals, as requested in the *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*.	Addressing. During the review, the Party explained that the value of the FMRL for Slovakia was calculated by JRC using the European Forest Information Scenario model and the Global Forest Model. Slovakia calculated and reported a technical correction of the FMRL due to the recalculation of emissions in the reference period, using the tool provided by JRC, to ensure methodological consistency. Slovakia further explained that the final technical correction of the FMRL may be recalculated by JRC. As explained by Slovakia, the significant difference between the FMRL and the reported sink in FM is attributable to the fact that Slovakia's FMRL was constructed using the area defined as forest land remaining forest land under the Convention as a proxy for the smaller area under FM, as Slovakia did not elect FM for the first commitment period of the Kyoto Protocol. The Party also acknowledged that changes to the estimation methodology based on the significant improvements already made imply iterative technical corrections to the FMRL. The ERT considers that there is not sufficient information in the NIR to demonstrate that the reference area for FM estimates is the same as the one used for the original FMRL and technical corrections thereof and to demonstrate that the differences between the two are attributable to changes in management practices and/or policies, rather than differences in the factors/parameters used in calculations.
KL.6	FM – CO_2, CH_4 and N_2O (KL.10, 2017) Accuracy	Report the correct FM cap (20,796.023 kt CO_2 eq) in the CRF accounting table.	Not resolved. The value included in the CRF accounting table is 20,707.142 kt CO_2 eq.
KL.7	Biomass burning – CH_4 and N_2O (KL.11, 2017) Transparency	Explain the use of the default IPCC value for the available mass of fuel for combustion (19.8 t dm/ha) in AR and FM to estimate emissions from forest wildfires instead of using the available country-specific regional data.	Resolved. Slovakia revised the methodology by using the average national growing stock to estimate emissions from forest wildfires. Relevant information is included in chapters 6.6.2 and 11.4.4 of the NIR (see ID# L.9 above).

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

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

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

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

Table 4
Issues and/or problems identified in three successive reviews and not addressed by Slovakia

ID#	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed* [a]
General	No issues identified	
Energy		
E.21	Move to a higher-tier approach in accordance with the decision tree in the 2006 IPCC Guidelines (vol. 2, figure 4.2.1)	3 (2015/2016–2019)
IPPU	No issues identified	
Agriculture	No issues identified	
LULUCF		
L.1	Continue the ongoing technical research in order to provide reliable data for estimating CSC in living biomass, dead organic matter and soil organic matter	5 (2013–2019)
Waste	No issues identified	
KP-LULUCF activities	No issues identified	

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

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

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

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

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
Energy			
E.22	1. General (energy sector)	Recalculations were made to the energy sector that changed the emission/removal estimate for a category by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with these recalculations.	Not an issue/problem
IPPU			
I.13	2.A.2 Lime production – CO_2	Recalculations were made to category 2.A.2 lime production in the 2018 submission that decreased the emissions in 2015 by 17.6 per cent. Slovakia provided a transparent explanation for this recalculation in annex 4.1 to the 2018 NIR, stating that CO_2 emissions are biogenic for the paper and pulp industry's kraft chemical recovery process and therefore are not included in the emission estimates for this category. The ERT noted that the CO_2 emissions and the AD for lime production were recalculated to exclude this activity. The information on biogenic emissions from the kraft chemical recovery process was not included in the 2019 NIR. Furthermore, the 2019 NIR (chap. 4.7.3.2) states that "Lime produced by sugar and pulp and paper producers is included in inventory as 'others'." The ERT recommends that Slovakia improve the transparency of chapter 4.7.3 of the NIR by explaining that CO_2 emissions from lime production by the pulp and paper industry are not estimated because of the use of the kraft chemical recovery process, which results in biogenic CO_2 emissions originating from biomass input. The ERT also recommends that the Party revise NIR chapter 4.7.3.2 to exclude references to lime production in the pulp and paper industry.	Yes. Transparency
I.14	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2	Recalculations were made to category 2.D.3 other – solvent use (non-energy products from fuels and solvent use), which resulted in a 78.6 per cent increase in the CO_2 emissions reported for 2015 in the 2019 submission compared to the 2018 submission. Slovakia provided a transparent explanation of the updated methodology in chapter 4.10.3.1 of the NIR. During the review, Slovakia explained that the indirect CO_2 emissions were calculated based on the CLRTAP submission 2019_SK_CLRTAP_NECD_v2 (available at https://cdr.eionet.europa.eu/sk/un/clrtap/inventories/envxiurpa/) and that QA/QC of the CLRTAP inventory was ongoing at the time of the preparation of the GHG inventory. However, the ERT noted inconsistencies between the CLRTAP submission and the NIR. For example, NMVOC emissions from coating application are reported as 11.08 kt for 2017 in annex I to the CLRTAP submission, but reported as 22.66 kt for 2017 in NIR table 4.44, which was used to calculate indirect CO_2 emissions. The ERT noted that the use of the earlier version of the CLRTAP inventory led to an overestimation of CO_2 emissions (see ID# I.15 in table 6). The ERT recommends that Slovakia recalculate the CO_2 emissions reported in category 2.D.3 other – solvent use by using the most recent information on NMVOC emissions as AD. The ERT further recommends that the Party undertake QA/QC activities to ensure the accuracy of the indirect CO_2 emissions from category 2.D.3, in particular regarding the consistency of the underlying NMVOC emissions with the relevant CLRTAP submission.	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
Agriculture			
A.13	3.B.3 Swine – CH_4	Slovakia conducted a recalculation for CH_4 emissions from manure management of swine between the 2018 and 2019 submissions. According to NIR table 5.9 and the values presented in CRF table 3.B(a)s1, the total change was a decrease of 35.4 per cent in the values reported for 2016 (from 4.02 to 2.60 kt CH_4). This recalculation was essentially due to the revised estimate of VS excretion for swine, which is calculated based on the estimate of GE. In the 2019 submission, for 2017, Slovakia reported the following average values for swine: GE = 38.08 MJ/head/day (CRF table 3.As2) and VS = 0.415 kg dm/head/day (CRF table 3.B(a)s1). The ERT considers that these average values are rather high compared with those of other Annex I Parties but still remain in a reasonable range of magnitude. However, the NIR also presents in table 5.33 values of VS excretion by detailed swine category (sows, fattening animals <20 kg, 20–50 kg, 50–80 kg, 80–100 kg, >110 kg) and at least some of these values seem to be incorrect. For example, in the Bratislava region VS = 0.37 kg dm/day is reported for sows and VS = 0.42 kg dm/day for piglets under 20 kg. The ERT noted that VS is linked with the weight of animals and it is unlikely that sows have a lower VS excretion rate than piglets under 20 kg; the VS excretion rate from piglets is likely to be much lower. During the review, Slovakia provided calculation spreadsheets in which GE is calculated for several categories of swine. In this document there are estimates of GE for several swine categories based on weight. The ERT considers that these values of GE are logical, because GE is dependent on the weight of animals. The ERT considers that the VS estimates should similarly reflect the weight of animals. The ERT recommends that Slovakia investigate the possibility of elaborating specific VS excretion rates for each subcategory of swine, taking into account the weight of animals. The ERT also recommends that Slovakia revise NIR table 5.33 accordingly, by presenting the revised values of VS excretion for each subcategory.	Yes. Accuracy
A.14	3.B.3 Swine – CH_4	Following a recommendation of the previous review report (see ID# A.8), Slovakia implemented a tier 2 methodology for category 3.B.3. The ERT noted that it is explained in the NIR (p.249) that GE is estimated based on the total demand of metabolized energy and the equation GE = ME/DE (where GE = gross energy intake, ME = metabolizable energy, DE = digestibility of feed). The ERT noted that metabolizable energy is different from digestible energy, and that the explanations related to energies in the NIR lack clarity and are not sufficiently detailed. During the review, Slovakia acknowledged that the proper equation would be GE = DE/DE% (where GE = gross energy intake, DE = digestible energy, DE% = digestibility of feed expressed in % of GE). During the review, Slovakia provided an example of the calculation showing that these calculations were correctly implemented in the inventory. The ERT recommends that Slovakia correct the equation used to calculate GE in its NIR and indicate explicitly the calculation of digestible energy from metabolizable energy.	Yes. Transparency
A.15	3.B.3 Swine – N_2O	Slovakia conducted a recalculation for manure management of swine that resulted in changes in direct and indirect N_2O emissions from category 3.B. According to NIR 2019 table 5.10 and values included in CRF table 3.B(b), the total change for direct N_2O emissions was an increase of 26.4 per cent for manure management of swine compared with the previous submission (from 0.048 to 0.061 kt N_2O for 2016). This recalculation is due to an increase in Nex rate, which is calculated based on GE and crude protein content of the rations. In the 2019 submission, for 2017, Slovakia reported the following average values for swine: GE = 38.08 MJ/head/day (CRF table 3.As2) and Nex rate = 12.52 kg N/head/year (CRF table 3.B(b)). The value for average Nex rate is in agreement with the values	Yes. Accuracy

