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## **Report on the individual review of the annual submission of Slovakia submitted in 2022\***

**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 review of the 2022 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 17 to 22 October 2022 in Bonn.

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\* In the symbol for this document, 2022 refers to the year in which the inventory was submitted, not to the year of publication.



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## Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
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”
BCEF	biomass conversion and expansion factor
BCEF <sub>I</sub>	biomass conversion and expansion factor for conversion of net annual increment in volume (including bark) to above-ground biomass growth
BCEF <sub>S</sub>	biomass conversion and expansion factor for expansion of merchantable growing stock volume to above-ground biomass
BCEF <sub>R</sub>	biomass conversion and expansion factors applicable to wood removals
CaO	calcium oxide
CER	certified emission reduction
CH <sub>4</sub>	methane
CM	cropland management
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> 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
EU	European Union
FAOSTAT	statistical database of the Food and Agriculture Organization of the United Nations
FM	forest management
FMRL	forest management reference level
FMRL <sub>corr</sub>	forest management reference level technical correction
Frac <sub>Remove</sub>	fraction of above-ground residues of crop removed annually for purposes such as feed, bedding and construction
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
Kyoto Protocol Supplement	<i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i>

LFG	landfill gas
LULUCF	land use, land-use change and forestry
N	nitrogen
N <sub>2</sub> O	nitrous oxide
NA	not applicable
NE	not estimated
NF <sub>3</sub>	nitrogen trifluoride
NFI	national forest inventory
NH <sub>3</sub>	ammonia
NIR	national inventory report
NO	not occurring
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF <sub>6</sub>	sulfur hexafluoride
SIAR	standard independent assessment report
UNFCCC Annex I inventory reporting guidelines	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”
UNFCCC review guidelines	“Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”
WDR	wetland drainage and rewetting
Wetlands Supplement	<i>2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands</i>

## I. Introduction

1. This report covers the review of the 2022 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” (annex to decision 13/CP.20). The review took place from 17 to 22 October 2022 in Bonn and was coordinated by Simon Wear, Javier Hanna Figueroa and Gopal Joshi (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for Slovakia.

Table 1

**Composition of the expert review team that conducted the review for Slovakia**

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Mauro Santos	Brazil
	Sina Wartmann	Germany
Energy	Nicholas Giles	Australia
	Lungile Manzini	South Africa
	Gherghita Nicodim	Romania
	Luis de la Torre	Peru
IPPU	Niculina Mihaela Balanescu	Romania
	David Kuntze	Germany
Agriculture	Abdulkadir Bektas	Türkiye
	Christopher Dore	United Kingdom
LULUCF and KP-LULUCF	Rosie Brook	United Kingdom
	Esther Mertens	Belgium
	Eray Özdemir	Türkiye
	Miguel Angel Taboada	Argentina
Waste	Juliana Bempah	Ghana
	Gustavo Mozzer	Brazil
Lead reviewers	David Kuntze	
	Mauro Santos	

2. The basis of the findings in this report is the assessment by the ERT of the Party’s 2022 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines.

3. The ERT has made recommendations that Slovakia resolve identified findings, including issues<sup>1</sup> designated as problems.<sup>2</sup> Other findings, and, if applicable, the encouragements of the ERT to Slovakia to resolve related issues, are also included in this report.

4. A draft version of this report was communicated to the Government of Slovakia, which provided no comments.

5. Annex I presents the annual GHG emissions of Slovakia, including totals excluding and including LULUCF, indirect CO<sub>2</sub> emissions, and emissions by gas and by sector, and

<sup>1</sup> Issues are defined in decision 13/CP.20, annex, para. 81.

<sup>2</sup> Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

contains background data on emissions and removals from KP-LULUCF, if elected by the Party, 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 Party’s 2022 annual submission

7. Table 2 provides the assessment by the ERT of the Party’s 2022 annual submission with respect to the tasks undertaken during the review. Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.

Table 2

### Summary of review results and general assessment of the 2022 annual submission of Slovakia

Assessment	Issue/problem ID#(s) in table 3 or 5 <sup>a</sup>
Dates of submission	Original submission: NIR, 14 April 2022; CRF tables (version 4), 6 April 2022; SEF tables, 13 April 2022 Revised submission: CRF tables (version 5), 20 October 2022 Unless otherwise specified, values from the most recent submission are included in this report
Review format	Centralized
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable)	Have any issues been identified in the following areas: (a) Identification of key categories? Yes G.5, G.6 (b) Selection and use of methodologies and assumptions? Yes E.2 (c) Development and selection of EFs? No (d) Collection and selection of AD? Yes I.5, A.1, L.1 (e) Reporting of recalculations? No (f) Reporting of a consistent time series? No (g) Reporting of uncertainties, including methodologies? Yes G.3 (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, or completeness? <sup>b</sup> Yes I.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? Yes
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable? No A.6, L.5, L.18
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?

Assessment	Issue/problem ID#(s) in table 3 or 5 <sup>a</sup>	
(a) Overall functioning of the national registry?	No	
(b) Performance of the functions of the national registry and the adherence to technical standards for data exchange?	No	
Have any issues been identified related to the reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies 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 SIAR?	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 the 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?	No	
Have any issues been identified related to the following reporting requirements for KP-LULUCF:		
(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?		No
(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?		No
(c) Reporting requirements of decision 6/CMP.9?		No
(d) Country-specific information to support provisions for natural disturbances in accordance with decision 2/CMP.7, annex, paragraphs 33–34?		No
CPR Was the CPR reported in accordance with decision 18/CP.7, annex; decision 11/CMP.1, annex; and decision 1/CMP.8, paragraph 18?	No	G.7
Adjustments Has the ERT applied any adjustments under Article 5, paragraph 2, of the Kyoto Protocol?	No	
Has the Party submitted a revised estimate to replace a previously applied adjustment?	NA	Slovakia 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 assessing conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Yes	
Recommendation for an exceptional in-country review On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	No	
Questions of implementation Did the ERT list any questions of implementation?	No	

<sup>a</sup> Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.

<sup>b</sup> 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 recommendations included in the previous review report

8. Table 3 compiles the recommendations from previous review reports that were included in the most recent previous review report, published on 7 October 2022,<sup>3</sup> and had not been resolved by the time of publication of the report on the review of the Party's 2021 annual submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue or problem by the time of publication of this review report and has provided the rationale for its determination, which takes into consideration the publication date of the most recent previous review report and national circumstances.

Table 3  
Status of implementation of recommendations included in the previous review report for Slovakia

<i>ID#</i>	<i>Issue/problem classification<sup>a</sup></i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	Article 3.14 (G.1, 2021) (G.9, 2019) Transparency	Report in the NIR, in accordance with decision 15/CMP.1, annex, paragraph 25, 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 the 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.	Resolved. The Party reported in its NIR (chap. 15, pp.475–476) changes in relation to the 2021 submission on fiscal and emission reduction policies, such as a carbon border adjustment mechanism, and the EU climate and energy package known as “Fit for 55”. Regarding sustainability of biofuel production and use, and climate-related issues of its assistance abroad, Slovakia reported that it is channelling its official development assistance to third-party countries through projects that incorporate a climate change component as a cross-sectoral issue. Climate change is reflected in the projects oriented to food safety, agriculture, infrastructure, and sustainable use of resources.
G.2	Methods (G.2, 2021) (G.5, 2019) Accuracy	(a) Reconcile the information contained in CRF table summary 3 and NIR table 6.3 to reflect the methodology improvements that have been introduced.  (b) 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, either move to higher-tier methods or explain the reasons for the use of tier 1 in	Resolved.  (a) The Party reported in its NIR (chap. 16.1, table 6.3, p.319) as well as in CRF table summary 3s2 updated information on the methodologies used for all categories.  (b) No key categories were estimated using a tier 1 method in the agriculture and LULUCF sectors.

<sup>3</sup> FCCC/ARR/2021/SVK.



<i>ID#</i>	<i>Issue/problem classification<sup>a</sup></i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
		line with the provisions of paragraph 11 of the UNFCCC Annex I inventory reporting guidelines.	
G.3	Uncertainty analysis (G.4, 2021) (G.7, 2019) Convention reporting adherence	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. (This could best be done by providing the results in the format of table 3.2 of the 2006 IPCC Guidelines (vol. 1, chap. 3, p.3.31).)	Addressing. The Party reported a quantitative uncertainty assessment for the base year and the latest reported inventory year (2020) in its NIR (annex 3, p.507) “Table A3.1 Approach 1 uncertainty with LULUCF assessment in 2020”. The assessment was performed using the format of table 3.2 of the 2006 IPCC Guidelines; however, Slovakia did not provide the final row of table 3.2 with the overall uncertainty levels. During the review, the Party provided the ERT with the spreadsheet with the uncertainties calculation in the format of the complete table 3.2 of the 2006 IPCC Guidelines.
G.4	Uncertainty analysis (G.5, 2021) (G.8, 2019) Transparency	(a) Include in the NIR the information on effort prioritization, inventory improvements and methodological choice that was provided during the review of the 2019 submission, 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 on the basis of their level of importance for the inventory, and that continuous improvement of the inventory methodology for significant categories is carried out on the basis of the outcomes of the uncertainty analysis.  (b) 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.	Resolved.  (a) The Party reported in its NIR (chap. 1.2.4.6, p.38) that the prioritization process is based on recommendations raised during previous reviews, aimed at those categories with higher uncertainty. Examples of these were in the categories of swine in agriculture or in 1.B.2 of fugitive methane emissions.  (b) In the same section of the NIR, the Party said that the underlying assumptions used for estimating uncertainties applied on EF and AD are mostly based on the default values provided in the IPCC 2006 Guidelines and/or expert judgment.  The ERT agrees that this information in the NIR resolves the issue in full.
G.5	Key category analysis (G.6, 2021) Convention reporting adherence	Include in the NIR the results of the key category analysis in accordance with paragraphs 39 and 50(d) of the UNFCCC Annex I inventory reporting guidelines.	Addressing. The Party reported in its NIR (annex 1, pp.485–496) the results of the key category analysis in accordance with paragraph 39 of the UNFCCC Annex I inventory reporting guidelines. However, the summary table with the key categories identified for the latest reporting year (by level and trend) in accordance with paragraph 50(d)–(i) of these guidelines was not provided. During the review, the Party provided the ERT with the summary table, to be included in the next annual submission. The ERT agreed with the format and suggested that the categories be labelled with their codes for better comprehension if such information could be useful for the Party.

ID#	Issue/problem classification <sup>a</sup>	Recommendation from previous review report	ERT assessment and rationale
<b>Energy</b>			
E.1	1.A.1.c Manufacture of solid fuels and other energy industries – solid fuels – CO <sub>2</sub> (E.3, 2021) (E.6, 2019) (E.25, 2017) Transparency	Explain in the NIR the high value of the CO <sub>2</sub> IEF for this category and how it was obtained.	Resolved. The Party reported a high IEF for solid fuels (e.g. 191.01 t/TJ) in 2020 and explained in its NIR (p.69) that the IEF for CO <sub>2</sub> is high because blast furnace gas combustion in this category has a high carbon content. It represents more than 70 per cent of total fuels combusted in this category. The information on fuel consumption, net calorific values and EFs is obtained directly from the operator and checked every year with an IPPU expert. The IEF calculated in this category is influenced by the share of individual fuels with the large difference between the EF for blast furnace gas and the EF for coking gas. Therefore, small changes in the fuel mix can lead to significant inter-annual changes in the IEF.
E.2	1.A.4 Other sectors – solid fuels – CH <sub>4</sub> (E.6, 2021) (E.17, 2019) (E.36, 2017) Accuracy	Estimate and report CH <sub>4</sub> 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 CH <sub>4</sub> emissions from solid fuels for category 1.A.4 using a tier 1 methodology. The emissions were reported in CRF table 1.A(a). Category 1.A.4.b was considered a key category, but the Party was unable to progress to a tier 2 methodology. The Party reported in its NIR (p.68) that owing to a lack of information and the absence of a relevant study or report about types and numbers of combustion equipment in households and services, this recommendation was not implemented for this key category 1.A.4.b. Slovakia reported that advanced and country-specific EFs for non-CO <sub>2</sub> gases are essential for full implementation of a higher tier. Additionally, the Party specified that in its improvement plan, improving AD estimation is currently a priority. Moving to a higher tier in category 1.A.4 is difficult, as it covers many minor sources. During the review, the Party indicated that it is currently working on addressing the recommendation and that the application of tier 2 has been postponed.
E.3	1.A.5.a Stationary – biogas – CO <sub>2</sub> (E.10, 2021) Transparency	Clearly describe in the NIR the methods, data and parameters used for calculating emissions of LFG and sludge gas for categories 1.A.1.a (fuel combustion activities – energy industries – public electricity and heat production) and 1.A.5.a (fuel combustion activities – other – stationary).	Resolved. The Party reported in its NIR (p.107) the methodology applied to calculate LFG, including an analysis of LFG consumed, which was carried out with the help of waste sector experts. The methods and data used for calculating LFG and sludge gas, such as country-specific EFs and net calorific values, were fully described in the NIR (pp.66–67) and the NIR table 10.3 recalculations. During the review, the Party confirmed that biogas consumption in the energy sector was analysed, with the focus on AD. In its NIR (chap. 3.2.4, pp.67), the Party provided a summary of the analysis. During the review, the Party clarified that LFG and sludge gas are used only in the energy sector and combusted for energy purposes. Therefore, no emissions occur in the waste sector from LFG and sludge gas.
E.4	1.A.5.b Mobile – military diesel oil and military gasoline – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.7, 2021) (E.26, 2019) Consistency	Use expert judgment and/or one of the recalculation techniques included in the 2006 IPCC Guidelines (vol. 1, chap. 5.3.3) to estimate the emissions of CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O for this category for gasoline (1990–2014), diesel (1990–2014) and biomass	Resolved. The Party reported in its NIR (p.109) that consumption of jet kerosene, gasoline and diesel oil for military usage is reported under category 1.A.5.b. The recalculated emissions of CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O for this category for gasoline (1990–2014) and diesel (1990–2014) were also reported in CRF table 1.A(a)s4. GHG emission estimates for military aviation, that is, jet kerosene consumption, were reported from 1990 and military gasoline and diesel oil from 2016. Data on military gasoline and military diesel oil before 2016 were statistically estimated by the sectoral experts using linear regression from 1990 (2006 IPCC Guidelines (vol. 1, chap. 5.3.3)). During the

