



United Nations

FCCC/ARR/2019/CZE



Framework Convention on  
Climate Change

Distr.: General  
23 January 2020

English only

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## **Report on the individual review of the annual submission of Czechia submitted in 2019\***

**Note by the expert review team**

### *Summary*

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


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

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## Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
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”
AWMS	animal waste management system
B <sub>0</sub>	maximum methane-producing capacity of manure
CER	certified emission reduction
CF <sub>4</sub>	tetrafluoromethane
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”
CPR	commitment period reserve
CRF	common reporting format
CSC	carbon stock change
CZSO	Czech Statistical Office
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
F <sub>I</sub>	stock change factor for input of organic matter
F <sub>LU</sub>	stock change factor for a land-use system or subsystem for a particular land use
FM	forest management
F <sub>MG</sub>	stock change factor for management regime
FMRL	forest management reference level
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance	<i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i>
IPCC good practice guidance for LULUCF	<i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>
IPPU	industrial processes and product use
KP-LULUCF activities	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol

Kyoto Protocol Supplement	<i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i>
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
MCF	methane correction factor
N	nitrogen
N <sub>2</sub> O	nitrous oxide
NA	not applicable
NE	not estimated
Nex	nitrogen excretion rate
NFI	national forest inventory
NF <sub>3</sub>	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
NR	not reported
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
R	reported
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF <sub>6</sub>	sulfur hexafluoride
TOW	total organic waste
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<sup>1</sup>

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

Table 1

### Composition of the expert review team that conducted the review of Czechia

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

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

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

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

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

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

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

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

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

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

## II. Summary and general assessment of the 2019 annual submission

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

Table 2

### Summary of review results and general assessment of the inventory of Czechia

Assessment		Issue or problem ID#(s) in table 3, 5 and/or 6 <sup>a</sup>	
Dates of submission	Original submission: 12 April 2019 (NIR), 12 April 2019 (CRF tables) version 1, 29 April 2019 (SEF tables)		
Review format	Desk review		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	Yes	G.4, G.14
	(b) Selection and use of methodologies and assumptions?	Yes	A.15, A.23, L.12, L.26
	(c) Development and selection of EFs?	Yes	I.2
	(d) Collection and selection of AD?	Yes	E.3, E.4, L.6, L.11, W.6, W.7, W.18, KL.3
	(e) Reporting of recalculations?	Yes	E.8, I.19, A.28, A.29, W.17
	(f) Reporting of a consistent time series?	Yes	I.20, A.32, L.24
	(g) Reporting of uncertainties, including methodologies?	No	
	(h) QA/QC?		QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below)
	(i) Missing categories/completeness? <sup>b</sup>	Yes	E.7, I.1, W.8, KL.9
	(j) Application of corrections to the inventory?	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	No	E.7
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes	
Supplementary information under	Have any issues been identified related to the following aspects of the national system:		

<i>Assessment</i>	<i>Issue or problem ID#(s) in table 3, 5 and/or 6<sup>a</sup></i>		
the Kyoto Protocol	(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?	Yes	G.1
	Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry?	No	
	(b) Performance of the functions of the national registry and the technical standards for data exchange?	No	
	Have any issues been identified related to reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the standard independent assessment report?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	No	
	Have any issues been identified related to the following reporting requirements for KP-LULUCF activities:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	Yes	KL.7, KL.14
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	Yes	KL.11, KL.12, KL.13
(c) Reporting requirements of decision 6/CMP.9?	Yes	KL.11	
(d) Country-specific information to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33–34?	NA		
CPR	Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Did the Party submit a revised estimate to replace a previously applied adjustment?	NA	Czechia does not have a previously applied adjustment
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Partially	G.4, G.14, A.36
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	

<i>Assessment</i>	<i>Issue or problem ID#(s) in table 3, 5 and/or 6<sup>a</sup></i>
Questions of implementation	No

<sup>a</sup> The ERT identified additional issues and/or problems in all sectors as well as issues and/or problems related to reporting on KP-LULUCF activities that are not listed in this table but are included in tables 5–6.