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		reported by many other Annex I Parties. However, the NIR also presents in table 5.37 Nex rate values by detailed animal category (sows, fattening animals <20 kg, 20–50 kg, 50–80 kg, 80–100 kg, >110 kg) and at least some of these values appear to be incorrect – for example, Nex rate = 11.39 kg N/head/year for fattening pigs above 110 kg and Nex rate = 10.97 kg N/head/year for piglets under 20 kg. During the review, the Party explained that the Nex rate for piglets under 20 kg is related to the crude protein, which was estimated from the ration, and provided the calculation file to the ERT. However, the ERT noted that Nex rate is linked with the weight of animals and it is unlikely that the difference between the Nex rate for piglets under 20 kg and that of fattening pigs above 110 kg would be so small. The ERT considers that the Nex rate for piglets is overestimated. The ERT recommends that Slovakia investigate the possibility of elaborating more accurate Nex rate values for each subcategory of swine in order to increase the accuracy of the estimate. The ERT also recommends that Slovakia revise accordingly NIR table 5.37 using Nex rate values for each subcategory of swine.	
A.16	3.D.a.4 Crop residues – N_2O	Slovakia conducted a recalculation for crop residues in its 2018 annual submission, which resulted in changes in direct and indirect N_2O emissions from category 3.D. The impact of the recalculation was a decrease of 251.41 kt CO_2 eq for 2015, which represents a decrease of 58.2 per cent for the category. During the review, Slovakia provided the calculation spreadsheet for crop residues. The ERT identified the following potential errors in the calculation spreadsheet: (1) wheat, which is one of the main crops in Slovakia, is excluded from the calculation; (2) the calculation of the parameter $AG_{DM(T)}$ (above-ground residue dry matter) is not in line with the equation provided in the 2006 IPCC Guidelines, volume 4, table 11.2, because of an error in the units used; and (3) the implementation of equation 11.7A in the 2006 IPCC Guidelines, volume 4, is not fully correct because of an incorrect use of brackets. This issue was included in the list of potential problems and further questions from the ERT. In response to this list, Slovakia provided revised estimates for crop residues and resubmitted the CRF tables for 1990–2017 taking into account all the above-mentioned required corrections. Moreover, in accordance with further guidance from the ERT, the Party made additional improvements in its methodology: a country-specific value of 20 kg N/ha was used for sugar beet; for maize used for silage, only below-ground residues were considered by applying the value 1 for the parameter $Frac_{REMOVE}$ (fraction of above-ground residues of crop removed); and alfalfa and clover were considered as perennial crops with a four- and three-year rotation, respectively. The total impact of the revised estimates, including on direct and indirect N_2O emissions, was an increase of 121.05 kt CO_2 eq for 2017. The revised estimates were accepted by the ERT. The ERT recommends that Slovakia revise the methodology description in its NIR taking into account the improvements made in response to the list of potential problems and further questions from the ERT, including the use of a country-specific value for sugar beet (20 kg N/ha), consideration of only below-ground residues for maize used for silage, and consideration of alfalfa and clover as perennial crops with a four- and three-year rotation, respectively.	Yes. Transparency
LULUCF			
L.11	4.B.1 Cropland remaining cropland – CO_2	Slovakia carried out recalculations from the 2018 to the 2019 submission, leading to significant changes for cropland remaining cropland, that is, for the base year from –1,199.71 to –1,415.71 kt CO_2 (–18.0 per cent), of which the soil estimates stand out, with a change from –11.42 to 13.88 kt carbon (221.5 per cent). The NIR (p.281) indicates that the recalculations are mainly owing to implementation of a previous recommendation (see ID# L.5 in	Yes. Convention reporting adherence

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		table 3). The ERT noted that recalculations for cropland remaining cropland were also carried out in the 2018 submission, resulting in, for example, a change of –25.6 per cent for the base year and –23.2 per cent in the 2015 values from the 2017 submission. During the review, Slovakia explained that recalculations were connected to the disaggregation into annual and perennial cropland (see ID# L.5 in table 3). Information on the recalculation is included in the 2018 NIR, chapters 6.3, 6.4 and 6.7.1 and table 10.3. The Party explained during the review that owing to technical issues with the CRF Reporter software, full implementation of this methodological change was done only in the 2019 submission. However, the ERT considered that this was not transparently reflected in the 2019 NIR. The ERT recommends that the Party improve the QC procedures to ensure that the recalculations are correctly reflected in the NIR.	
Waste			
W.5	5. General (waste) – CH_4 and N_2O	The ERT noted several errors in the description of recalculations in the NIR: (a) The impact of recalculations on CH_4 emissions from MSW disposal was reported in NIR table 7.10 as an increase of 219.9 per cent for 2016 compared with the previous submissions. According to CRF table 8s3, the recalculation of CH_4 emissions for solid waste disposal increased emissions from 972.15 to 1137.20 kt CO_2 eq, that is, by 17.0 per cent. During the review, Slovakia explained that it had not updated table 7.10 for its 2019 NIR and provided the corrected table 7.10, accompanied by an explanation of the impact of the recalculation; (b) According to CRF table 8s3, as a result of a recalculation, N_2O emissions from incineration and open burning of waste increased by 247.2 per cent, but according to chapter 7.7.1 of the NIR, no recalculation was carried out for the category. During the review, the Party explained that an error had been corrected for 2016; (c) On page 367 of the NIR, regarding N_2O emissions from wastewater treatment and discharge, it was reported both that no recalculations were carried out and that a recalculation was carried out in response to revised protein consumption. During the review, the Party explained that the recalculation in response to revised protein consumption was carried out because updated AD for 2015 and 2016 had become available. The ERT recommends that Slovakia improve the QC procedures to ensure that the waste sector recalculations are correctly reflected in the NIR.	Yes. Convention reporting adherence
KP-LULUCF activities			
KL.8	General (KP-LULUCF activities)	Recalculations made to KP-LULUCF activities changed the emission/removal estimate for a category by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with these recalculations.	Not a problem