<i>ID#</i>	<i>Issue/problem classification<sup>a</sup></i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
		(2007–2014) and explain in the NIR the methods used.	review, the Party clarified that the fuels reported under category 1.A.5.b do not contain biomass. The ERT agrees that there is no need to estimate biomass emissions for this category as they do not occur and considers that the recommendation has been resolved.
E.5	1.B.1.a Coal mining and handling – solid fuels – CO <sub>2</sub> and CH <sub>4</sub> (E.11, 2021) Transparency	Ensure the consistency of the coal production data provided in NIR table 3.52 and the CRF tables and increase the transparency of the description of the method of estimating CO <sub>2</sub> emissions for category 1.B.1.a (coal mining and handling) in the NIR by including the details on the Hornonitrianske Bane Prievidza mining company measurements and the application of these estimates to other mines.	Resolved. The Party reported in its 2022 NIR (pp.123–125) a description of the methodology used in the estimation of emissions from coal mining and handling, including details of the AD sources, the details of the Hornonitrianske Bane Prievidza mining company measurements and a justification for the application of these estimates to other mines. The estimated emissions reported in CRF table 1.B.1 and 2021 NIR table 3.56 (p.123) for mining activities are consistent.
E.6	1.B.2.b Natural gas 1.B.2.c Venting and flaring – natural gas – CH <sub>4</sub> (E.13, 2021) Transparency	Improve the transparency of the description in the NIR of the methodology used to estimate category 1.B.2.b.4 and 1.B.2.c.1.ii emissions by including (a) summary information on the sources of emissions in these categories (e.g. valves or compressors), (b) the method of measurement or estimation (e.g. infrared camera, Bacharach Hi Flow sampler or specific EFs), (c) the method of back calculation of emissions for years before 2013 (e.g. the extrapolation approach or proxy data used) and (d) the verification of the results.	Addressing. The assessment set out below covers the four elements of the recommendation, which were analysed separately. (a) Addressing. The Party listed in its NIR (p.129) the sources of emissions for categories 1.B.2.b.4 and 1.B.2.c.1.ii; however, these sources have not been clearly or fully defined and described. The ERT considers that this part of the recommendation is still being addressed. (b) Resolved. The Party reported in its NIR (pp.120 and 439) a detailed description of the methodology used to estimate category 1.B.2.b.4 and 1.B.2.c.1.ii emissions. During the review, the Party highlighted additional information provided in the NIR, (chap. 3.5.7.1, p.129), including that Eustream uses plant-specific methodology to estimate fugitive emissions from compressors, accidents, and planned repairs. Infrared cameras are used to monitor each of these possibilities. The ERT considers that the recommendation regarding this item has been fully addressed as sufficient information on the methodology used to estimate category 1.B.2.b.4 and 1.B.2.c.1.ii emissions is available in the NIR. (c) Resolved. The Party provided in its NIR (chap. 3.5.4, p.120) a detailed description of how the recalculation of emissions for categories 1.B.2.b.4 and 1.B.2.c.1.ii were completed. The Party reported that recalculations were completed for 2010–2019 from revised data accessed directly from the source, namely the company Nafta. Differences were found between statistical data and direct data from the operation. The ERT considers that the recommendation for this item has been fully addressed as sufficient information on the recalculation is available in the NIR. (d) Resolved. The Party reported in its NIR (chap. 3.5.3, p.120) details of the verification process of cross-checking the input data from the supplier companies Nafta (oil), Transpetrol (oil), Eustream (natural gas) and the Slovak Gas Industry (natural gas) with the statistics from the Ministry of Economy of the Slovak Republic and the Statistical Office of the Slovak Republic. The ERT considers that the recommendation

ID#	Issue/problem classification <sup>a</sup>	Recommendation from previous review report	ERT assessment and rationale
			for this item has been fully addressed as sufficient information on the verification process is available in the NIR.
IPPU			
I.1	2.A.1 Cement production – CO <sub>2</sub> (I.6, 2021) Transparency	Include the estimated values of magnesium oxide content in NIR table 4.7 with notation explaining how these values were estimated and adopt different wording or symbols for aggregated CaO content and CaO content in the cement clinker.	Addressing. The Party reported in its NIR table 4.6 (p.147) magnesium oxide content for 1990, 1995 and 2000 as “NE” and CaO values for 1990–2020 explaining its aggregated CaO content calculation. However, a detailed explanation of the calculation for magnesium oxide values before 2000 was not provided in the NIR.  During the review, the Party provided the ERT with the calculation datasheet for the CaO content for 2000–2003, which was used as the base for the estimation of the CaO content for 1990–1999.  The ERT agrees with the calculation presented and considers that the calculation’s inclusion in the NIR will resolve the issue.
I.2	2.A.1 Cement production – CO <sub>2</sub> (I.7, 2021) Transparency	Provide in the NIR the average values of cement kiln dust and the mass of slag entering used to estimate the correction factor, while safeguarding confidentiality, to facilitate the verification process.	Resolved. The Party reported separately in the NIR (chap. 4.7.2.1, p.148) the values of the cement kiln dust and a composition factor, which reflect the mass of used slag.  During the review, the Party provided the ERT with the confidential calculation datasheets for the composition factor for 2020 and the comparison with the EU ETS emissions and the ERT was able to verify the correction factor used.
I.3	2.A.3 Glass production – CO <sub>2</sub> (I.9, 2021) Transparency	Include in the NIR a comparison between the country-specific EF with the tier 1 default value from the 2006 IPCC Guidelines (vol. 3, chap. 2.4.1.2) (using the following equation for calculating the difference, $(0.1 - 0.057)/0.1 = x \cdot 100\%$ , which leads to a reduction in estimated emissions of 43 per cent) and explain the large difference between the country-specific EF and the tier 1 default value, in accordance with the 2006 IPCC Guidelines QC procedure (vol. 1, chap. 6, p.6.13).	Not resolved. The Party reported an IEF of 0.423 t/t of used carbonates mixture or 0.052 t/t of glass produced in 2020 and did not provide in its NIR a comparison between the country-specific EF with the tier 1 default value from the 2006 IPCC Guidelines (vol. 3, chap. 2.4.1.2). The Party noted the difference and explained it was due to the use of alternative additions to raw materials, such as calumite, colemanit or clay, as well as fluctuations in the amounts of recycled glass produced in Slovakia, but did not provide details on the large difference (43 per cent) between the country-specific EF and the tier 1 default value (0.20 t/t).  During the review, the Party clarified that this recommendation will be implemented in the next annual submission.  The ERT agrees that by including this information in the next NIR the issue will be resolved.
I.4	2.B.1 NH <sub>3</sub> production – CO <sub>2</sub> (I.10, 2021) Transparency	Include in its NIR an explanation as to why the country-specific EF is lower than the range of EF default values of 1.694–3.273 t CO <sub>2</sub> /t NH <sub>3</sub> produced recommended in the 2006 IPCC Guidelines (vol. 3, chap. 3, table 3.1).	Resolved. The Party reported in its NIR (chap. 4.8.1.1, p.158) that the IEF is 1.29 t CO <sub>2</sub> /t NH <sub>3</sub> produced in 2020 and is based on plant-specific data, after subtracting the CO <sub>2</sub> used for urea production. It was explained (chap. 4.8.1.2, p.158) that a modern production line became fully operational in 2019 and this led to a decrease in CO <sub>2</sub> emissions and the IEF of approximately 15 per cent. The ERT confirms that this information has been included in the NIR.
I.5	2.D.3 Other (non-energy products from fuels and	(a) Report the AD used in the estimation of CO <sub>2</sub> emissions from urea used in catalytic	(a) Not resolved. The following assessment covers the separate elements of the recommendation, which were analysed separately. The Party continued to report AD for

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	solvent use) – CO <sub>2</sub> (I.3, 2021) (I.8, 2019) (I.9, 2017) Transparency	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).  (b) Explain in the NIR how those CO <sub>2</sub> emissions are estimated.	urea catalytic converters in CRF table 2(I).A-Hs2 as “NE” and reported in NIR table 4.41 (p.186) only urea consumption in the industry.  During the previous three annual submission reviews, Slovakia explained that the AD cannot be reported because they consist of two completely different types of data: (1) the amount of urea in vehicles, calculated using the default values of the COPERT model; and (2) actual amounts of urea used in industrial plants for selective catalytic reduction technology. The Party also stated that it does not have an appropriate methodology to aggregate the number of vehicles using a selective catalytic reduction technology with the amount of urea used in industrial plants to provide an overall figure for AD for CRF table 2(I).A-Hs2. Adding the calculated amount of used urea in vehicles to the actual amount of urea from industrial plants results in a high uncertainty level of AD.  The ERT considers that the recommendation has not yet been fully addressed because the Party did not provide the AD required to estimate the CO <sub>2</sub> emissions from the urea used in catalytic converters to enable the ERT to retrieve and assess the estimated emissions, even though the Party did not use these data to estimate the CO <sub>2</sub> emissions.  During the review, the Party clarified that this recommendation will be implemented in the next submission.  (b) Resolved. The Party explained in the NIR (p.185) that it uses the default values in the COPERT model to estimate CO <sub>2</sub> emissions from urea used in catalytic converters.
Agriculture			
A.1	3.D.a.4 Crop residues – N <sub>2</sub> O and CH <sub>4</sub> (A.4, 2021) (A.16, 2019) Accuracy	Revise the methodology description in the 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.	Addressing. The Party reported in its NIR (chap. 5.1, p.246) that it implemented a descriptive estimate of the amount of forage consumed by livestock during the 200 days grazing period. During the review, the Party clarified that the amount of forage consumed by livestock is still missing and will be implemented in future submissions. In NIR table 10.3 (p.440), the Party explained that the recalculation of crop residues was performed due to the implementation of Frac <sub>Remove</sub> for cereal crops that were used for bedding purposes.
A.2	3.D.a.4 Crop residues – N <sub>2</sub> O (A.5, 2021) (A.17, 2019) Accuracy	Investigate how to consistently report N 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 the estimates accordingly.	Resolved. The Party reported in its NIR (chap. 5.12.2.1, p.295) that the managed manure N available for application to managed soils was calculated on the basis of equation 10.34 from the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.65). The ERT confirmed that the recalculation affected both categories 3.D.a.2.a and 3.D.a.4 to account for the fact that N input from straw, including deep litter for pigs and poultry, was considered under crop residue. The methodology is described in more detail in the NIR (chap. 5.12.6.1, p.303) and is in line with the 2006 IPCC Guidelines (vol. 4, chap. 10).