<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 issues and/or problems raised in the previous review report

8. Table 3 compiles all the recommendations made in previous review reports that were included in the previous review report, published on 23 March 2018.<sup>4</sup> For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2019 annual submission and provided the rationale for its determination, which takes into consideration the publication date of the previous review report and national circumstances.

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

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	Archiving (G.10, 2017) KP reporting adherence	Improve the documentation on how qualitative information (e.g. expert judgment) on key parameters (e.g. the parameters used in the uncertainty analysis) is generated and improve the archiving of this information in order to improve transparency.	Addressing. Czechia did not improve the documentation on how qualitative information (e.g. expert judgment) on key parameters is generated. Although the expert judgments on uncertainty values are documented in the NIR tables on uncertainty, many mentions of expert judgment in the NIR are still not clearly documented (e.g. on pp.108, 220–227, 255 and 286). The NIR indicates that the archiving system for this information was updated in 2017, and includes the schema for the archiving process (section 1.3.2, p.38) as in the 2017 NIR. During the review, the Party informed the ERT that all the data needed for estimating emissions and other related quantitative and qualitative information are uploaded to the archive with the inventory submission – this process is part of the inventory preparation – but did not provide the ERT with any additional information on how the documentation of qualitative information has been improved.
G.2	Article 3, paragraph 14, of the Kyoto Protocol (G.1, 2017) (G.9, 2016) (G.9, 2015) (108, 2014)	Report any changes in the information provided under Article 3, paragraph 14, of the Kyoto Protocol in accordance with decision 15/CMP.1, annex, chapter I.H, and/or further relevant	Resolved. Czechia reported the changes since the previous submission regarding the information provided under Article 3, paragraph 14, of the Kyoto Protocol in the NIR (chap. 15, p.388).

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



ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
G.3	<p>KP reporting adherence</p> <p>CPR (G.2, 2017) (G.15, 2016) (G.15, 2015)</p> <p>KP reporting adherence</p>	<p>decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.</p> <p>Calculate and report the CPR correctly.</p>	<p>Resolved. Czechia correctly calculated the CPR and reported it in the NIR (section 12.5, p.384). The CPR is calculated on the basis of 90 per cent of the assigned amount.</p>
G.4	<p>Key category analysis (G.4, 2017) (G.11, 2016) (G.11, 2015)</p> <p>Convention reporting adherence</p>	<p>Provide in the NIR a key category analysis that is prepared in accordance with the 2006 IPCC Guidelines.</p>	<p>Not resolved. Czechia did not correctly apply the threshold for identifying key categories. During the review, the Party explained that it prepared its key category analysis following the approach presented in the 2006 IPCC Guidelines (vol. 1, chap. 4) as per the recommendation made by the ERT of the 2017 in-country review, and that it included the first category that surpasses the threshold in the analysis as key as per the recommendation made by the ERT of the 2016 centralized review. However, the current ERT noted that in some cases the Party incorrectly identified as key one or two additional categories; for example, in NIR table A1-1 (approach 1 – level including LULUCF), categories 1.B.2.b (natural gas – CH<sub>4</sub>) and 1.A.1 (energy industries – liquid fuels – CO<sub>2</sub>); in NIR table A1-2 (approach 1 – trend including LULUCF), category 1.A.4 (other sectors – solid fuels – CH<sub>4</sub>); and in NIR table A1-3 (approach 1 – level excluding LULUCF), category 1.B.2.b (natural gas – CH<sub>4</sub>).</p>
G.5	<p>Key category analysis (G.13, 2017)</p> <p>Convention reporting adherence</p>	<p>Shift fully to the 2006 IPCC Guidelines methodology when conducting the key category analysis, specifically by providing a more detailed and accurate level of category disaggregation for the energy sector (e.g. further disaggregating stationary combustion into categories 1.A.1 (energy industries), 1.A.2 (manufacturing industries and construction), 1.A.4 (other sectors) and 1.A.5 (other (fuel combustion))).</p>	<p>Resolved. Czechia changed its key category analysis methodology, specifically by using a more detailed level of category disaggregation for the energy sector, as recommended. The category structure of the analysis now complies with the 2006 IPCC Guidelines (vol. 1, chap. 4).</p>
G.6	<p>Key category analysis (G.13, 2017)</p> <p>Convention reporting adherence</p>	<p>Explain in the NIR any relevant changes to the results of the key category analysis after fully implementing the 2006 IPCC Guidelines.</p>	<p>Resolved. Czechia transparently reported the results of the key category analysis after changing the structure of the categories (see ID# G.5 above).</p>
G.7	<p>KP-LULUCF activities supplementary information (G.6, 2017) (G.15, 2016) (G.15, 2015)</p> <p>Transparency</p>	<p>Conduct QA/QC procedures on the reporting elements under the Kyoto Protocol.</p>	<p>Resolved. Czechia reiterated its view that the QA/QC procedures for the LULUCF sector apply to KP-LULUCF activities, and included information on both in the same section of the NIR (section 1.2.3.5.6, p.35). The ERT agrees with this approach.</p>