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

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

Table 6
Additional findings made during the individual review of the 2019 annual submission of Slovakia

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?[a] If yes, classify by type*
General			
G.5	Methods	The ERT noted that according to chapter 1.2.7 of the NIR, the application of higher-tier methods for key categories is among the improvement priorities for the GHG inventory. The ERT further noted that according to CRF summary table 3, a tier 1 method has been used for a few key categories in the energy, agriculture and LULUCF sectors (e.g. ID# L.14). During the review, Slovakia clarified that the reasons for using a tier 1 method for the estimation of fugitive emissions in the energy sector were explained in chapter 3.5.3 of the NIR (see also ID# E.21 in table 3 and ID# E.27 below). Slovakia also explained the progress regarding moving to a higher-tier method for CH_4 from category 1.A.4 (see ID# E.17 in table 3). The Party further clarified that even though tier 1 is used for agricultural soils, some country-specific parameters have been developed and are being used and that a tier 2 method has recently been developed and is being used for manure management for some livestock categories (see ID# A.13 in table 5). Furthermore, the Party informed the ERT about an ongoing methodology improvement in the LULUCF sector, in particular the revision of the methodology for the cropland category. Slovakia further indicated that the information on the estimation method of CSC for land converted to cropland and for land converted to grassland in table 6.3 of the NIR needs to be corrected because higher-tier methods have already been applied for these categories in the 2019 annual submission. The ERT recommends that Slovakia reconcile the information contained in CRF table summary 3 and table 6.3 of the NIR to reflect the methodology improvements that have been introduced. The ERT also recommends that for those key categories in the agriculture and LULUCF sectors where a tier 1 method is still being applied and the respective decision trees in the 2006 IPCC Guidelines indicate the use of a higher-tier method, the Party either move to higher-tier methods or explain the reasons for the use of tier 1 in line with the provisions of paragraph 11 of the UNFCCC Annex I inventory reporting guidelines.	Yes. Accuracy
G.6	Key category analysis	The ERT noted that Slovakia has undertaken a key category analysis following approaches 1 and 2 of the 2006 IPCC Guidelines and reported on it in the NIR (i.e. in annex I). The ERT further noted that in accordance with paragraphs 39 and 50(d) of the UNFCCC Annex I inventory reporting guidelines, the results of a key category analysis (individual and cumulative percentage contributions from key categories to the national total) should be reported in the NIR using tables 4.2 and 4.3 of the 2006 IPCC Guidelines, while the description of national key categories shall include a summary table with the key categories identified for the latest reporting year (by level and trend). The ERT noted that in annex 1 to the NIR, Slovakia provided the summary table with a description of national key categories following the structure of table 4.4 of the 2006 IPCC Guidelines, while the results of the key category analysis (individual and cumulative percentage contributions from key categories to national total) have not been provided in the NIR. During the review, Slovakia clarified that a key category analysis was performed annually with the use of calculation spreadsheets that follow tables 4.2 and 4.3 of the 2006 IPCC Guidelines, but the results of the analysis were not included in the NIR. The Party further provided the ERT with the calculation spreadsheets. To enhance transparency, the ERT encourages Slovakia to include in the NIR the results of its key category analysis (individual and cumulative percentage contributions from key categories to national total) using tables 4.2 and 4.3 of	Not an issue/problem