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A.3	3.D.a.4 Crop residues – N <sub>2</sub> O (A.8, 2021) Transparency	Clearly explain in the NIR the procedure used to calculate crop residues, crop yields and N content and correct the units used in NIR tables 5.62 and 5.63.	Resolved. The Party corrected the units used to calculate crop residues in NIR table 5.69 (p.305) instead of crop yields (2021 NIR table 5.62, p.297). The methodology is described in more detail in the NIR (chap. 5.12.6.1, pp.302–303). The recalculation of crop residues was performed after removing the Frac <sub>Remove</sub> cereal crops used for bedding purposes (NIR table 5.71, p.303) by updating the values in 2021 NIR table 5.64.
LULUCF			
L.1	4. General (LULUCF) – CO <sub>2</sub> (L.1, 2021) (L.1, 2019) (L.1, 2017) (L.1, 2016) (L.1, 2015) (66, 2014) (44, 2013) Accuracy	Continue the ongoing technical research to provide reliable data for estimating CSC in living biomass, dead organic matter, and soil organic matter.	<p>Addressing. The Party continued its improvements for the sector and reported in its NIR (pp.336, 340, 353, 356, 359 and 362) and CRF tables 4.A, 4.B, 4.C, 4.E and 4.F CSC in the deadwood pool for the categories forest land remaining forest land, land converted to forest land, forest land converted to cropland, forest land converted to grassland, forest land converted to settlements and forest land converted to other land. However, the Party also reported in its NIR (p.326) that continuation of technical research in order 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 will be implemented in future submissions.</p> <p>During the review, the Party clarified that the calculation of CSC in deadwood carbon pools in land converted to forest land, based on partial results from the above-mentioned research, was included in the CRF tables and the NIR.</p> <p>The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet concluded the technical research to provide reliable data for estimating CSC in living biomass, dead organic matter and soil organic matter.</p>
L.2	4. General (LULUCF) – CO <sub>2</sub> (L.2, 2021) (L.2, 2019) (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 <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i> , and reference the source of those values.	<p>Resolved. The Party did not use default uncertainty values from the <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>, but rather the default uncertainty values from the 2006 IPCC Guidelines. The Party included in NIR table 6.6 (pp.327–328) references for the uncertainty values used.</p> <p>During the review, the Party indicated that further information on uncertainty values was added to NIR chapter 6.5 (pp.327–329).</p>
L.3	4. General (LULUCF) – CO <sub>2</sub> and N <sub>2</sub> O (L.11, 2021) (L.4, 2019) Completeness	Review the estimates of the area of organic soils, in particular as other area values have been suggested in the scientific literature, such as 26 kha (Fazekašová et al., 2021), 35 kha (table 1 in Montanarella et al., 2006), and 60 kha (table 1 in Tanneberger et al., 2017); and report on the entire area of organic soils, and include an analysis demonstrating that emissions are below the significance threshold or, alternatively, report estimates.	<p>Resolved. The Party demonstrated in its NIR (pp.348–351) that emissions from the entire area of organic soils are below the significance threshold in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11. The area of organic soils and the emissions of the organic soils amounted to 450 ha and 8.25 Gg CO<sub>2</sub> eq respectively for the whole time series (1990–2020). The significance threshold was changed to 18.524 Gg CO<sub>2</sub> eq for 1990 and 36.731 Gg CO<sub>2</sub> eq for 2020. The impact on the GHG inventory in the individual years of that period rose from 0.00011 to 0.00022 per cent (NIR table 6.14, pp.350–351).</p> <p>During the review, the Party clarified that the article of Fazekašová et al. (2021) referenced another article affirming an area of organic soils in Slovakia of 26 kha, namely Michalko et al. (1986). According to the relevant publication, the total area of</p>

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L.4	4. General (LULUCF) (L.12, 2021) Comparability	If reporting the area of and emissions from organic soils as “NE” in CRF table 4.B, explain in CRF table 9 the notation key used.	<p>peatlands in Slovakia was assessed as small with the raised bogs covering some 550 ha, the transitional mires covering about 800 ha and, fens covering an area somewhat in excess of 3,000 ha. The larger fens in Slovakia are found in the Podunajská nížina Lowland before the major drainage schemes (Michalko et al., 1986, p.130). In addition, according to Fazekašová et al. (2021), the present map of Slovakia has been reconstructed with the approach of mapping potential vegetation and included a vegetation map depicting the distribution of climax plant communities, shown on page 8 of the vegetation map. The Party also clarified that the situation is very similar to the findings of the other mentioned publications with respect to potential organic soil areas. The Party also referred to a publication on organic soil research which was based on potential organic soil areas (<a href="http://www.vupop.sk/dokumenty/Identifikacia_aktualne_existujucich_organickych_pod.pdf">http://www.vupop.sk/dokumenty/Identifikacia_aktualne_existujucich_organickych_pod.pdf</a>) (see ID# L.4 below).</p> <p>Addressing. The Party reported in CRF table 4.B the area of organic soils as “NE” owing to emissions from organic soils being below the significance threshold (see ID# L.3 above). However, no information on the use of this notation key was provided in CRF table 9.</p> <p>During the review, the Party clarified that CRF table 9 is generated automatically.</p>
L.5	Land representation (L.10, 2021) Transparency	Provide in the NIR an explanation for the cause of the abrupt increase in the areas of settlements and decrease in other land occurring around 1995 and report land representation data for 2016 onward.	<p>Addressing. The Party explained in its NIR (chap. 6.1, p.320) that the abrupt changes in the areas of settlements and other land occurring around 1995 were probably a result of new property owners rushing to get their land recognized as ‘settlement’ during the country’s transition to a market economy.</p> <p>During the review, the Party clarified that it assumes that the increase in the area reported in the settlements category and the reciprocal decline in the area reported in the other land category could be caused by the administrative transfer of other land to settlements following the introduction of a new territorial administrative division of Slovakia (from three to eight regions) and the effort of the new administrators to obtain property in the form of settlements.</p> <p>The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided an explanation for the abrupt increase in the areas of settlements between 2015 and 2016.</p>
L.6	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.4, 2021) (L.14, 2019) Accuracy	Implement the planned improvement to move to a higher-tier method for estimating the CSC in deadwood and include natural mortality in the estimates for this category following the use of a higher-tier method for deadwood, if appropriate.	Resolved. The Party reported in its NIR (p.336) and CRF table 4.A CSC in the deadwood pool for the forest land remaining forest land category, estimated using a tier 2 methodology. The Party included natural mortality in the estimates for this category.

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L.7	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.5, 2021) (L.15, 2019) Accuracy	Investigate whether changes to dead organic matter pools are likely to be significant and if so, include in the inventory dead organic matter estimates in line with the data obtained from the second NFI cycle and/or similar relevant national data. If it is concluded that the changes to the pools are not significant, explain this in the NIR to justify the use of the tier 1 method.	Resolved. The Party reported in its NIR (p.336) CSC in the deadwood pool for the forest land remaining forest land category for the entire time series in line with the data obtained from the first and second NFI (2005–2006 and 2015–2016).
L.8	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.13, 2021) Transparency	(a) Justify the conversion of deadwood volume to biomass and carbon, as well as the use and the applicability of reduction factors for deadwood in different decomposition stages used by Czechia.  (b) Present the methodology for the conversion and use of reduction factors from the NIR of Czechia more clearly and consistently for the relevant categories.	Resolved.  (a) The Party reported in its NIR (p.336) information on the use of reduction factors for deadwood (conversion of deadwood volume to biomass and carbon) in different decomposition stages, categorized as fresh (1.00), hard (0.83), soft (0.66) and decayed (0.5).  (b) These reduction factors were also used in the NIR of Czechia.  The ERT agrees that this information in the NIR resolves the issue in full.
L.9	4.A.2 Land converted to forest land –CO <sub>2</sub> (L.14, 2021) Accuracy	Investigate whether the subcategories under land converted to forest land are significant and consider implementing a higher-tier approach, if appropriate, after considering the available data and the significance of the subcategory. If a tier 1 approach is then applied, include, in the NIR, a more detailed justification of the assumption that biomass on land prior to conversion to forest land is not removed.	Resolved. The Party reported in its NIR (pp.339–340) that the changes in living biomass and deadwood are assumed to be zero at conversion due to common afforestation practices; if any vegetation exists in cropland or grassland it is not removed before conversion to forest land and remains in afforested areas. The Party also reported that land converted to forest land is located exclusively on the steeper slopes of the Carpathian Mountains with less productive soil, while rich soil in the lowlands remains under managed cropland or grassland for economic reasons. Therefore, when these areas are converted to forest land, existing grass vegetation is not removed to prevent intensive soil erosion on mountain slopes.  During the review, the Party clarified that changes in living biomass and deadwood are assumed to be zero at conversion due to common afforestation practices. If any vegetation exists in cropland or grassland it is not removed before conversion to forest land and remains in afforested areas. The Party also clarified that it used equations 2.15 and 2.16 for estimating CSC in biomass in the land converted to forest land category.
L.10	4.B.1 Cropland remaining cropland – CO <sub>2</sub> (L.6, 2021) (L.6, 2019) (L.12, 2017) Completeness	Report the area and associated CSC in organic soils for cropland in CRF table 4.B, replacing the “not occurring” currently reported.	Resolved. The Party reported in its NIR (pp.348–351) the estimation of CSC in organic soils for cropland and demonstrated that the results are below the threshold of significance (see ID# L.3 above). Therefore, the Party reported CSC in CRF table 4.B in organic soils as “NE”.  During the review, the Party highlighted the information provided in the NIR (chap. 6.7.1.1.4, p.348) on the estimation of CSC in organic soils for cropland and the reasons



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			<p>why the results are below the threshold of significance (see ID# L.3 above). The Party also summarized the results of research conducted in 2021 based on a combination of remote sensing, GIS, field survey and laboratory analysis. The aim of this research was to identify existing organic soils, which are managed within the cropland category on selected representative areas and the current state of occurrence of organic soils within arable lands – cropland class in Slovakia (NIR, chap. 6.7.1.4). This research was published in December 2021 (<a href="http://www.vupop.sk/dokumenty/Identifikacia_aktualne_existujucich_organickych_pod.pdf">www.vupop.sk/dokumenty/Identifikacia_aktualne_existujucich_organickych_pod.pdf</a>) and the article of this research is still available on the Soil Science and Conservation Research Institute website at <a href="http://www.vupop.sk/dokumenty/ekologicke_dni_organozeme_final_diskusia_2022_jul.pdf">www.vupop.sk/dokumenty/ekologicke_dni_organozeme_final_diskusia_2022_jul.pdf</a>. Some of the analyses and results will be published by the end of 2022.</p>
L.11	4.B.1 Cropland remaining cropland – CO <sub>2</sub> (L.8, 2021) (L.16, 2019) Transparency	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.	<p>Resolved. The Party reported in its NIR (pp.346–347) on an investigation by relevant experts and institutions regarding perennial crops on options to include periodic cuttings, including, but not limited to, pruning and thinning in the estimation of annual losses in perennial croplands in 2020. According to the results of this investigation, periodic cuttings, pruning and thinning are not included in the estimation of annual losses in perennial croplands owing to the low acreage of these areas, lack of historical data and the use of the cut material in the production of mulch.</p>
Waste			
W.1	5. General (waste) – CH <sub>4</sub> and N <sub>2</sub> O (W.2, 2021) (W.6, 2019) Transparency	Provide information about sludge treatment in the appropriate sections of NIR chapter 7.	<p>Resolved. The Party reported the AD for distribution of domestic sludge and industrial sludge in NIR tables 7.27 and 7.28 (pp.425–426 respectively), including data sources regarding the share of sewage sludge distribution for domestic and industrial sludge treatment. In 2022 there was a change to activity data that led to a change in the treatment of sewage sludge which focused on how sewage sludge produced in the wastewater treatment plants was distributed between landfill, incineration and compost. Previously this information was not included.</p>
W.2	5.A.1 Managed waste disposal sites – CO <sub>2</sub> (W.8, 2021) Convention reporting adherence	Correct the erroneous references in which the burning of LFG is allocated under the waste sector in the waste chapter of the NIR and clearly indicate the amounts of gas burned and its characteristics in the relevant sections of the NIR.	<p>Addressing. The Party reported in NIR table 7.12 (p.408) details of the corrections of the LFG calculation based on the Regulatory Office for Network Industries data for 2011–2020 but indicated in the NIR that emissions from LFG flared with energy use are reported in CRF table 5.A.1. Slovakia explained in its NIR (p.408) that the amount of CH<sub>4</sub> flared without energy recovery is for 2006–2011 and this practice did not exist after 2011. Following the Party’s consultations with the Regulatory Office for Network Industries, small corrections were made to the data on the amount of electricity produced in earlier years and a unified calculation of the CH<sub>4</sub> used for the entire period under the same combustion conditions introduced.</p> <p>During the review, the Party clarified that emissions from the combustion of LFG in cogeneration units for electricity generation are reported in the energy sector. CH<sub>4</sub>,</p>