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a] If yes, classify by type
		the 2006 IPCC Guidelines in accordance with paragraphs 39 and 50(d) of the UNFCCC Annex I inventory reporting guidelines.	
G.7	Uncertainty analysis	The ERT noted that Slovakia performed a quantitative uncertainty assessment for the entire inventory following approach 1 of the 2006 IPCC Guidelines. The results were reported in table A3.1 of annex 3 to the NIR. The ERT further noted that in accordance with paragraph 15 of the UNFCCC Annex I inventory reporting guidelines, the quantitative uncertainty assessment is to be performed for at least the base year and the latest inventory year and for the trend between these two years. Furthermore, the ERT noted that the uncertainty assessment should be reported for all source and sink categories. However, it is not clear from NIR table A3.1 whether the quantitative uncertainty assessment was performed for the base year and the latest inventory year. It is also unclear whether the uncertainty analysis was separately made for all categories. During the review, Slovakia confirmed that it annually performs a quantitative uncertainty assessment for the base year and the latest inventory year for all categories (including and excluding the contribution of the LULUCF sector). The Party made uncertainty calculation spreadsheets available to the ERT during the review. The ERT recommends that Slovakia include in the NIR a quantitative uncertainty assessment for the base year and the latest inventory year for all categories as required by paragraph 15 of the UNFCCC Annex I inventory reporting Guidelines. In the view of the ERT, this could best be done by providing the results in the format of table 3.2 of the 2006 IPCC Guidelines.	Yes. Convention reporting adherence
G.8	Uncertainty analysis	The ERT noted that Slovakia performed a quantitative uncertainty assessment (see ID# G.7 above). The ERT also noted that in accordance with paragraph 42 of the UNFCCC Annex I inventory reporting guidelines, the quantitative uncertainty assessment is to be reported in the NIR, together with the methods and underlying assumptions used, for the purpose of prioritizing efforts to improve the accuracy of national inventories and to guide decisions on methodological choice. However, it is not clear from annex 3 to the NIR which methods and underlying assumptions were used in the assessment, and how the outcomes derived were used for effort prioritization, inventory improvement and methodology choice. During the review, Slovakia confirmed that the results of the uncertainty assessment were reflected in the annual improvement plan, where the actions for specific sectors and categories were prioritized based on the level of their importance for the inventory. The Party further clarified that continuous improvement of the inventory methodology for significant categories was carried out on the basis of the outcomes of the uncertainty analysis. The ERT recommends that Slovakia include in the NIR the information on effort prioritization, inventory improvements and methodological choice that it provided during the review, that is, that the results of the uncertainty assessment are reflected in the annual improvement plan, where the actions for specific sectors and categories are prioritized based on the level of their importance for the inventory, and that continuous improvement of the inventory methodology for significant categories are carried out on the basis of the outcomes of the uncertainty analysis. The ERT also recommends that Slovakia provide the description of underlying assumptions used for the estimation of uncertainties in line with paragraph 42 of the UNFCCC Annex I inventory reporting guidelines.	Yes. Transparency
G.9	Article 3, paragraph 14, of	The ERT noted that Slovakia provided information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, in its annual submission in accordance with paragraphs 23 and 24 of	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?[a] If yes, classify by type*
	the Kyoto Protocol	the annex to decision 15/CMP.1. The ERT also noted that in accordance with paragraph 25 of the same annex, Parties included in Annex I should include information on any changes that have occurred compared with the information reported in their last submission. However, it was not clear from the NIR what changes have been made since the last (i.e. 2018) submission. During the review, Slovakia clarified that there have been no changes in national fiscal and emission reduction policies with regard to the efforts on minimization of the adverse impacts of climate change in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The Party further confirmed the continuity of its commitments regarding the sustainability of the imported biofuels and the raw materials used in their production. Furthermore, Slovakia informed the ERT that its official development assistance to developing countries is performed through food safety, agriculture, infrastructure, sustainable development and health security projects, where climate change is incorporated as an important cross-sectoral component. Although of limited scale, the climate component is also taken into consideration in the projects on reducing youth unemployment and improving access to quality education and practical skill acquisition that are implemented by Slovakia in developing countries. The ERT recommends that Slovakia report in the NIR, in accordance with paragraph 25 of the annex to decision 15/CMP.1, on the changes in the information provided regarding the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol since its last submission, including, for example, any changes in fiscal and emission reduction policies, maintaining the sustainability of biofuel production and use, and incorporating climate-related issues into its official development assistance to developing countries.	
Energy			
E.23	Comparison with international data – liquid and other fuels – CO_2	The ERT noted differences in apparent consumption between the IEA data and the reference approach in the CRF tables. During the review, the Party explained that this difference occurred because of the discrepancy with the data regarding, for example, import of additives (import of additives is reported to IEA, but not to the UNFCCC) and consumption of jet kerosene (no data are reported for jet kerosene consumption in international aviation in the CRF tables). In addition, the Party explained that improvements to the reporting in the CRF tables are planned to be implemented in future submissions, because the cooperation between the Slovak Hydrometeorological Institute, which prepares the national GHG inventories, and the Statistical Office of the Slovak Republic, which prepares the energy balance tables, has been strengthened and several projects for improving the energy balance are planned or ongoing. The ERT encourages the Party to address the differences in apparent consumption between the reference approach and the IEA data identified for jet kerosene and additives, and if this is not possible, explain the underlying reasons for the differences in the NIR.	Not an issue/problem
E.24	1.A.3.b Road transportation – other liquid fuels – CO_2, CH_4 and N_2O	The information on how the Party reported emissions from combustion of lubricants in two-stroke engines in the CRF tables was not explained in the NIR. The ERT noted that AD and emissions from other liquid fuels were reported as "NO" in CRF table 1.A(a)s3. During the review, the Party provided data on CO_2, CH_4 and N_2O emissions	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?[a] If yes, classify by type*
		from combustion of lubricants in two-stroke engines and explained that the emissions are included in emissions from gasoline in CRF table 1.A(a)s3 as there are only gasoline two-stroke engines in Slovakia. The ERT recommends that the Party report emissions of other liquid fuels under this category as "IE" in CRF table 1.A(a)s3 and provide the explanation in the NIR and CRF table 9 that the emissions from combustion of lubricants in two-stroke engines are included in those of gasoline.	
E.25	1.A.3.d Domestic navigation – gasoline, biomass – CO_2, CH_4 and N_2O	The Party reported CO_2, CH_4 and N_2O emissions from this category as "NE" for gasoline for 1990–2015 and biomass for 2007–2015. It provided the explanation of the reporting of "NE" in CRF table 9 for gasoline and table A2.3 in annex 2 to the NIR for both gasoline and biomass that the estimates were below the thresholds of significance. During the review, the Party provided calculation spreadsheets indicating that it had determined that the emissions of gasoline for 1990–2015 and of biomass for 2007–2015 would be below the significance threshold because the emissions for 2016 and 2017 were well below the threshold. For example, CO_2 emissions from gasoline in 2017 were 0.004 kt CO_2, while the CH_4 and N_2O emissions from biomass and gasoline were even lower. The ERT noted that the provisions in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines regarding exclusion of emissions from categories below the threshold of significance are not applicable when only a part of the time series has not been estimated. The ERT recommends that the Party use expert judgment and/or one of the recalculation techniques included in the 2006 IPCC Guidelines, volume 1, section 5.3.3, to estimate the CO_2, CH_4 and N_2O emissions for gasoline for 1990–2015 and biomass for 2007–2015 and that the Party explain in the NIR the methods used.	Yes. Consistency
E.26	1.A.5.b Mobile – military diesel oil, military gasoline – CO_2, CH_4 and N_2O	The Party reported CO_2, CH_4 and N_2O emissions from this category as "NE" for gasoline (1990–2014), diesel (1990–2014) and biomass (2007–2014) and provided the explanation of the reporting of "NE" in CRF table 9 and table A2.3 in annex 2 to the NIR that the emissions were below the thresholds of significance. During the review, the Party provided calculation spreadsheets indicating that it had determined that the emissions for 1990–2014 would be below the significance threshold because the emissions for 2015–2017 were well below the threshold. For example, CO_2 emissions from military diesel oil in 2017 were 0.008 kt CO_2, while the CO_2 emissions from military gasoline as well as CH_4 and N_2O emissions from military diesel oil, biomass and gasoline were even lower. The ERT noted that the provisions in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines regarding exclusion of emissions from categories below the threshold of significance are not applicable when only a part of the time series has not been estimated. The ERT recommends that the Party use expert judgment and/or one of the recalculation techniques included in the 2006 IPCC Guidelines, volume 1, section 5.3.3, to estimate the emissions of CO_2, CH_4 and N_2O from this category for gasoline (1990–2014), diesel (1990–2014) and biomass (2007–2014) and that the Party explain in the NIR the methods used.	Yes. Consistency
E.27	1.B.2.b Natural gas – CH_4	The ERT noted that as a follow-up to a recommendation included in the previous review report to move to a higher-tier approach in accordance with the decision tree in the 2006 IPCC Guidelines (see ID# E.21 in table 3), Slovakia compared the results of the tier 1 method with a country-specific method consisting of direct and mass-balance measurements and expert judgment based on data provided by three natural gas operators in Slovakia. The ERT noted that Slovakia referred to this method as tier 2 in the NIR (chap. 3.5.3), but the ERT considers that this	Not an issue/problem

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?[a] If yes, classify by type*
		approach is equivalent to a tier 3 method. The ERT also noted that the tier 2 method for natural gas operations entails using the same equations as in tier 1, but with country-specific EFs, as described in the 2006 IPCC Guidelines (vol. 2, p.4.43). The ERT encourages Slovakia, when it is considering the most appropriate method to be used to address ID# E.21, to compare the results of the tier 1, the tier 2 and the country-specific (tier 3) approach, determine the most accurate method and use it in its inventory. The ERT also encourages Slovakia to provide in the NIR the results of this comparison and the rationale for its methodological choice.	
IPPU			
I.15	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2	Slovakia reported indirect CO_2 emissions from NMVOC emissions from solvent use under 2.D.3 other (non-energy products from fuels and solvent use). In chapter 4.10.3.1 of the NIR, Slovakia explained that indirect CO_2 emissions are reported only for NMVOC emissions from coating application, degreasing and dry cleaning. The ERT noted that this accounts for 13.76 kt of 21.69 kt NMVOC in 2017, as reported under 2.D.3 in the 2019 CLRTAP submission. However, because the Party used an earlier version of the CLRTAP inventory (see ID# I.14 in table 5), the NMVOC emissions from coating application, degreasing and dry cleaning (used as AD to calculate indirect CO_2 emissions) accounted for 25.23 kt NMVOC (NIR tables 4.44 and 4.45). During the review, Slovakia explained that the inclusion of the remaining indirect CO_2 emissions is an improvement planned for the next submission. The ERT encourages Slovakia to include all indirect CO_2 emissions from NMVOC emissions under category 2.D.3.	Not an issue/problem
Agriculture			
A.17	3.D.a.4 Crop residues – N_2O	It is mentioned in the NIR (p.267) that no removal of straw was considered in the calculations for crop residues. However, at the same time it is noted in table 5.47 that nitrogen input from straw is included in the estimate of N_2O from animal manure applied to soils (category 3.D.a.2.a). Omitting straw removals from crop residues and including nitrogen input from straw in animal manure applied to soils lead to a potential double counting of N_2O emissions, that is, a potential overestimation of N_2O emissions. The ERT recommends that Slovakia investigate how to consistently report nitrogen input from straw in animal manure applied to soils (currently reported under category 3.D.a.2.a) and straw removals under category 3.D.a.4 crop residues and revise its estimates accordingly.	Yes. Accuracy
A.18	3.G Liming – CO_2	For category 3.G lime application, it is mentioned in the NIR (p.271) that the amount of applied limestone is provided in calcium oxide as a component of limestone, burnt lime, lime sludge and other calcareous products. During the review, the ERT asked the Party whether burnt lime is included in the liming products. Slovakia indicated that most of the liming products were calcareous products (calcium carbonate) and that burnt lime is excluded from liming products for 2014–2017. Slovakia also indicated its intention to check whether burnt lime is excluded from the AD for 1990–2013. The ERT recommends that the Party ensure the consistency of the time series by investigating whether burnt lime is excluded from liming products for 1990–2013, and if this is the case, modify the AD to exclude burnt lime. The ERT	Yes. Consistency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a] If yes, classify by type
		further recommends that Slovakia clarify in the NIR for which years burnt lime is excluded from liming products reported as AD for this category.	
LULUCF			
L.12	4.A.1 Forest land remaining forest land – CO_2	The ERT noted that the Party included average values in the last row of table 6.6 of the NIR, for biomass conversion and expansion factors and root-to-shoot values available per (group of) species and considered that it was not clear whether and how these values were used in the inventory estimates. During the review, Slovakia explained that the average values are given only for informative purposes, while the estimation of biomass gains was based on specific values. The ERT encourages Slovakia to either include the explanation in the NIR that the average values for biomass conversion and expansion factors and root-to-shoot values per (group of) species are for information purposes only or remove the "average" row in NIR table 6.6.	Not an issue/problem
L.13	4.A.1 Forest land remaining forest land – CO_2	The ERT noted that in chapter 6.6 of the NIR the information on harvested timber required to estimate biomass losses is derived from two main sources: forest management plans and the National Forest Inventory and Monitoring Programme. The ERT also noted that while the former are updated every 10 years for a given area, information from the latter is available for 2005–2006 only. At the same time, Slovakia indicated in the NIR (p.290) that all forest managers have reporting obligations to the National Forest Centre – Institute for Forest Resources and Information, and the aggregated data on wood harvesting are compiled in the annual Green Reports, which are publicly available. The ERT considered that there was a lack of clarity regarding the primary source of information for annual harvesting figures and the actual means of ensuring the necessary precision of the reported figures. During the review Slovakia explained that the primary source of information for annual harvesting is the mandatory reporting of all forest owners and managers to the National Forest Centre – Institute for Forest Resources and Information, covering any annual harvest data including thinning, fuelwood, stolen timber and regeneration cuttings, in accordance with the national legislation in force (Act No. 326/2005 on Forests; Regulation No 297/2011 of the Ministry of Agriculture and Rural Development of the Slovak Republic). The ERT recommends that Slovakia clarify in its NIR the main data sources on harvested timber, for example by including in the NIR the information on reporting of wood harvesting volumes provided to the ERT during the review, complemented by additional information on any verification measures in place.	Yes. Transparency
L.14	4.A.1 Forest land remaining forest land – CO_2	The ERT assessed the information provided by Slovakia in chapter 6.6.1.1 of the NIR on the methodology for estimating biomass losses within the stock change method in use. With reference to section 4.2.1.1 and equation 2.21 in the 2006 IPCC Guidelines (vol. 4), the ERT asked the Party to specify whether and if so how natural mortality has been treated for the calculation of biomass losses. During the review, the Party explained that CSC in living biomass was estimated based on equations 2.9–2.12 of the 2006 IPCC Guidelines (tier 1). Slovakia also confirmed that natural mortality is not included in the calculation of biomass losses, because of the lack of data. The ERT also asked the Party to clarify whether and if so what improvements are planned to ensure that losses due to natural mortality are estimated and thus ensure that removals are not overestimated. Slovakia responded that such improvements are neither ongoing nor planned and indicated that all losses, including natural mortality and disturbances, are already included in the reported harvested wood. The ERT noted that the inclusion of natural mortality in the transfer of	Yes. Accuracy

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?[a] If yes, classify by type*
		biomass from living biomass pools to non-biomass pools is part of the higher-tier, gain-loss methods referred to in section 2.3.2.1 of the 2006 IPCC Guidelines, which are currently not used by Slovakia. The Party further explained during the review that it plans to report CSC in the deadwood pool using a tier 2 method in its next submission, and that the planned methodology will include an estimation of natural mortality, if appropriate. The ERT noted that this issue is linked to ID# KL.13 below on the need for further evidence that the deadwood pool is not a source under FM. The ERT recommends that Slovakia implement the planned improvement to move to a higher-tier method for estimating the CSC in deadwood and that the Party include natural mortality in its estimates for this category following the use of a higher-tier method for deadwood, if appropriate.	
L.15	4.A.1 Forest land remaining forest land – CO_2	The ERT noted that in CRF table 4.A the notation key "NO" is reported for dead organic matter pools (deadwood and litter), and that, according to chapter 6.6.1 of the NIR 2019 (p.292), dead organic matter pools are assumed to be zero. However, the ERT noted that the 2006 IPCC Guidelines include relevant estimation methodologies, namely, equation 2.17 corroborated with equation 2.18 in chapter 2, section 2.3.2.1 (as well as in annex 2, p.A2.9). During the review, Slovakia explained that currently available national data on deadwood and litter did not allow the determination of CSC. Nevertheless, the recently concluded second cycle of the National Forest Inventory provided this kind of national data; therefore Slovakia plans to consider implementing appropriate methodologies for dead organic matter estimates in future submissions. The ERT recommends that Slovakia investigate whether changes to dead organic matter pools are likely to be significant and if so, include in its inventory dead organic matter estimates in line with the data obtained from the second National Forest Inventory cycle and/or similar relevant national data. If the Party concludes that the changes to the pools are not significant, the ERT recommends that the Party explain this in the NIR to justify the use of the tier 1 method.	Yes. Accuracy
L.16	4.B.1 Cropland remaining cropland – CO_2	The ERT noted that in chapter 6.7.1.1.1 of the NIR methodologies are reported for biomass gain estimates for perennial cropland, but not for the losses. However, CRF table 4.B includes values for both gains and losses in biomass. The ERT also noticed a significant discrepancy between the two IEFs (2.65 and –0.07 t C/ha, respectively). Considering that orchards, vineyards and hop gardens are normally affected annually by cuttings such as pruning or thinning, the ERT asked the Party to provide additional information on how the annual biomass losses have been considered so as to avoid their underestimation. During the review, Slovakia explained that only the final harvest of orchards and vineyards is considered in the calculation of biomass losses under these subcategories. The ERT also noted that it is explained in the NIR (p.301) that values for above-ground biomass carbon stock at harvest considered by Slovakia are taken from Hungary's inventory (70.5 t C/ha for orchards and 132.90 t C/ha for vineyards) to represent annual biomass carbon loss. For gardens and hop gardens, the default value for perennial cropland from the 2006 IPCC Guidelines (vol. 4, table 5.1) was used. The ERT is of the view that the generic methods for the estimation of biomass losses presented in chapter 2, volume 4, of the 2006 IPCC Guidelines (equation 2.13), as well	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a] If yes, classify by type
		as the methodology included in volume 4, section 5.2.1, should be applied for these estimates of perennial cropland remaining perennial cropland to avoid the risk of underestimation of emissions/overestimation of removals. The ERT recommends that the Party investigate the options to include periodic cuttings, including, but not limited to, pruning and thinning, in the estimation of annual losses in perennial croplands and report on progress in its next submission.	
L.17	4.B.1 Cropland remaining cropland – CO_2	The ERT noted that in chapter 6.6.1.1.4 of the NIR there is a reference to the use of IPCC methodologies as well as national data for the soil estimates. It asked Slovakia for further information explaining the origin of the sink (gains in carbon stock) in the mineral soil pool for both perennial and annual cropland remaining in the same subcategory (the positive values in cells J12 and J13, respectively, in CRF table 4.B). During the review, Slovakia provided a calculation sheet and indicated that the gains in carbon stock in the mineral soil pool for both perennial and annual cropland remaining in the same subcategory was calculated in accordance with equation 2.25 of the 2006 IPCC Guidelines, corresponding to a country-specific methodology (tier 2). However, it was not possible during the review to trace back the calculation of the soil estimates on the basis of the information provided. Specifically, it was not clear to the ERT why the value of the relative stock change factor of 1.10, corresponding with 'no tillage' in annual cropland in table 5.5 of the 2006 IPCC Guidelines, volume 4, was used (as indicated in chapter 6.6.1.1.4 of the NIR), instead of, for example, 1.00, which corresponds with 'full tillage', or 1.02, which corresponds with 'reduced tillage'. The ERT recommends that Slovakia include in the NIR additional information regarding the change of carbon stocks in mineral soils in both perennial cropland remaining perennial cropland and annual cropland remaining annual cropland, highlighting the parameters and underlying assumptions behind the use of relative stock change factors that led to the estimated gains in soil organic carbon.	Yes. Transparency
Waste			
W.6	5. General (waste) – CH_4 and N_2O	NIR table 7.19 provides information on sewage sludge treatment. In 2017, 34,416 t sludge was composted, 12,238 t sludge was incinerated and 2,636 t sludge was landfilled. However, the ERT considered that there is no transparent information in the NIR about sewage sludge treatment in the relevant sections on composting, incineration and landfilling. During the review, Slovakia clarified that input data on sewage sludge were taken from the Statistical Yearbook 2017 and that the emissions are included in the appropriate categories of the inventory based on the 2006 IPCC Guidelines, volume 5. Emissions from sewage sludge incineration without energy recovery are included in the category 5.C.1 and referenced in chapter 7.7.1 of the NIR, emissions from composting of sewage sludge are included in category 5.B.1, and emissions from landfill disposal of sewage sludge are included in the category 5.A.1 and referenced in table 7.11 of the NIR. The ERT recommends that Slovakia provide information about sludge treatment in the appropriate sections of chapter 7 of the NIR.	Yes. Transparency
W.7	5.A Solid waste disposal on land – CH_4	The ERT noted that the values of MSW treated in SWDS reported in NIR table 7.7 are different from those of landfilled waste reported in CRF table 5.A (managed and unmanaged), with a difference of 56.96 kt in 2017. During	Yes. Convention reporting adherence