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			<p>which makes up 50 per cent of landfill gas and which enters the combined heat and power unit as fuel, is reported in the waste sector as recovered CH<sub>4</sub>.</p> <p>The ERT considers that the recommendation has not yet been fully addressed because the Party continues to state in its NIR that emissions from LFG flared with energy use since 2011 are reported in CRF table 5.A.1.</p>
W.3	5.D.1 Domestic wastewater – N <sub>2</sub> O (W.9, 2021) Convention reporting adherence	Correct the reference to the sources of information regarding protein consumption in the relevant sections of the NIR, specifically delete the reference to FAOSTAT data being the source of protein consumption.	Resolved. The Party corrected the reference to the sources of information regarding protein consumption, including by deleting the reference to FAOSTAT. Slovakia reports that data reported on protein consumption are published retrospectively each January by the Statistical Office of the Slovak Republic for the two previous years; therefore, the latest inventory year (2020) is estimated as preliminary and the final value for 2019 is updated in the current submission.
W.4	5.D.1 Domestic wastewater – N <sub>2</sub> O (W.10, 2021) Transparency	Include in the relevant sections of the NIR an explanation of (1) how the protein consumption values are estimated, (2) how provisional data for the latest year are presented and then, the following year, recalculated with the final value and (3) the recalculation.	<p>Resolved. The Party reported in NIR table 7.30 (pp.427–428) estimates of N<sub>2</sub>O emissions from domestic and commercial wastewater by pathways for 1990–2020 using the 2006 IPCC Guidelines and default EFs. Slovakia used new AD on protein consumed provided by the Statistical Office of the Slovak Republic for 2018 and 2019, which led to a recalculation of N<sub>2</sub>O emissions and N in effluent and retention tanks for domestic wastewater.</p> <p>The ERT considers the recommendation resolved in NIR chapters 7.8.1, 7.8.1.1 and 7.8.1.3.</p>
W.5	5.D.2 Industrial wastewater – N <sub>2</sub> O (W.6, 2021) (W.10, 2019) Convention reporting adherence	Correct the erroneous reference to CH <sub>4</sub> emissions in NIR chapter 7.8.2.2.	Resolved. The Party corrected the erroneous reference to CH <sub>4</sub> emissions in NIR chapter 7.8.2.2 and provided additional information on the high uncertainty of N <sub>2</sub> O emissions due to the N <sub>2</sub> O EF from industrial wastewater treatment.
W.6	5.D.2 Industrial wastewater – N <sub>2</sub> O (W.6, 2021) (W.10, 2019) Convention reporting adherence	Provide in the NIR additional information about why there is such a high uncertainty of N <sub>2</sub> O emissions due to the N <sub>2</sub> O EF from industrial wastewater treatment.	Resolved. The high uncertainty for industrial wastewater of –40 per cent has been corrected under NIR chapter 7.8.2.2 (p.431). Slovakia explained in the NIR (chap. 7.8.2.2, p.431) that the default uncertainties are based on the 2006 IPCC Guidelines and were used to assess CH <sub>4</sub> and N <sub>2</sub> O estimates to reflect country-specific data or circumstances. The Party explained in the NIR that on the basis of expert judgment and discussions values of +/-10 per cent for CH <sub>4</sub> and +/-20 per cent were defined for N <sub>2</sub> O emissions, and referred to the list of the most significant EFs and their uncertainty range in table 7.33 (p.431).
KP-LULUCF			
KL.1	General (KP-LULUCF) – CO <sub>2</sub> (KL.15, 2021) Accuracy	Use root-to-shoot ratios for broadleaves and conifers for both FM and deforestation to ensure consistency and consider in the selection of default root-to-shoot ratios the size of the above-ground biomass pool	Resolved. The Party reported in its NIR (p.463) that it used default root-to-shoot ratios for broadleaves and conifers according to the size of the above-ground biomass pool given in the 2006 IPCC Guidelines (vol. 4, chap. 4, table 4.4) for both FM and deforestation, thus ensuring consistency. The Party also reported recalculated emissions/removals in CRF tables 4(KP-I)A.2 and 4(KP-I)B.1.

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		given in the 2006 IPCC Guidelines (vol. 4, chap. 4, table 4.4), which was the focus of recommendation ID# KL.8 in the 2017 review (FCCC/ARR/2017/SVK) for root-to-shoot ratios under deforestation.	
KL.2	AR – CO <sub>2</sub> (KL.8, 2021) Comparability	Identify whether the deadwood pool is significant and, if not significant, report net CSC in deadwood in CRF table 4(KP-I)A.1 as “NE” and include an appropriate justification for the use of this notation key, or, if significant, taking into consideration that AR is a key category, provide estimates for the deadwood pool under AR.	Resolved. The Party provided estimates for CSC in deadwood in CRF table 4(KP-I)A.1 for the commitment period. The Party also reported in its NIR (chap. 11.3.1.1, p.453) the methodology used to estimate CSC in the deadwood carbon pool of AR.
KL.3	FM – CO <sub>2</sub> (KL.4, 2021) (KL.5, 2019) (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 by differences in the factors/parameters, including increments, used in the FMRL and in the actual estimates of emissions and removals, as requested in the Kyoto Protocol Supplement.	Resolved. The Party explained in its NIR (pp.462–463) the main factors responsible for the reporting of a larger sink during the commitment period compared with the FMRL. The Party reported in its NIR (p.466) the policy assumptions by referencing its fourth biennial report (chap. 4, p.49) and its 2021 submission under EU regulation 2018/1999 on governance of the Energy Union and climate action and Commission implementing regulation 2020/1208, Article 18, on policies and measures and Reporter (see <a href="https://reportnet.europa.eu/public/country/SK">https://reportnet.europa.eu/public/country/SK</a> ). The ERT considers that the recommendation has been addressed with regard to explaining the main factors responsible for the reporting of a greater sink during the commitment period compared with the FMRL.
KL.4	FM – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (KL.5, 2021) (KL.6, 2019) (KL.10, 2017) Accuracy	Report the correct FM cap (20,796.023 kt CO <sub>2</sub> eq) in the CRF accounting table.	Resolved. The Party reported in the CRF accounting table the correct value of the FM cap (20,796.023 kt CO <sub>2</sub> eq).
KL.5	FM – CO <sub>2</sub> (KL.7, 2021) (KL.13, 2019) Transparency	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.	Resolved. The Party reported in its NIR (p.341) how to analyse the values of carbon content by different types of soils and site conditions, characterizing different types of forests. The Party calculated mean values of soil organic carbon stocks in each category using data sets from the Forest Monitoring System (112 representative monitoring plots in forests) and Soil Monitoring System (318 monitoring plots). Soil organic carbon stock data were recalculated for the uppermost 30 cm soil layer (topsoil) and compared for three altitudinal zones in each category. For partial results on soil organic carbon content, the Party referred to several articles (Barančíková et al., 2013; Barančíková et al., 2016; Pavlenda et al., 2016).

<i>ID#</i>	<i>Issue/problem classification<sup>a</sup></i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
KL.6	FM – CO <sub>2</sub> (KL.7, 2021) (KL.13, 2019) KP reporting adherence	Provide in the NIR further evidence that the deadwood pool is not a source under FM.	Resolved. The Party reported in its NIR (pp.336, 340, 353, 356, 359 and 362) that it used the results of finished technical analyses for the deadwood carbon pool. The reported estimates for both forest land remaining forest land and FM demonstrate that this pool is not a source under FM. The Party also reported (p.456) that the same assumption was made in countries with similar climatic conditions (Hungary and Czechia).
KL.7	FM – CO <sub>2</sub> (KL.10, 2021) Transparency	Correct the statement in the NIR (p.441 in the 2021 NIR) that no changes in data or methods were made since its 2017 submission and explain the recalculations.	Resolved. The Party explained in its NIR (pp.462–463) all implemented recalculations for the entire commitment period due to changes in data, methods, and factors. The Party also explained (chap. 11.3.1.4, p.457) that the recalculation of the whole time series in the 2022 submission was due to including the deadwood carbon pool and changing the root-to-shoot ratios.
KL.8	FM – CO <sub>2</sub> (KL.11, 2021) KP reporting adherence	Report in the next annual submission, being the year of accounting for the second commitment period of the Kyoto Protocol, on the technical correction by considering the relevant guidance in the Kyoto Protocol Supplement and decisions 2/CMP.7, 2/CMP.8, 6/CMP.9 and 4/CMP.11, including, but not limited to, demonstrating that the method or model used to calculate FMRL <sub>corr</sub> is capable of reproducing the historical data of FM or forest land remaining forest land used for the construction of the FMRL, as reported in the FMRL submission, or if this is not the case, providing a justification for this.	Resolved. The Party reported on the technical correction following the relevant guidance in the Kyoto Protocol Supplement and decisions 2/CMP.7, 2/CMP.8, 6/CMP.9 and 4/CMP.11. Further, the Party demonstrated in its NIR (chap. 11.5.2.3, pp.461–466) that the method used to calculate FMRL <sub>corr</sub> is capable of reproducing the historical data of FM or forest land remaining forest land used for the construction of the FMRL, as reported in the FMRL submission.
KL.9	FM (KL.12, 2021) KP reporting adherence	Demonstrate methodological consistency in its technical correction between the FMRL and reporting for FM during the second commitment period, including in the area accounted for, the treatment of HWP and the accounting of any emissions arising from natural disturbances.	Resolved. The Party demonstrated in its NIR (chap. 11.5.2.3, pp.461–466) the methodological consistency in its technical correction between the FMRL and reporting for FM during the second commitment period, including in the area accounted for, the treatment of HWP. In accordance with paragraph 33(a) of the annex to the decision 2.CMP.7, Slovakia did not apply the provision to exclude emissions from natural disturbances for the accounting for afforestation and reforestation under Article 3, paragraph 3, of the Kyoto Protocol and/or FM under Article 3, paragraph 4, of the Kyoto Protocol during the second commitment period.
KL.10	FM – CO <sub>2</sub> (KL.14, 2021) Accuracy	Ensure that the main factors generating the accounted quantity, namely the difference in net emissions between reporting of FM during the second commitment period and the FMRL, are explained in the next annual	Resolved. The Party reported in its NIR (pp.463–464) information on the main factors generating the accounted quantity (the difference in net emissions between reporting of FM during the second commitment period and the FMRL) with relevant explanations.

<i>ID#</i>	<i>Issue/problem classification<sup>a</sup></i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
		submission when accounting for the second commitment period of the Kyoto Protocol.	The ERT considers that the recommendation has been addressed by ensuring that the main factors generating the accounted quantity, namely the difference in net emissions between reporting of FM during the second commitment period and the FMRL.

<sup>a</sup> References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) in which the issue 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.

#### IV. Issues and problems identified in three or more 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 and/or problems included in table 4 have been identified in three or more successive reviews, including the review of the 2022 annual submission of Slovakia, and had not been addressed by the Party by the time of publication of this review report.

Table 4

##### Issues and/or problems identified in three or more successive reviews and not addressed by Slovakia

<i>ID#</i>	<i>Previous recommendation for issue</i>	<i>Number of successive reviews issue not addresses<sup>a</sup></i>
<b>General</b>		
G.3	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. (This could best be done by providing the results in the format of table 3.2 of the 2006 IPCC Guidelines (vol. 1, chap. 3, p.3.31).)	3 (2019–2022)
<b>Energy</b>		
E.2	Estimate and report CH <sub>4</sub> 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.	4 (2017–2022)
<b>IPPU</b>		
I.5	Report the AD used in the estimation of CO <sub>2</sub> 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 <sub>2</sub> emissions are estimated.	4 (2017–2022)
<b>Agriculture</b>		
A.1	Revise the methodology description in the 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.	3 (2019–2022)

<i>ID#</i>	<i>Previous recommendation for issue</i>	<i>Number of successive reviews issue not addresses<sup>a</sup></i>
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.	7 (2013–2022)
Waste	No issues identified.	
KP-LULUCF	No issues identified.	

<sup>a</sup> Reports on the reviews of the 2018 and 2020 annual submissions of Slovakia have not yet been published. Therefore, 2018 and 2020 were not included when counting the number of successive years for this table. In addition, as the reviews of the Party's 2015 and 2016 annual submissions were conducted together, they are not considered successive reviews and 2015/2016 is counted as one year.

## V. Additional findings made during the individual review of the Party's 2022 annual submission

10. Table 5 presents findings made by the ERT during the individual review of the 2022 annual submission of Slovakia that are additional to those identified in table 3.

Table 5

### Additional findings made during the individual review of the 2022 annual submission of Slovakia

<i>ID#</i>	<i>Finding classification</i>	<i>Description of finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?<sup>a</sup></i>
General			
G.6	Key category analysis	<p>In its NIR (annex 3, table A3.1, p.507), the Party reported information on its key category analysis, for which the ERT asked for the background estimates.</p> <p>During the review, the Party provided the ERT with a spreadsheet showing the relevant calculations, in which the ERT noted calculation errors, as the Party had not updated the figures for all categories. The Party also provided an updated spreadsheet, which changed the number of identified key categories from 33 to 31, for analysis with LULUCF, and maintaining 28 key categories for the analysis without LULUCF. In both cases, the ERT noted that the Party should have considered one more category to add up to more than 95 per cent of the accumulated sum, according to the IPCC methodology (IPCC 2006 Guidelines, vol. 1, chap. 4.3.1, p. 4.17).</p> <p>The ERT recommends that the Party enhance its QA/QC process to ensure a high-quality key category analysis and report a correct key category analysis in the next annual submission.</p>	Yes. Convention reporting adherence
G.7	CPR	The Party reported in its NIR (chap. 12.4, p.472) its CPR, which was calculated through a comparison with the most recently reviewed inventory. The ERT noted that the estimate was calculated based on the 2020 submission rather than on the 2022 submission.	Yes. KP reporting adherence

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? <sup>a</sup>
Energy IPPU	2.C.1 Iron and steel production – CH <sub>4</sub>	<p>During the review, the ERT indicated to the Party that the CPR to be reported in the 2022 annual submission was to be calculated based on the 2020 GHG inventory, which, at the end of the current review process, will be the latest reviewed inventory. The Party accepted this reasoning and provided the correct calculation, although it did not change the final value of the CPR, 182,042,046 t CO<sub>2</sub> eq, which is 90 per cent of its assigned amount. Later in the review week, the Party resubmitted its inventory, which did not change the value of the total emissions without LULUCF and without indirect CO<sub>2</sub> emissions, or the CPR.</p> <p>The ERT concludes that this potential problem of a mandatory nature does not influence the Party’s ability to fulfil its commitments for the second commitment period of the Kyoto Protocol and therefore this issue was not included in the list of potential problems and further questions raised. The ERT agrees with this value for the CPR.</p> <p>No findings for the energy sector additional to those included in table 3 were made by the ERT during the review.</p> <p>Category 2.C.1 is an important key category in Slovakia’s GHG inventory. Slovakia reported in its NIR (chap. 4.9.1, p.171) that steel is produced in one integrated site, which reports CO<sub>2</sub> emissions.</p> <p>Slovakia reported in its NIR (chap. 4.9.1.1, p.171) on CH<sub>4</sub> emissions from iron and steel production that technological emissions from pig iron (2.C.1.b) and steel (2.C.1.a), and emissions from coke electrodes used by the electric arc furnaces in steel production (2.C.1.f) are included in category 2.C.1 (iron and steel production). Owing to the application of a tier 2 methodology, CH<sub>4</sub> emissions were not balanced in line with the IPCC 2006 IPCC Guidelines. In CRF table 2(I).A-Hs2, cell I14, the Party reported CH<sub>4</sub> emissions resulting from sinter production as “IE” and in CRF table 9 that CH<sub>4</sub> emissions are reported under category 1.C.1.a. Similar reporting is done for CH<sub>4</sub> emissions from pig iron and pallets. However, under category 1.C.1.a, CH<sub>4</sub> emissions are reported as “NA”.</p> <p>The 2006 IPCC Guidelines (vol. 3, p.4.23) indicate that the sintering process is part of the integrated iron and steel process and CH<sub>4</sub> is emitted from this process, and provide a methodology and a default CH<sub>4</sub> EF (table 4.2) to estimate CH<sub>4</sub> emissions associated with sinter production (vol. 3, chap. 4.2.2.2, p.4.19). The ERT considers that, by assuming that all the emitted carbon is emitted as CO<sub>2</sub>, Slovakia underestimated the CH<sub>4</sub> emissions, as part of the carbon is emitted as CH<sub>4</sub> during the sintering process.</p> <p>During the review, the Party clarified that it used a methodology based on the carbon balance that does not allow the calculation of CH<sub>4</sub> emissions. Reporting CH<sub>4</sub> emissions from sinter production as “IE” indicates that they are allocated to category 2.C.1.a. The Party confirmed that only the CO<sub>2</sub> emissions are estimated and that there are no CH<sub>4</sub> emission estimates reported under category 2.C.1. Slovakia provided the ERT with a preliminary separate estimate of the CH<sub>4</sub> emissions (7.17 kt CO<sub>2</sub> eq for 2020) using a tier 1 methodology and the EF from the 2006 IPCC Guidelines (vol. 3, chap. 4.2.2.2, p.4.19, and table 4.2). The ERT noted that the underestimate is below the significance threshold for application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11 (18.50 kt CO<sub>2</sub> eq for Slovakia’s 2022 submission) and therefore this issue was not included in the list of potential problems and further questions raised.</p> <p>The ERT recommends that the Party report CH<sub>4</sub> emissions from sintering production under category 2.C.1 (or the category where those emissions are reported) for the entire time series, including a description of the methodologies, AD and EFs used in the estimates. Alternatively, if the Party considers these emissions to be insignificant, the ERT recommends that it report them as “NE” and demonstrate that the likely level of emissions is</p>	Yes. Completeness

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? <sup>a</sup>
		below the significance threshold mentioned in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	
	Agriculture		
A.4	3. General (agriculture) – CH <sub>4</sub> and N <sub>2</sub> O	<p>The Party reported in NIR figure 5.4 (p.250) a comparison of the 2021 and 2022 submissions in the agriculture sector (in Gg CO<sub>2</sub> eq). The ERT noted, however, that the figure shows only 2022 data and 2021 data are missing. During the review, the Party clarified that figure 5.4 presents a comparison between the figures of the March and January 2022 submissions (originally presented to the EU). Slovakia provided the ERT with the corrected figure comparing 2022 and 2021 submissions.</p> <p>The ERT recommends that the Party use the correct figure to compare emissions of the agriculture sector from one submission to the next. The ERT also encourages the Party to improve the QA/QC procedures to avoid reporting errors in the future.</p>	Yes. Convention reporting adherence
A.5	3.A Enteric fermentation – CH <sub>4</sub>	<p>The Party reported in NIR figure 5.15 (p.267) the trend in CH<sub>4</sub> emissions of animals from enteric fermentation in 1990–2020. However, the ERT noted that while CH<sub>4</sub> emissions from enteric fermentation decreased from 1990 to 2020, there was a small percentage increase in 1995 (2.54), 2012 (3.07) and 2015 (0.04). There is no explanation in the NIR as to what caused this increase in CH<sub>4</sub> emissions from enteric fermentation for these years.</p> <p>During the review, the Party explained that the trend in CH<sub>4</sub> emissions from enteric fermentation correlates with the number of livestock, especially the key categories, where the tier 2 approach was implemented. The Party verified the correlation between the parameters (milk yield, weight gain, percentage digestibility of feed ratio and years). Furthermore, the Party gave a detailed explanation of the small increases in 1995, 2012 and 2015. It also clarified that the development of several livestock species in connection with economic change and the transformation of the sector has had an impact on reducing emissions in this sector since 1990.</p> <p>The ERT recommends that the Party include in the NIR an explanation of the key livestock types and drivers of the emission trends under enteric fermentation to ensure clarity on the factors affecting these trends, and information explaining the fluctuations in the trends.</p>	Yes. Transparency
A.6	3.B Manure management – CH <sub>4</sub>	<p>The Party provided in NIR figure 5.17 (p.275) the trend in CH<sub>4</sub> emissions by category within manure management in 1990–2020. The ERT noted that the CH<sub>4</sub> emissions from manure management decreased from 1990 to 2020 by 79.95 per cent and there were small increases in 1995 (3.9 per cent), 2001 (1.4 per cent), 2012 (4.6 per cent), 2014 (3.0 per cent), 2017 (3.9 per cent) and 2018 (3.0 per cent). There were large decreases in 1992 (20.0 per cent), 1998 (14.2 per cent) and 2020 (12.2 per cent). There is no explanation in the NIR as to what caused these decreases.</p> <p>During the review, the Party explained that the swine category has a considerable impact on emission trends in manure management. The number of swine decreased by 7 per cent in 1992, about 12 per cent in 1998 and 9 per cent in 2020. In 1992 and 1998, the number of all animal species except goats decreased. This decline was caused by the economic situation at that time.</p> <p>The ERT recommends that the Party include in the NIR an explanation of the emission trends under manure management and the factors affecting these trends and fluctuations.</p>	Yes. Transparency
A.7	3.B.3 Swine – N <sub>2</sub> O	<p>The Party provided a detailed explanation of the methods used for estimating the N excretion rate for swine in its NIR (chap. 5.9.1, pp.286–288). The ERT noted that the trend in the N excretion rate for breeding swine increased</p>	Yes. Transparency



ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? <sup>a</sup>
		<p>from 1990 to 2015 by 24.16 per cent, then there was a sharp decrease in 2016 of 29.8 per cent, followed by a continuation of the upward trend in 2017–2019. There is no explanation in the NIR as to what caused this sharp decrease in the N excretion rate for breeding swine in 2016. During the review, the Party explained that the N excretion rates were developed based on the N content of the feed. The N intakes were determined from the crude protein content of each feed ingredient. The decrease in crude proteins and cereals had an impact on the decrease of monitored parameters. Pig breeding in Slovakia is beset by problems, mainly the risk of persistent morbidity – African swine fever has been present in herds in Slovakia since 2016 (since 2014 in other EU countries, see State Veterinary and Food Administration website <a href="http://www.svps.sk/zvierata/choroby_amo.asp">www.svps.sk/zvierata/choroby_amo.asp</a>) – and other economic influences such as insufficient investments, which led to decreased numbers of pigs and a decrease in the share of crude protein in feeding doses.</p> <p>The ERT recommends that the Party include in the NIR a discussion of the N excretion rate for breeding swine and how this affects the trends.</p>	
A.8	3.D.a.4 Crop residues – N <sub>2</sub> O	<p>The Party reported growing areas and total N in crops and legumes in 2020 in NIR table 5.73 (p.305). The ERT observed that although the emissions from crop residues in 2022 and all other data (harvested area, crop and crop residues) are different from those of 2021, the AD in the 2022 NIR table 5.73 are the same in those in the 2021 NIR table 5.35. During the review, the Party clarified that the values reported in the 2022 submission are identical to those reported in the 2021 submission because, during the preparation of the NIR, table 5.73 was not updated. Slovakia provided the ERT with a file showing the actual values used in the 2022 submission.</p> <p>The ERT recommends that the Party update NIR table 5.73 with new values for the harvested area, crop and crop residues to reflect the estimates reported in the CRF tables. The ERT also encourages the Party to improve the QA/QC procedures to avoid reporting errors in the future.</p>	Yes. Convention reporting adherence
LULUCF			
L.12	4. General (LULUCF) – CO <sub>2</sub> and N <sub>2</sub> O	<p>The Party reported limited information in its NIR (p.329) on climate zones, for forest land indicating that Slovakia falls under a temperate climate zone. The ERT noted that climate domain and ecological zones are important parameters for determining factors and coefficients for estimating GHG inventories for the LULUCF sector.</p> <p>During the review, the Party clarified that the entire territory of Slovakia lies in the climatic reference region of Western and Central Europe according to the IPCC. According to the 2006 IPCC Guidelines (vol. 4, chap. 3, annex 3A.5, “Default climate and soil classifications”), the Slovakian territory belongs to IPCC climate zone “Cool Temperate Moist”.</p> <p>The ERT recommends that the Party provide further explanation of the climate domain and ecological zones of Slovakia in the LULUCF chapter of its NIR.</p>	Yes. Transparency
L.13	4. General (LULUCF) – CO <sub>2</sub> and N <sub>2</sub> O	<p>The Party reported in its NIR the definition of land-use categories (p.320) and thresholds for forest land (p.442). The ERT noted that the information on wooded land which is below the thresholds for forest land is not clear in these definitions, and neither is the amount of the removals and emissions of such wooded land in the forest land remaining forest land category. Furthermore, some AD (such as annual increment, area, etc.) and selected factors for the estimation of CSC of other wooded land are not clear in the NIR. The ERT also noted that there is no allocation problem between subcategories.</p>	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? <sup>a</sup>
L.14	4.A.1 Forest land remaining forest land – CO <sub>2</sub>	<p>During the review, the Party clarified that wooded land which is below the thresholds for forest land (tree species covering less than 0.3 ha or with density lower than 20 per cent, woody vegetation which potentially cannot exceed 5 m height) is reported as other conifers under the forest land remaining forest land category. According to the Food and Agriculture Organization of the United Nations <i>Global Forest Resources Assessment 2020</i> report (Food and Agriculture Organization of the United Nations, 2020), Slovakia considers as other wooded land the Alpine vegetation zone with <i>Pinus mugo</i> plantations, which is reported under forest land. CSC of other wooded land in forest land remaining forest land represents 0.29 to 17.96 kt carbon/year (0.01 to 2.71 per cent of total removals of the FL remaining FL category in individual years). Other wooded land represents a net sink for the whole reporting period. The area of other conifers (other wooded land) ranges from 18 to 22 kha (1.00 to 1.12 per cent), of the total forest land area in individual years. All AD are reported in NIR tables 6.7, 6.8 and 6.9 (chap. 6.6.1, pp.333–336). The current annual increment of biomass varied from 1.39 to 2.60 m<sup>3</sup>/ha/year, BCEF<sub>I</sub> and BCEF<sub>R</sub> are similar pine tree species.</p> <p>The ERT recommends that the Party provide in its NIR further information on thresholds for land-use definitions and subcategories used. The ERT also recommends that the Party provide clearer information on CSC, AD (such as annual increment, area, etc.) and selected factors for estimation of CSC of other wooded land.</p> <p>The Party reported in NIR table 6.7 (p.334) the BCEF<sub>I</sub> values and in table 6.9 (p.336) the BCEF<sub>R</sub> values for each tree species for the forest land remaining forest land category. The ERT noted that the BCEF<sub>R</sub> values for pine, larch, oak, and beech are lower than the BCEF<sub>I</sub> values of these species. The ERT also noted that the average BCEF<sub>R</sub> value for conifers (0.602) is lower than the average BCEF<sub>S</sub> value for conifers (0.603) and the average BCEF<sub>R</sub> value for broadleaves (0.770) is also very close to the average BCEF<sub>S</sub> value for broadleaves (0.603). The difference between BCEF<sub>R</sub> from other BCEF types is that BCEF<sub>R</sub> covers bark and harvest losses according to the 2006 IPCC Guidelines (vol. 4, chap. 4, p.4.14). This difference is explained in the 2006 IPCC Guidelines as “BCEF<sub>R</sub> and BEF<sub>R</sub> for wood and fuelwood removal will be larger than that for growing stock due to harvest loss. Default conversion and expansion factors for wood removals can be derived by dividing BCEF<sub>S</sub> by (1.– 0.08) for conifers and (1.–0.1) for broadleaves” (vol. 4, chap. 4, p.4.14). Default BCEF<sub>R</sub> values are also higher than BCEF<sub>S</sub> and BCEF<sub>I</sub> values in table 4.5 of the 2006 IPCC Guidelines (vol. 4, chap. 4, p.4.50) due to the inclusion of bark and harvest losses. Therefore, the ERT noted that the incorrect calculation of BCEF values affected the accuracy of the inventory and the low BCEF<sub>R</sub> values may have caused an underestimation of emissions from annual carbon losses due to commercial felling for both the forest land remaining forest land category of LULUCF and FM of KP-LULUCF.</p> <p>During the review, the ERT suggested that BCEF<sub>R</sub> coefficients for conifer species be divided by 0.92 and BCEF<sub>R</sub> coefficients for broadleaves species be divided by 0.9 for adding bark and harvest losses in accordance with the 2006 IPCC Guidelines. The Party revised its calculation on annual carbon losses due to commercial felling for the forest land remaining forest land category of LULUCF and FM of KP-LULUCF with revised BCEF<sub>R</sub> coefficients.</p> <p>The ERT agreed with these revised calculations. The Party resubmitted the LULUCF and KP-LULUCF CRF tables with the revised calculations, which were then accepted by the ERT and the resubmission confirmed. The forest land remaining forest land removals decreased from –7,422.68 kt CO<sub>2</sub> eq to –6,290.29 kt CO<sub>2</sub> eq (15.3 per cent) for 2020 through this resubmission. This revision affected the whole time series (1990–2020).</p>	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? <sup>a</sup>
L.15	4.B.2.1 Forest land converted to cropland – CO <sub>2</sub>	<p>The ERT recommends that the Party provide information on the revised coefficients BCEF<sub>R</sub> for conifer and broadleaves species and clearly describe the related methodological recalculations in the next submission.</p> <p>The Party reported in its NIR (p.352) the use of average BCEF<sub>R</sub> values (0.602 for conifers, 0.770 for broadleaves) for estimating biomass CSC of forest land converted to cropland. The Party reported in NIR table 6.9 (p.336), the use of BCEF<sub>R</sub> values for each tree species in the forest land chapter. The ERT noted the inconsistent use of the same coefficient in the different subcategories of LULUCF.</p> <p>During the review, the Party clarified that the structure of the AD (stock per ha) does not allow the use of BCEF<sub>R</sub> values by tree species. Therefore, it used average values for BCEF<sub>R</sub>. The Party also clarified that it calculated average BCEF<sub>R</sub> coefficients by weighted tree species proportion.</p> <p>During the review, the Party changed the structure of the AD of forest land converted to cropland by species with weighted tree species proportion, which it used for the calculation of BCEF coefficients and revised BCEF<sub>R</sub> values as suggested by the ERT (see ID# L.14 above). The Party also revised its estimate of biomass CSC of forest land converted to cropland by changing the AD structure by tree species and revised BCEF<sub>R</sub> coefficients (see ID# L.14 above) for the forest land converted to cropland category of LULUCF and deforestation of KP-LULUCF with revised BCEF<sub>R</sub> coefficients. The ERT agreed with these revised calculations. The LULUCF and KP-LULUCF CRF tables resubmitted by the Party with revised calculations were accepted by the ERT. The forest land converted to cropland emissions increased from 2.86 kt CO<sub>2</sub> eq to 3.02 kt CO<sub>2</sub> eq (5.5 per cent) for 2020 through this resubmission. These revised estimates were also reflected in the entire time series (1990–2020) in the resubmission.</p>	Yes. Transparency
L.16	4.C.2 Land converted to grassland – CO <sub>2</sub>	<p>The ERT recommends that the Party provide information on the revised estimations, revised AD and revised coefficients and clearly describe the related methodological updates in the next submission.</p> <p>The Party reported in its NIR (p.356) the use of average BCEF<sub>R</sub> values (0.602 for conifers, 0.770 for broadleaves) for estimating CSC of forest land converted to grassland. The Party also reported in NIR table 6.9 (p.336) the use of BCEF<sub>R</sub> values for each tree species in the forest land chapter. The ERT noted that this is not in accordance with the UNFCCC Annex I inventory reporting guidelines.</p> <p>During the review, the Party clarified that the structure of the AD (data of the stock per ha) does not allow the use of BCEF<sub>R</sub> values by tree species. Therefore, it used average values for BCEF<sub>R</sub>. The Party also clarified that it calculates average BCEF<sub>R</sub> coefficients by weighted tree species proportion.</p> <p>During the review, the Party changed the structure of the AD of forest land converted to grassland by species with weighted tree species proportion, which it used for the calculation of BCEF coefficients and revised BCEF<sub>R</sub> values as suggested by the ERT. The Party revised its estimation of biomass CSC of forest land converted to grassland by changing the AD structure by tree species and revised BCEF<sub>R</sub> coefficients (see ID# L.14 above) for the forest land converted to grassland category of LULUCF and deforestation of KP-LULUCF with revised BCEF<sub>R</sub> coefficients. The ERT agreed with these revised calculations. The Party resubmitted the LULUCF and KP-LULUCF CRF tables with the revised calculation, which was accepted by the ERT. The forest land converted to grassland emissions increased from 7.52 kt CO<sub>2</sub> eq to 7.87 kt CO<sub>2</sub> eq (4.7 per cent) for 2020 through this resubmission. These revised estimates were also reflected in the entire time series (1990–2020) in the resubmission.</p>	Yes. Transparency
		<p>The ERT recommends that the Party provide information on the revised estimation, revised AD and revised coefficients and clearly describe the related methodological updates in the next submission.</p>	

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? <sup>a</sup>
L.17	4.G HWP – CO <sub>2</sub>	<p>The Party reported in its NIR (p.366) the AD for HWP available since 1961. However, the HWP AD were aggregated for Czechoslovakia between 1961 and 1993 (when Czechoslovakia was divided into the Czech Republic and Slovakia). The share of both countries was calculated for 1993–1997 and this share applied to 1961–1993. The ERT noted that the HWP AD for 1961–1990 in CRF table 4Gs2 are incomplete and the cells are left empty even though the Party has used the above described AD for estimation and the AD were submitted by Czechia when using a calculated country share of the aggregated data.</p> <p>During the review, the Party confirmed that the HWP AD for 1961–1990 in CRF table 4Gs2 are incomplete. This table will be completed by the Party using the approach used by Czechia in the next submission.</p> <p>The ERT recommends that the Party complete the HWP AD for 1961–1990 in CRF table 4Gs2.</p>	Yes. Comparability
L.18	4.G HWP – CO <sub>2</sub>	<p>The Party reported in NIR table 6.21 (p.367) CSC of HWP for 1990–2020. The ERT noted that there is a large change in the last four years (–1,077.04 Gg CO<sub>2</sub> eq in 2017 to –146.9 Gg CO<sub>2</sub> eq in 2020) and significant changes for 1990–1995, 1995–2000 and 2000–2005. The ERT also noted that the NIR does not include an explanation for these trends.</p> <p>During the review, the Party clarified that the CSC of HWP follows the production approach, and the real use of wood products in the country differs owing to trade with wood products. The HWP production structure in countries differs according to the wood industry structure. HWP production culminated in 2006–2007, just before the 2008 global financial crisis; in Slovakia, the production of sawnwood also accelerated owing to greater availability of wood processed after the destruction of spruce stands by a windstorm in November 2004. While the production of wood-based panels, paper and paperboard is more stable, sawnwood shows higher fluctuations. The wood production and processing sectors in Slovakia as a relatively small country are sensitive to disturbances, for example, the availability of wood due to disturbances in forests, technological processes in wood-processing factories and the situation in the wood products market. The course of carbon stored in the HWP pool (NIR figure 6.30) shows that 1990–2000 following 1990 was characterized by balanced losses and gains of carbon in the pool and a trend of increasing carbon gains in sawnwood and paper is evident. The second decade was characterized by the growth of the production of sawnwood and wood-based panels and increasing carbon gains in these HWP. Later years are characterized by a drop in production in all HWP categories, which is reflected in the annual CSC in HWP (NIR figure 6.30) and 2008 (the start of the economic crisis) can be identified as a breaking point when the trend of increasing gains in the HWP carbon pool turned into a decrease. It is noticeable that in the years since 2008 felling in Slovakia has been higher than in the previous period, indicating an increase in an alternative use of wood, such as for energy purposes. The inventory results indicate that the HWP pool is a carbon sink; however, if the market does not recover and the production stagnates or drops down, the HWP pool may become a source of carbon emissions owing to the decline in the higher gains accumulated in the past. In addition, since 2018 there has been a decrease in timber harvesting in Slovakia, which has caused a decrease in the supply of wood to the domestic market. The decrease in the wood supply since 2019 was due to a decrease in timber harvesting, mainly owing to the coronavirus disease 2019 pandemic, restrictions by nature conservation authorities and the unfavorable situation in the softwood market.</p> <p>The ERT recommends that the Party provide an explanation of the trend of CSC of HWP in its NIR.</p>	Yes. Transparency
L.19	4.G HWP – CO <sub>2</sub>	<p>The Party reported in NIR table 6.20 (p.366) methodological tiers, EFs and default half-lives for each type of HWP from the Kyoto Protocol Supplement, which are used for the estimation of CSC of HWP. The ERT noted that the</p>	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? <sup>a</sup>
		<p>Party did not provide information on other parameters for estimating CSC for HWP, whether default or country-specific, such as densities and carbon fraction for each type of HWP.</p> <p>During the review, the Party clarified that it used the following default conversion factors (from the Kyoto Protocol Supplement, table 2.8.1) for estimating CSC of HWP: sawnwood (aggregate) 0.229, wood-based panels (aggregate) 0.269 and paper and paperboard (aggregate) 0.386.</p> <p>The ERT recommends that the Party provide in its NIR further information on parameters for estimating CSC for HWP, such as densities and carbon fraction for each type of HWP.</p>	
Waste			
W.7	5.D.1 Domestic wastewater – N <sub>2</sub> O	<p>The Party reported in its NIR table 7.33 (p.431) uncertainties for category 5.D.1, including a value of +/-10 per cent for N<sub>2</sub>O emissions and refers to table 7.33 as the category domestic wastewater treatment instead of industrial wastewater treatment. The ERT noted that this is an error and not in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 6.3.3, p.6.27) because the value of +/-20 per cent that was defined for N<sub>2</sub>O emissions in the NIR based on expert judgment was rather +/-10 per cent under table 7.33 in the NIR. Further, NIR table 7.33 refers to domestic wastewater instead of industrial wastewater which is an error.</p> <p>The ERT recommends that the Party corrects this uncertainty value for N<sub>2</sub>O in the NIR with the correct value as determined by expert judgment and refer to table 7.33 as industrial wastewater treatment.</p>	Yes. Convention reporting adherence
KP-LULUCF			
KL.11	Deforestation – CO <sub>2</sub>	<p>The Party reported in its NIR (chap. 11.3.1.1, p.452) the use of average BCEF<sub>S</sub> values (0.603 for conifers, 0.769 for broadleaves) for estimating above-ground biomass carbon stocks on forest land before deforestation in the KP-LULUCF deforestation chapter. The Party also reported in its NIR (pp.334–336) the use of BCEF coefficients for each tree species in the FL remaining FL category.</p> <p>During the review, the Party changed the structure of the deforestation AD by species by using weighted tree species proportions, which it used for calculating BCEF coefficients, and it used BCEF<sub>S</sub> coefficients by tree species as suggested by the ERT. The Party revised its estimation of biomass CSC of deforestation by changing the AD structure by tree species and used BCEF<sub>S</sub> coefficients by tree species for the deforestation chapter of KP-LULUCF with BCEF<sub>S</sub> coefficients by tree species. The ERT agreed with these revised calculations. The Party resubmitted the LULUCF (see ID#s L.15 and L.16 above) and KP-LULUCF CRF tables with the revised calculation, which were accepted by the ERT and the resubmission confirmed. Deforestation emissions increased from 45.17 kt CO<sub>2</sub> eq to 49.18 kt CO<sub>2</sub> eq (8.9 per cent) for 2020 through this resubmission. These revised calculations were also reflected in the whole commitment period in the resubmission.</p>	Not a problem
KL.12	FM – CO <sub>2</sub>	<p>The Party reported in NIR table 6.7 (p.333) the BCEF<sub>I</sub> values and in table 6.9 (p.336) the BCEF<sub>R</sub> values for each tree species for the forest land remaining forest land and KP-LULUCF FM categories. The ERT noted that BCEF<sub>R</sub> values for pine, larch, oak, and beech are lower than the BCEF<sub>I</sub> values of these species. The ERT also noted that the average BCEF<sub>R</sub> value for conifers (0.602) is lower than the average BCEF<sub>S</sub> value for conifers (0.603), and the average BCEF<sub>R</sub> value for broadleaves (0.770) is very close to the average BCEF<sub>S</sub> value for broadleaves (0.603), which is not in line with the 2006 IPCC Guidelines (vol. 4, chap. 4, pp.4.14 and 4.50) (see ID# L.14 above).</p>	Not a problem