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?[a] If yes, classify by type*
		the review, Slovakia confirmed that an erroneous version of table 7.7 was used during the process of NIR finalization and provided a corrected table 7.7. The ERT recommends that Slovakia correct the error in table 7.7 of the NIR regarding the amount of MSW treated in SWDS and enhance the QC activities carried out in the process of finalizing the waste sector entries in the NIR.	
W.8	5.A Solid waste disposal on land – CH_4	Slovakia reported in chapter 7.5.2 of the NIR that after 1991, agricultural, industrial and other waste (i.e. non-municipal waste) started to be disposed to dedicated landfills in Slovakia. The methodology and key parameters were reported in the NIR, but the emissions from these landfills were not. Furthermore, it was unclear whether these emissions were included in CRF table 5.A. During the review, Slovakia explained that the category managed waste disposal sites in CRF table 5.A also includes non-municipal waste. The ERT recommends that Slovakia explain in the NIR that the emissions from non-municipal waste disposal sites are included in the emissions reported in CRF table 5.A. The ERT encourages the Party to provide emissions from non-municipal disposal sites in the NIR.	Yes. Transparency
W.9	5.D Wastewater treatment and discharge – CH_4 and N_2O	Wastewater discharge pathways in relation to population values are presented in figure 7.5 of the NIR. During the review, Slovakia clarified that data for figure 7.5 are based on statistical data for 2010, while the inventory calculations are based on the actual values for each reported year. The ERT recommends that Slovakia update NIR figure 7.5 to represent population values and wastewater discharge pathways for domestic and industrial wastewater in the latest year of the inventory.	Yes. Transparency
W.10	5.D.2 Industrial wastewater – N_2O	The ERT noted that in chapter 7.8.2.2 of the NIR it is reported that the uncertainty of CH_4 emissions from industrial wastewater was estimated at –40 per cent to 2,250 per cent and that the main source of uncertainty is the N_2O EF. During the review, the ERT asked whether that information was correct, and what the reason was for the high uncertainty. Slovakia explained that there is a mistake in the NIR and that it is the uncertainty of N_2O emissions from industrial wastewater that is estimated at –40 per cent to 2,250 per cent. The ERT recommends that Slovakia correct the erroneous reference to CH_4 emissions in NIR chapter 7.8.2.2. The ERT further recommends that Slovakia provide in the NIR additional information about the reason why there is such a high uncertainty of N_2O emissions due to the N_2O EF from industrial wastewater treatment.	Yes. Convention reporting adherence
W.11	5.D.2 Industrial wastewater – CH_4	The ERT noted that in CRF table 5.D the sludge removed from industrial wastewater is reported as “NE”. In NIR chapter 7.8.2 there is no explanation of why Slovakia was unable to report the AD of sludge removed. During the review, Slovakia explained that it could not report sludge removed because the emissions had been estimated using data on the chemical oxygen demand in effluent. The Party further confirmed that it was unable to add this information as a comment to CRF table 5.D owing to a problem encountered with the CRF Reporter software and that it plans to include a relevant explanation in the next NIR. The ERT recommends that Slovakia include in the NIR the reason it reports sludge removed as “NE” in CRF table 5.D.	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a] If yes, classify by type
KP-LULUCF			
KL.9	General (KP-LULUCF activities)	In the CRF accounting table, "No" is selected under both commitment period accounting and annual accounting. During the review, the Party explained that it has elected the accounting at the end of the second commitment period. The ERT recommends that Slovakia indicate the correct accounting period in the CRF accounting table.	Yes. Transparency
KL.10	AR – CO_2	Slovakia reported in chapter 6.6.3 of the NIR that average increment values by main tree species were used to estimate annual biomass gains under afforestation activities (regardless of the year of planting within the commitment period). The ERT considers that there are changes to increment values from one year to another, which may be significant in relative terms in young stands. The Party confirmed that these inter-annual variations are captured in the average values obtained from experimental data in forest stands with different ages from 2 to 12 years. Moreover, Slovakia considers that this approach is consistent with the 2006 IPCC Guidelines, volume 4, as table 4.9 provides only the average default data for the increment of above-ground biomass for the forest stands above and below 20 years old. The ERT also referred to the last part of the finding KL.5 in the 2017 annual review report and asked the Party whether yield tables of other Parties with similar natural conditions in Central Europe have been checked for availability of increment data for 0- to 20-year-old forest stands. Slovakia replied that it had compiled information on biomass estimates in AR activities from the NIRs of the neighbouring countries. The ERT noted that the national data have precedence over both the IPCC data and those of the neighbouring countries, irrespective of the good practice of exploring and comparing different, relevant options. The ERT encourages Slovakia to make further use of the outcomes of experimental data obtained from measurements in young stands in its estimates of AR activities and describe the methodology used in the NIR.	Not an issue/problem
KL.11	Deforestation – CO_2	The ERT noted different values reported in CRF table 4(KP-I)A.2 for biomass loss per area for deforestation activities, depending on the land use after deforestation (cropland, grassland, settlements, other land) and asked the Party to explain these differences with particular reference to the corresponding land conversions in the LULUCF sector. Slovakia explained that these differences were caused by a calculation error, namely, incorrect use of carbon content for conifers and broadleaves, and confirmed that this calculation error implied in practice an error in the deforestation estimates. Calculations made by the Party during the review confirmed the underestimation of CSC in above-ground biomass of 2.4–3.4 per cent in individual years of the commitment period. The ERT recommends that Slovakia recalculate the deforestation estimates by using correctly the carbon content values in the estimation of above-ground biomass losses and report them in the next submission.	Yes. Accuracy
KL.12	FM – CO_2	The ERT noted that in chapter 11.1.1 of the NIR on the definition of forest applicable to activities under Article 3, paragraph 3, of the Kyoto Protocol "temporarily unstocked areas are included (forest regeneration areas)." The ERT also noted in chapter 11.4.2 of the NIR regarding FM activity the definition that "the temporarily (no more than 2 years) unstocked areas (e.g. harvested area, disturbances) are still considered as forest area and are not accounted as deforestation." Given the apparent overlap, the ERT asked Slovakia to explain how strict delimitation between the two is ensured. During the review, Slovakia explained that all temporarily unstocked areas (e.g. harvested area, disturbances) remain forests and are not accounted for as deforestation. Temporarily unstocked areas following forest management measures or forests with biotic and abiotic reduction of their crown coverage (e.g. windthrows, forest	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?[a] If yes, classify by type*
		fire, pest outbreaks) maintain the natural succession of forest vegetation and site conditions and therefore remain part of the forest. Slovakia also emphasized that the National Forest Act obliges landowners to afforest the temporarily unstocked forest land and ensure the regeneration of forest areas without sufficient crown cover within a defined time span. On the other hand, deforestation represents a permanent and irreversible change of forest land to a different land-use category in Slovakia. The Slovak Forest Act obliges landowners or managers to officially apply to the appropriate forestry authorities for permanent deforestation, implying a long and administratively demanding process, which will be captured in the inventories. The ERT recommends that Slovakia include the information on how deforestation areas are distinguished from temporarily unstocked areas under FM in the NIR.	
KL.13	FM – CO_2	The ERT noted that the notation key "NO, NR" has been used for non-biomass pools under FM in CRF table NIR-1, and referred to decision 2/CMP.7 indicating that a Party may choose not to account for a given pool if transparent and verifiable information is provided that the pool is not a source. The ERT also recalled the relevant text in chapter 6.6.1 of the NIR (on forest land remaining forest land) explaining the use of a tier 1 estimation method assuming no change in these pools. During the review, Slovakia responded that it considers information provided in chapter 11.3.1.2 of the NIR as transparent and verifiable information that the deadwood, litter and mineral soil pools are not a source of GHG emissions in accordance with decision 2/CMP.7. The ERT understands that the growing stock in biomass pools and the forest management measures limiting clear cuttings and promoting regeneration of the natural type of forests are favouring the maintenance of carbon stocks in both biomass and non-biomass pools; however, it considers that this should be substantiated through country-based, empirical evidence. Furthermore, the ERT commends Slovakia for the evidence provided on the basis of 1993 and 2006 data from the International Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forests of the United Nations Economic Commission for Europe but it also draws attention to the standard deviation of the value of carbon content in soils implying high dispersion of individual plot values from the mean. The ERT recommends that Slovakia continue to analyse the values of carbon content by different types of soils and site conditions, characterizing different types of forests, and report on this in the NIR. With regard to the deadwood estimates, the ERT also referred to ID# L.14 above on the estimation of natural mortality in forest land and recommends that Slovakia provide in the NIR further evidence that the deadwood pool is not a source under FM.	Yes. Transparency

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

VI. Application of adjustments

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

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

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

VIII. Questions of implementation

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

Annex I

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

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

Table 1
Total greenhouse gas emissions for Slovakia, base year[a]–2017
(kt CO_2 eq)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions including indirect CO_2 emissions[b]*				*KP-LULUCF activities (Article 3.4 of the Kyoto Protocol)*	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*	*Land-use change (Article 3.7 bis as contained in the Doha Amendment)[c]*	*KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)[d]*	*CM, GM, RV, WDR*	*FM*
FMRL								–1 084.00
Base year	63 664.56	73 365.09	NA	NA	NA		NA	
1990	63 664.56	73 365.09	NA	NA				
1995	43 444.48	53 273.46	NA	NA				
2000	39 369.58	49 262.92	NA	NA				
2010	40 219.46	46 367.36	NA	NA				
2011	39 172.16	45 640.68	NA	NA				
2012	35 694.53	43 120.31	NA	NA				
2013	34 731.11	42 827.47	NA	NA		–399.93	NA	–6 546.02
2014	34 660.42	40 779.50	NA	NA		–400.23	NA	–4 601.01
2015	35 165.69	41 782.35	NA	NA		–435.98	NA	–5 153.27
2016	35 575.96	42 298.09	NA	NA		–494.60	NA	–4 974.48
2017	36 853.12	43 437.50	NA	NA		–486.71	NA	–4 892.02

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

[a] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases except NF_3, for which the base year is 2000. Slovakia has not elected any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

[b] The Party did not report indirect CO_2 emissions in CRF table 6.

[c] The value reported in this column refers to 1990.

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

Table 2
Greenhouse gas emissions by gas for Slovakia, excluding land use, land-use change and forestry, 1990–2017
(kt CO_2 eq)

	CO_2[a]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1990	61 577.16	6 992.97	4 480.04	NO	314.86	NO	0.06	NO
1995	44 267.22	5 830.62	3 019.51	13.32	132.65	NO	10.15	NO
2000	41 224.48	5 284.56	2 620.88	105.04	14.91	NO	13.04	NO
2010	38 499.41	4 753.16	2 472.91	597.24	25.01	NO	19.62	NO
2011	38 066.07	4 818.46	2 110.22	605.03	20.11	NO	20.80	NO
2012	35 979.28	4 435.30	2 030.62	628.20	25.66	NO	21.24	NO
2013	35 570.42	4 571.29	2 006.77	646.88	9.81	NO	22.30	NO
2014	33 638.31	4 337.61	2 124.42	653.84	11.15	NO	14.17	NO
2015	34 466.85	4 502.68	2 055.11	734.88	8.50	NO	14.31	NO
2016	34 893.50	4 563.70	2 155.22	673.37	6.49	NO	5.82	NO
2017	36 033.64	4 601.17	2 047.93	739.06	8.62	NO	7.08	NO
Per cent change 1990–2017	**–41.5**	**–34.2**	**–54.3**	**NA**	**–97.3**	**NA**	**12 034.9**	**NA**

Note: Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions.
[a] Slovakia did not report indirect CO_2 emissions in CRF table 6.