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? <sup>a</sup>
		<p>During the review, the ERT suggested that BCEF<sub>R</sub> coefficients for conifer species be divided by 0.92 and BCEF<sub>R</sub> coefficients for broadleaves species be divided by 0.9 in order to add bark and harvest losses in accordance with the 2006 IPCC Guidelines. The Party revised its calculation on annual carbon losses due to commercial felling for the forest land remaining forest land category of LULUCF and FM of KP-LULUCF with revised BCEF<sub>R</sub> coefficients. The ERT agreed with these revised calculations. The Party resubmitted the LULUCF and KP-LULUCF CRF tables with the revised calculation, which were accepted by the ERT and the resubmission confirmed. The FM removals decreased from -7,384.364 kt CO<sub>2</sub> eq to -6,252.263 kt CO<sub>2</sub> eq (15.3 per cent) for 2020 through this resubmission. These revised calculations were also reflected in the whole commitment period in the resubmission.</p>	

<sup>a</sup> 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.

## **VI. Application of adjustments**

11. The ERT did not identify the need to apply any adjustments for the 2022 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**

12. Table I.5 presents the accounting quantities for KP-LULUCF reported by Slovakia and the final values agreed by the ERT. The final quantities of units to be issued and cancelled are presented in table I.6.

## **VIII. Questions of implementation**

13. No questions of implementation were identified by the ERT during the individual review of the Party's 2022 annual submission.

## Annex I

## Overview of greenhouse gas emissions and removals and data and information on activities under Article 3, paragraphs 3–4, of the Kyoto Protocol, as submitted by Slovakia in its 2022 annual submission

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

Table I.1  
**Total greenhouse gas emissions and removals for Slovakia, base year–2020**  
 (kt CO<sub>2</sub> eq)

	<i>Total GHG emissions excluding indirect CO<sub>2</sub> emissions</i>		<i>Total GHG emissions and removals including indirect CO<sub>2</sub> emissions<sup>a</sup></i>		<i>Land-use change (Article 3.7 bis as contained in the Doha Amendment)<sup>b</sup></i>	<i>KP-LULUCF (Article 3.3 of the Kyoto Protocol)<sup>c</sup></i>	<i>KP-LULUCF (Article 3.4 of the Kyoto Protocol)</i>	
	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>			<i>CM, GM, RV, WDR</i>	<i>FM</i>
FMRL								–1 084.00
Base year <sup>d</sup>	64 055.38	73 374.79	64 143.15	73 462.56	NA		NA	
1990	64 055.38	73 374.79	64 143.15	73 462.56				
1995	43 362.64	52 840.35	43 444.73	52 922.44				
2000	39 313.30	48 704.17	39 378.74	48 769.61				
2010	40 412.94	45 624.02	40 462.14	45 673.22				
2011	39 080.46	44 642.64	39 138.08	44 700.25				
2012	35 576.95	42 237.69	35 623.43	42 284.17				
2013	34 486.23	41 915.27	34 532.64	41 961.68		–407.64	NA	–6 129.23
2014	34 729.17	39 959.82	34 778.71	40 009.36		–406.25	NA	–3 946.09
2015	34 904.10	40 657.98	34 960.45	40 714.32		–443.65	NA	–4 510.29
2016	35 299.96	41 126.85	35 352.48	41 179.37		–505.65	NA	–4 321.72
2017	36 492.64	42 215.29	36 540.12	42 262.77		–496.55	NA	–4 269.09
2018	37 332.37	42 081.77	37 385.48	42 134.89		–458.44	NA	–3 397.32
2019	34 263.33	39 776.35	34 308.63	39 821.65		–548.40	NA	–4 076.47
2020	29 409.53	37 002.71	29 455.41	37 048.58		–551.24	NA	–6 252.26

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

<sup>a</sup> The Party reported indirect CO<sub>2</sub> emissions in CRF table 6.

<sup>b</sup> The value reported in this column relates to GHG emissions from conversion of forests (deforestation) in 1990 as contained in the report on the review of the Party's report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol.

<sup>c</sup> Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.



<sup>d</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for all gases except NF<sub>3</sub>, 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.

Table I.2

**Greenhouse gas emissions and removals by gas for Slovakia, excluding land use, land-use change and forestry, 1990–2020**

(kt CO<sub>2</sub> eq)

	<i>CO<sub>2</sub><sup>a</sup></i>	<i>CH<sub>4</sub></i>	<i>N<sub>2</sub>O</i>	<i>HFCs</i>	<i>PFCs</i>	<i>Unspecified mix of HFCs and PFCs</i>	<i>SF<sub>6</sub></i>	<i>NF<sub>3</sub></i>
1990	61 557.96	7 300.92	4 288.77	NO	314.86	NO	0.06	NO
1995	44 224.41	5 644.75	2 897.16	13.32	132.65	NO	10.15	NO
2000	41 201.38	4 834.14	2 601.09	105.04	14.91	NO	13.04	NO
2010	38 453.13	3 907.62	2 670.59	597.24	25.01	NO	19.62	NO
2011	38 042.45	3 866.58	2 145.29	605.03	20.11	NO	20.80	NO
2012	35 956.88	3 740.46	1 911.73	628.20	25.66	NO	21.24	NO
2013	35 611.98	3 718.54	1 952.17	646.88	9.81	NO	22.30	NO
2014	33 705.76	3 521.03	2 103.42	653.84	11.15	NO	14.17	NO
2015	34 524.57	3 518.56	1 913.49	734.88	8.50	NO	14.31	NO
2016	34 965.39	3 470.82	2 057.47	673.37	6.49	NO	5.82	NO
2017	36 160.13	3 442.93	1 904.94	739.06	8.62	NO	7.08	NO
2018	36 156.08	3 340.12	1 918.74	702.77	7.78	NO	9.39	NO
2019	33 821.49	3 318.38	1 946.98	720.74	5.19	NO	8.86	NO
2020	31 140.60	3 261.56	1 944.73	678.88	5.61	NO	17.20	NO
<b>Percentage change 1990– 2020</b>	<b>–49.4</b>	<b>–55.3</b>	<b>–54.7</b>	<b>NA</b>	<b>–98.2</b>	<b>NA</b>	<b>59 370.0</b>	<b>NA</b>

*Note:* Emissions and removals reported for the sector other (sector 6) are not included in this table..

<sup>a</sup> Including indirect CO<sub>2</sub> emissions as reported in CRF table 6.

Table I.3

**Greenhouse gas emissions and removals by sector for Slovakia, 1990–2020**

(kt CO<sub>2</sub> eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1990	56 279.49	9 789.43	5 987.29	–9 319.41	1 406.35	NO
1995	38 723.51	9 389.89	3 504.26	–9 477.71	1 304.78	NO
2000	35 982.78	8 595.28	2 817.09	–9 390.87	1 374.46	NO
2010	32 020.50	9 472.69	2 607.63	–5 211.08	1 572.40	NO

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
2011	31 466.97	9 081.90	2 534.11	-5 562.18	1 617.27	NO
2012	29 208.81	9 001.32	2 427.73	-6 660.74	1 646.31	NO
2013	29 026.03	8 714.19	2 585.58	-7 429.03	1 635.89	NO
2014	26 696.56	8 932.35	2 744.44	-5 230.65	1 636.01	NO
2015	27 346.69	9 139.56	2 537.98	-5 753.87	1 690.10	NO
2016	27 508.71	9 343.88	2 682.97	-5 826.89	1 643.80	NO
2017	28 445.74	9 621.02	2 521.07	-5 722.64	1 674.94	NO
2018	28 295.65	9 606.63	2 543.37	-4 749.40	1 689.23	NO
2019	26 848.46	8 733.63	2 572.24	-5 513.02	1 667.33	NO
2020	24 608.52	8 175.71	2 579.71	-7 593.17	1 684.65	NO
<b>Percentage change 1990–2020</b>	<b>-56.3</b>	<b>-16.5</b>	<b>-56.9</b>	<b>-18.5</b>	<b>19.8</b>	<b>NA</b>

Notes: (1) Slovakia did not report emissions or removals for the sector other (sector 6); the corresponding cells in the CRF tables were left blank; (2) totals include indirect CO<sub>2</sub> emissions reported in CRF table 6.

Table I.4

**Greenhouse gas emissions and removals from activities under Article 3, paragraphs 3–4, of the Kyoto Protocol by activity, base year–2020, for Slovakia**  
(kt CO<sub>2</sub> eq)

	<i>Article 3.7 bis as contained in the Doha Amendment<sup>a</sup></i>	<i>Activities under Article 3.3 of the Kyoto Protocol</i>		<i>FM and elected activities under Article 3.4 of the Kyoto Protocol</i>				
	<i>Land-use change</i>	<i>AR</i>	<i>Deforestation</i>	<i>FM</i>	<i>CM</i>	<i>GM</i>	<i>RV</i>	<i>WDR</i>
FMRL				-1 084				
Technical correction				-3 723.00				
Base year <sup>b</sup>	NA				NA	NA	NA	NA
2013		-454.30	46.66	-6 129.23	NA	NA	NA	NA
2014		-474.49	68.24	-3 946.09	NA	NA	NA	NA
2015		-509.65	66.00	-4 510.29	NA	NA	NA	NA
2016		-536.47	30.82	-4 321.72	NA	NA	NA	NA
2017		-557.71	61.17	-4 269.09	NA	NA	NA	NA
2018		-579.55	121.11	-3 397.32	NA	NA	NA	NA
2019		-591.12	42.72	-4 076.47	NA	NA	NA	NA
2020		-600.42	49.18	-6 252.26	NA	NA	NA	NA
<b>Percentage change base year–2020</b>					<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

<sup>a</sup> The value reported in this column relates to 1990.

<sup>b</sup> 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.

2. Table I.5 provides information on the Party's accounting quantities for reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

**Table I.5**  
**Accounting quantities for activities under Article 3, paragraph 3, and forest management and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol for Slovakia**

(kt CO<sub>2</sub> eq)

GHG source/sink activity	Net emissions/removals										Accounting parameters	Accounting quantities <sup>a</sup>
	Base year <sup>b</sup>	2013	2014	2015	2016	2017	2018	2019	2020	Total <sup>c</sup>		
A.1. AR		-454.299	-474.489	-509.652	-536.465	-557.715	-579.551	-591.120	-600.417	-4303.708		-4 303.708
Excluded emissions from natural disturbances <sup>d</sup>		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
Excluded subsequent removals from land subject to natural disturbances		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
A.2. Deforestation		46.664	68.243	66.000	30.816	61.167	121.108	42.721	49.181	485.901		485.902
B.1. FM												
Net emissions/removals		-6 129.228	-3 946.094	-4 510.286	-4 321.724	-4 269.087	-3 397.323	-4 076.465	-6 252.264	-36 902.471		1 553.530
Excluded emissions from natural disturbances		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
Excluded subsequent removals from land subject to natural disturbances		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
Any debits from newly established forest		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
FMRL <sup>e</sup>												-1 084.000

GHG source/sink activity	Net emissions/removals										Accounting parameters	Accounting quantities <sup>a</sup>
	Base year <sup>b</sup>	2013	2014	2015	2016	2017	2018	2019	2020	Total <sup>c</sup>		
Technical corrections to FMRL											-3 723.000	
FM cap											20 796.023	1 553.530
B.2. CM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.3. GM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.4. RV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.5. WDR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA

<sup>a</sup> The accounting quantity is the total quantity of units to be issued or cancelled for a particular activity.