Table 3
Greenhouse gas emissions by sector for Slovakia, 1990–2017
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	56 270.42	9 753.92	5 912.90	–9 700.54	1 427.85	NO
1995	38 972.46	9 366.31	3 554.31	–9 828.98	1 380.38	NO
2000	36 444.78	8 592.83	2 805.82	–9 893.34	1 419.49	NO
2010	32 914.30	9 512.46	2 379.64	–6 147.90	1 560.97	NO
2011	32 456.14	9 113.42	2 470.26	–6 468.52	1 600.86	NO
2012	29 937.79	9 030.12	2 515.07	–7 425.77	1 637.32	NO
2013	29 832.38	8 746.70	2 629.61	–8 096.36	1 618.78	NO
2014	27 393.00	8 967.48	2 777.78	–6 119.08	1 641.23	NO
2015	28 242.94	9 179.91	2 666.79	–6 616.66	1 692.71	NO
2016	28 483.18	9 377.89	2 783.40	–6 722.13	1 653.62	NO

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
2017	29 442.35	9 646.59	2 667.85	–6 584.39	1 680.72	NO
Per cent change 1990–2017	**–47.7**	**–1.1**	**–54.9**	**–32.1**	**17.7**	**NA**

Notes: (1) Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions; (2) Slovakia did not report indirect CO_2 emissions in CRF table 6.

Table 4
Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year[a]–2017, for Slovakia
(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[b]	*Activities under Article 3, paragraph 3, of the Kyoto Protocol*		*FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol*				
	Land-use change	*AR*	*Deforestation*	*FM*	*CM*	*GM*	*RV*	*WDR*
FMRL				–1 084.00				
Technical correction				–1 164.00				
Base year	NA				NA	NA	NA	NA
2013		–443.28	43.35	–6 546.02	NA	NA	NA	NA
2014		–462.92	62.69	–4 601.01	NA	NA	NA	NA
2015		–497.16	61.19	–5 153.27	NA	NA	NA	NA
2016		–523.25	28.65	–4 974.48	NA	NA	NA	NA
2017		–543.92	57.20	–4 892.02	NA	NA	NA	NA
Per cent change base year–2017					**NA**	**NA**	**NA**	**NA**

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

[a] Slovakia has not elected to report on any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol, and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

[b] The value reported in this column refers to 1990.

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

Table 5
Key relevant data for Slovakia under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the 2019 annual submission

Key parameters	*Values*
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: not elected (g) WDR: not elected
Election of activities under Article 3, paragraph 4	None
Election of application of provisions for natural disturbances	No
3.5% of total base-year GHG emissions, excluding LULUCF	2 599.503 kt CO_2 eq (20 796.023 kt CO_2 eq for the duration of the commitment period)
Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for:	
1. AR	NA
2. Deforestation	NA
3. FM	NA
4. CM	NA
5. GM	NA
6. RV	NA
7. WDR	NA

Annex II

Information to be included in the compilation and accounting database

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

Table 1
Information to be included in the compilation and accounting database for 2017, including on the commitment period reserve, for Slovakia
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
CPR	182 042 046	–	–	182 042 046
Annex A emissions for 2017	–	–	–	–
CO_2[a]	36 033 643	–	–	36 033 643
CH_4	4 601 169	–	–	4 601 169
N_2O	1 926 873	2 047 927	–	2 047 927
HFCs	739 057	–	–	739 057
PFCs	8 623	–	–	8 623
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	7 083	–	–	7 083
NF_3	NO	–	–	NO
Total Annex A sources	**43 316 448**	**43 437 502**	–	**43 437 502**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2017	–	–	–	–
AR	–543 919	–	–	–543 919
Deforestation	57 204	–	–	57 204
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2017	–	–	–	–
FM	–4 892 023	–	–	–4 892 023

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 2
Information to be included in the compilation and accounting database for 2016 for Slovakia
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2016	–	–	–	–
CO_2[a]	34 893 497	–	–	34 893 497
CH_4	4 563 696	–	–	4 563 696
N_2O	2 010 994	2 155 221	–	2 155 221
HFCs	673 370	–	–	673 370
PFCs	6 490	–	–	6 490
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	5 818	–	–	5 818
NF_3	NO	–	–	NO
Total Annex A sources	**42 153 867**	**42 298 094**	–	**42 298 094**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2016	–	–	–	–

	Original submission	*Revised estimate*	*Adjustment*	*Final*
AR	–523 251	–	–	–523 251
Deforestation	28 647	–	–	28 647
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2016	–	–	–	–
FM	–4 974 477	–	–	–4 974 477

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 3
Information to be included in the compilation and accounting database for 2015 for Slovakia
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2015	–	–	–	–
CO_2[a]	34 466 852	–	–	34 466 852
CH_4	4 502 683	–	–	4 502 683
N_2O	1 917 426	2 055 113	–	2 055 113
HFCs	734 885	–	–	734 885
PFCs	8 504	–	–	8 504
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	14 314	–	–	14 314
NF_3	NO	–	–	NO
Total Annex A sources	**41 644 663**	**41 782 351**	–	**41 782 351**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015	–	–	–	–
AR	–497 163	–	–	–497 163
Deforestation	61 186	–	–	61 186
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015	–	–	–	–
FM	–5 153 274	–	–	–5 153 274

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 4
Information to be included in the compilation and accounting database for 2014 for Slovakia
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2014	–	–	–	–
CO_2[a]	33 638 309	–	–	33 638 309
CH_4	4 337 611	–	–	4 337 611
N_2O	2 004 841	2 124 422	–	2 124 422
HFCs	653 839	–	–	653 839
PFCs	11 148	–	–	11 148
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	14 168	–	–	14 168
NF_3	NO	–	–	NO
Total Annex A sources	**40 659 916**	**40 779 497**	–	**40 779 497**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014	–	–	–	–
AR	–462 920	–	–	–462 920
Deforestation	62 689	–	–	62 689
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014	–	–	–	–

	Original submission	*Revised estimate*	*Adjustment*	*Final*
FM	–4 601 013	–	–	–4 601 013

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 5
Information to be included in the compilation and accounting database for 2013 for Slovakia

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2013	–	–	–	–
CO_2[a]	35 570 424	–	–	35 570 424
CH_4	4 571 287	–	–	4 571 287
N_2O	1 906 437	2 006 766	–	2 006 766
HFCs	646 878	–	–	646 878
PFCs	9 810	–	–	9 810
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	22 303	–	–	22 303
NF_3	NO	–	–	NO
Total Annex A sources	**42 727 140**	**42 827 470**	–	**42 827 470**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013	–	–	–	–
AR	–443 283	–	–	–443 283
Deforestation	43 352	–	–	43 352
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013	–	–	–	–
FM	–6 546 020	–	–	–6 546 020

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Annex III

Additional information to support findings in table 2 in this report

Missing categories that may affect completeness

The only category for which a method is included in the 2006 IPCC Guidelines that was reported as "NE" or for which the ERT otherwise determined that there may be an issue with the completeness of reporting in the Party's inventory is CO_2 from organic soils in cropland (4.B) (see ID# L.6 in table 3 in this report).

Annex IV

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl.

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

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

B. UNFCCC documents

Annual review reports

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

Other

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

Annual status report for Slovakia for 2019. Available at https://unfccc.int/sites/default/files/resource/asr2019_SVK.pdf.

C. Other documents used during the review

Responses to questions during the review were received from Lenka Zetochová (Slovak Hydrometeorological Institute), including additional material on the methodology and assumptions used.