<sup>b</sup> Net emissions and removals from CM, GM, RV and/or WDR, if elected, in the Party's base year as established in decision 9/CP.2.

<sup>c</sup> Cumulative net emissions and removals for all years of the commitment period reported in the annual submission under review.

<sup>d</sup> The Party indicated that it is excluding emissions from natural disturbances at the end of the commitment period.

<sup>e</sup> As inscribed in the appendix to the annex to decision 2/CMP.7 in kt CO<sub>2</sub> eq per year.

3. Table I.6 provides an overview of key data from Slovakia's reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.6

**Key data for Slovakia under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2022 annual submission**

<i>Parameter</i>	<i>Data values</i>
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: not elected (g) WDR: not elected
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	None
Election of application of provisions for natural disturbances	No
3.5% of total base-year GHG emissions, excluding LULUCF and including indirect CO <sub>2</sub> emissions	2 599.503 kt CO <sub>2</sub> eq (20 796.023 kt CO <sub>2</sub> 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	Issue 4 303 708 RMUs
2. Deforestation	Cancel 485 902 units
3. FM	Cancel 1 553 530 units

*Note:* Values in this table reflect the accounting quantities for activities under Article 3, para. 3, and FM and any elected activities under Article 3, para. 4, of the Kyoto Protocol as reported in table I.5.

## Annex II

### Information to be included in the compilation and accounting database

Tables II.1–II.8 include the information to be included in the compilation and accounting database for Slovakia. Data shown are from the Party's annual submission, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table II.1

#### Information to be included in the compilation and accounting database for 2020, including on the commitment period reserve, for Slovakia (t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>CPR</b>	<b>182 042 046</b>	–	–	<b>182 042 046</b>
<b>Annex A emissions</b>				
CO <sub>2</sub>	31 140 603	–	–	31 140 603
CH <sub>4</sub>	3 261 560	–	–	3 261 560
N <sub>2</sub> O	1 944 732	–	–	1 944 732
HFCs	678 876	–	–	678 876
PFCs	5 609	–	–	5 609
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF <sub>6</sub>	17 201	–	–	17 201
NF <sub>3</sub>	NO	–	–	NO
<b>Total Annex A sources<sup>a</sup></b>	<b>37 048 582</b>	–	–	<b>37 048 582</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–600 417	–	–	–600 417
Deforestation	45 168	49 181	–	49 181
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–7 384 365	–6 252 264	–	–6 252 264

<sup>a</sup> The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.2

#### Information to be included in the compilation and accounting database for 2019 for Slovakia (t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	33 821 489	–	–	33 821 489
CH <sub>4</sub>	3 318 384	–	–	3 318 384
N <sub>2</sub> O	1 946 983	–	–	1 946 983
HFCs	720 738	–	–	720 738
PFCs	5 191	–	–	5 191
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF <sub>6</sub>	8 865	–	–	8 865
NF <sub>3</sub>	NO	–	–	NO
<b>Total Annex A sources<sup>a</sup></b>	<b>39 821 651</b>	–	–	<b>39 821 651</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–591 120	–	–	–591 120
Deforestation	39 243	42 721	–	42 721

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	-5 431 276	-4 076 465	-	-4 076 465

<sup>a</sup> The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.3

**Information to be included in the compilation and accounting database for 2018 for Slovakia**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	36 156 085	-	-	36 156 085
CH <sub>4</sub>	3 340 117	-	-	3 340 117
N <sub>2</sub> O	1 918 740	-	-	1 918 740
HFCs	702 771	-	-	702 771
PFCs	7 780	-	-	7 780
Unspecified mix of HFCs and PFCs	NO	-	-	NO
SF <sub>6</sub>	9 393	-	-	9 393
NF <sub>3</sub>	NO	-	-	NO
<b>Total Annex A sources<sup>a</sup></b>	<b>42 134 886</b>	-	-	<b>42 134 886</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	-579 551	-	-	-579 551
Deforestation	111 570	121 108	-	121 108
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	-4 832 568	-3 397 323	-	-3 397 323

<sup>a</sup> The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.4

**Information to be included in the compilation and accounting database for 2017 for Slovakia**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	36 160 133	-	-	36 160 133
CH <sub>4</sub>	3 442 931	-	-	3 442 931
N <sub>2</sub> O	1 904 939	-	-	1 904 939
HFCs	739 057	-	-	739 057
PFCs	8 623	-	-	8 623
Unspecified mix of HFCs and PFCs	NO	-	-	NO
SF <sub>6</sub>	7 083	-	-	7 083
NF <sub>3</sub>	NO	-	-	NO
<b>Total Annex A sources<sup>a</sup></b>	<b>42 262 766</b>	-	-	<b>42 262 766</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	-557 715	-	-	-557 715
Deforestation	56 202	61 167	-	61 167
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	-5 650 319	-4 269 087	-	-4 269 087

<sup>a</sup> The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.5

**Information to be included in the compilation and accounting database for 2016 for Slovakia**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	34 965 393	–	–	34 965 393
CH <sub>4</sub>	3 470 823	–	–	3 470 823
N <sub>2</sub> O	2 057 473	–	–	2 057 473
HFCs	673 370	–	–	673 370
PFCs	6 490	–	–	6 490
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF <sub>6</sub>	5 818	–	–	5 818
NF <sub>3</sub>	NO	–	–	NO
<b>Total Annex A sources<sup>a</sup></b>	<b>41 179 369</b>	<b>–</b>	<b>–</b>	<b>41 179 369</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–536 465	–	–	–536 465
Deforestation	28 281	30 816	–	30 816
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–5 715 633	–4 321 724	–	–4 321 724

<sup>a</sup> The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.6

**Information to be included in the compilation and accounting database for 2015 for Slovakia**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	34 524 573	–	–	34 524 573
CH <sub>4</sub>	3 518 558	–	–	3 518 558
N <sub>2</sub> O	1 913 485	–	–	1 913 485
HFCs	734 885	–	–	734 885
PFCs	8 504	–	–	8 504
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF <sub>6</sub>	14 314	–	–	14 314
NF <sub>3</sub>	NO	–	–	NO
<b>Total Annex A sources<sup>a</sup></b>	<b>40 714 320</b>	<b>–</b>	<b>–</b>	<b>40 714 320</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–509 652	–	–	–509 652
Deforestation	60 527	66 000	–	66 000
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–5 887 248	–4 510 286	–	–4 510 286

<sup>a</sup> The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.7

**Information to be included in the compilation and accounting database for 2014 for Slovakia**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	33 705 755	–	–	33 705 755
CH <sub>4</sub>	3 521 027	–	–	3 521 027
N <sub>2</sub> O	2 103 421	–	–	2 103 421



	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
HFCs	653 839	–	–	653 839
PFCs	11 148	–	–	11 148
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF <sub>6</sub>	14 168	–	–	14 168
NF <sub>3</sub>	NO	–	–	NO
<b>Total Annex A sources<sup>a</sup></b>	<b>40 009 360</b>	<b>–</b>	<b>–</b>	<b>40 009 360</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–474 489	–	–	–474 489
Deforestation	62 625	68 243	–	68 243
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–5 342 803	–3 946 094	–	–3 946 094

<sup>a</sup> The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.8

**Information to be included in the compilation and accounting database for 2013 for Slovakia**(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
<b>Annex A emissions</b>				
CO <sub>2</sub>	35 611 976	–	–	35 611 976
CH <sub>4</sub>	3 718 536	–	–	3 718 536
N <sub>2</sub> O	1 952 173	–	–	1 952 173
HFCs	646 878	–	–	646 878
PFCs	9 810	–	–	9 810
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF <sub>6</sub>	22 303	–	–	22 303
NF <sub>3</sub>	NO	–	–	NO
<b>Total Annex A sources<sup>a</sup></b>	<b>41 961 679</b>	<b>–</b>	<b>–</b>	<b>41 961 679</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol</b>				
AR	–454 299	–	–	–454 299
Deforestation	42 868	46 664	–	46 664
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</b>				
FM	–7 307 748	–6 129 228	–	–6 129 228

<sup>a</sup> The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

## **Annex III**

### **Additional information to support findings in table 2**

#### **Missing categories that may affect completeness**

The category for which estimation methods are included in the 2006 IPCC Guidelines that were reported as “NE” or for which the ERT otherwise determined that there may be an issue with the completeness of the reporting in the Party’s inventory is 2.C.1 iron and steel production (CH<sub>4</sub>) (see ID# I.6 in table 5).

## Annex IV

### Reference documents

#### A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. J Penman, M Gytarsky, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf.html>.

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>.

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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 <https://www.ipcc.ch/publication/2013-supplement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories-wetlands/>.

#### B. UNFCCC documents

##### Annual review reports

Reports on the individual reviews of the 2013, 2014, 2015, 2017, 2019 and 2021 annual submissions of Slovakia, contained in documents FCCC/ARR/2013/SVK, FCCC/ARR/2014/SVK, FCCC/ARR/2015/SVK, FCCC/ARR/2017/SVK, FCCC/ARR/2019/SVK and FCCC/ARR/2021/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/documents/510888>.

Annual status report for Slovakia for 2022. Available at [https://unfccc.int/sites/default/files/resource/asr2022\\_SVK.pdf](https://unfccc.int/sites/default/files/resource/asr2022_SVK.pdf).

#### C. Other documents used during the review

Responses to questions during the review were received from Janka Szemesová (Slovak Hydrometeorological Institute), including additional material on the methodology and assumptions used. The following references may not conform to UNFCCC editorial style as some have been reproduced as received:

Branchioma, G.; Makovníková, J.; Halas, J. 2016: Effect of land use change on soil organic carbon. Agriculture (Poľnohospodárstvo), vol. 62, 1, pp. 10-18.

Barančíková, G.; Makovníková, J.; Skalský, R.; Tarasovičová, Z.; Nováková, M.; Halás, J.; Koco, Š.; Gutteková, M. 2013: Changes in organic carbon pool in agricultural soils and its different development in individual agro-climatic regions of Slovakia. Agriculture (Poľnohospodárstvo), vol. 59, 2013, no. 1, pp. 9–20.

Food and Agriculture Organization of the United Nations, *Global Forest Resources Assessment 2020*, Rome

Fazekašová et al., 2021. *Chemical and Phytocoenological Characteristics of Two Different Slovak Peatlands*. Available at <https://doi.org/10.3390/plants10071290>.

J. Michalko et al. Geobotanická mapa ČSSR slovenská socialistická republika, Veda, Vydavateľstvo slovenskej akadémie vied, Bratislava 1986, 165 pp., 57 Figs, under separated cover 12 maps (color.), price Kčs 92, <https://link.springer.com/article/10.1007/BF02853343>

Michal Sviček, et al, Identification and analysis of organic soils managed within the category Croplands. *Research Institute of Soil Science and Soil Protection* Bratislava, 2021 Available at [www.vupop.sk/dokumenty/Identifikacia\\_aktualne\\_existujucich\\_organickych\\_pod.pdf](http://www.vupop.sk/dokumenty/Identifikacia_aktualne_existujucich_organickych_pod.pdf)

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Montanarella et al., 2006. *The distribution of peatland in Europe*. Available at <http://www.mires-and-peat.net/pages/volumes/map01/map0101.php>.

Pavlena, P.; Priwitzer, T.; Capuliak, J.; Šebeň, V.; Bošľa, M.; Pajčík, J.; Raši, R.; Pavlendová, H. 2016: Proposal for improvement of input data and procedures in the national methodology of greenhouse gases inventory in the LULUCF sector. Applicable deliverable of the project APVV-0243-11 Evaluation and modelling of carbon stocks in forest ecosystems for GHG inventory in the country (C-FORLAND), NFC, 20 pp. (in Slovak).

Tanneberger et al., 2017. *The peatland map of Europe*. Available at <http://www.mires-and-peat.net/pages/volumes/map19/map1922.php>.

Torma, Stanislav, 2017. *Postharvest residues of sugar beet and their role in the nutrient cycle*.

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