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
G.8	QA/QC and verification (G.14, 2017) Convention reporting adherence	Incorporate a specific procedure into the inventory planning process for prompt reflection of QA/QC findings in the new cycle in order to drive continued inventory improvement, either by making appropriate corrections or providing transparent explanations in the next submission or by integrating the feedback into the improvement plan.	Resolved. Czechia provided transparent information on its QA/QC procedures, including the feedback process (e.g. figure 1-2), in the NIR (section 1.2.3). During the review, the Party provided the ERT with further information on the feedback process, explaining that the sector-specific improvement plan in the NIR is the main organizing tool for continually improving the inventory. The planned improvements reflect internal QA/QC findings and recommendations from previous review reports. Czechia incorporates the feedback, discussing the improvements with the experts involved in preparing the inventory. When necessary, prioritization and timing of improvements are discussed and arranged with individual experts. The Party clarified that QC findings are recorded on QA/QC checklists by sectoral experts and appropriate corrective actions are then taken for the next submission.
G.9	QA/QC and verification (G.15, 2017) Transparency	Use the 2006 IPCC Guidelines as the only guidelines in QA/QC procedures and remove all outdated references to earlier IPCC guidelines from the NIR in order to improve transparency and comparability.	Addressing. Czechia implemented the recommendation in the LULUCF chapter of the NIR (chap. 6). However, some citations of the IPCC good practice guidance and the IPCC good practice guidance for LULUCF remain elsewhere in the NIR and need updating (e.g. on pp.9, 26, 39, 246 and 348).
G.10	QA/QC and verification (G.16, 2017) Transparency	Include detailed and consistent information on QA procedures in the NIR, including information on the annual QA procedures conducted at the sector level as well as the audits conducted on the whole inventory system once every three years.	Resolved. In the NIR, Czechia included information on QA activities in both the QA/QC plan section (section 1.2.3) and the recalculations and improvements chapter (chap. 10). During the review, the Party added that sectoral experts describe changes and improvements resulting from QA findings in the category-specific sections of the NIR. Further, the QA findings from the UNFCCC review process assist in prioritizing planned improvements.
G.11	Recalculations (G.17, 2017) Transparency	Describe only the recalculations made between the previous submission and the current submission.	Resolved. Czechia reported only the recalculations made between the previous and current submission, both in chapter 10 (on recalculations and improvements) and in the sectoral chapters of the NIR.
G.12	Uncertainty analysis (G.9, 2017) (G.13, 2016) (G.13, 2015) Transparency	Include explanatory information on the source of the uncertainty values for EFs for all categories included in categories 4.A–G reported in section 1.6 of and annex 2 to the NIR.	Resolved. Czechia implemented the recommendation in the 2018 and 2019 submissions, reporting explanatory information on the sources of uncertainty of all background data used in the estimation of emissions for categories 4.A–G in the relevant sections of chapter 6 of the NIR. The main sources of the uncertainties used are default IPCC values and values obtained from the 2014–2015 CzechTerra landscape inventory.
G.13	Uncertainty analysis (G.18, 2017)	Correct the values for the level and trend uncertainty reported in annex 2 and make them consistent with	Resolved. Czechia reported consistent values for the level and trend uncertainty in section 1.6 of and annex 2 to the NIR.

ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
	Convention reporting guidelines	the values reported in NIR section 1.6.	
Energy			
E.1	1. General (energy sector) (E.14, 2017) Convention reporting adherence	Correct the following errors identified: for 2014, in NIR table 3-26, report CH <sub>4</sub> emissions from solid fuels under category 1.A.1.c.i as 0.0613 kt CH <sub>4</sub> ; for 2015, clarify in NIR table 3-63 that jet kerosene consumption is reported under category 1.A.5 in the CRF tables; in NIR table A4-3, report data for crude oil in the correct row; and correctly report AD and emissions for the information item waste incineration with energy recovery in CRF table 1.A(a)s4.	Resolved. Czechia corrected the listed data errors identified in the NIR tables and CRF tables of the 2017 submission in the 2019 submission.
E.2	Fuel combustion – reference approach – all fuels (E.2, 2017) (E.21, 2016) (E.20, 2015) Transparency	Provide an explanation for the differences in CO <sub>2</sub> emission estimates between the reference and the sectoral approach when they are higher than 2 per cent.	Resolved. Czechia reported the significant differences between the reference and the sectoral approach as being due mainly to statistical differences and distribution losses reported in the energy balances (NIR, section 3.2.1). Table 3-8 of the NIR provides values for the statistical differences and distribution losses for the four years for which the differences in CO <sub>2</sub> emission estimates between the two approaches are greater than 2 per cent. The table also shows the decrease in the differences when the statistical differences and distribution losses are considered (e.g. from 5.25 to 2.65 per cent for 2004). After correcting for these differences, only the estimates for 1995, 1996 and 2004 have a difference of more than 2 per cent (2004 has the largest difference). Considering the small residual differences in excess of 2 per cent, the ERT concludes that this issue does not need further analysis.
E.3	1.A.2.f Non-metallic minerals – other fossil fuels – CH <sub>4</sub> and N <sub>2</sub> O (E.17, 2017) Accuracy	Revise the estimates and report CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O emissions from the biogenic fraction (CH <sub>4</sub> and N <sub>2</sub> O emissions reported under category 1.A.2.f; CO <sub>2</sub> emissions reported as a memo item) of alternative fuels used in non-metallic industry for the whole time series.	Not resolved. Czechia did not revise the biomass data between the 2017 and 2019 submissions or provide in the 2019 NIR further explanation of the reporting of the biogenic fraction of the alternative fuels used in cement industry. The previous ERT noted that the amounts reported under biomass in the CRF tables were lower than the amounts reported in the EU ETS reports. During the review, the Party explained that the data on alternative fossil fuels are reported under the EU ETS. Alternative biomass fuels are reported in CZSO surveys. These data, covering all biomass consumption for the category in the country, are then used in the inventory. However, it is not clear whether some of the data collected comprise mixed fuels (with fossil and biogenic components). The ERT noted that the assumption that the official energy statistics include the biogenic fraction but

ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
E.4	1.A.3.a Domestic aviation – jet kerosene – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.19, 2017) Accuracy	Obtain more accurate data on jet kerosene consumption for domestic aviation, following the approaches set out in the 2006 IPCC Guidelines (vol. 2, chap. 3.6.1.3), by obtaining either top-down data on jet kerosene consumption from taxation authorities or bottom-up data from surveys of airline companies or air traffic control records (e.g. data from EUROCONTROL, the European Organisation for the Safety of Air Navigation, on the number of domestic and international flights by aircraft type) (the higher fuel consumption per km for domestic flights should be considered in this approach).	not the fossil fraction needs confirmation. The ERT also noted that the NIR is not sufficiently clear regarding the accounting of mixed fuels. The ERT further noted that the biomass consumption reported under category 1.A.2.f is very low compared with the amount of other fossil fuels reported.  Not resolved. Czechia used the same methodology for obtaining data on jet kerosene consumption for domestic aviation as for the 2017 submission. During the review, the Party explained that it is working on methodological improvements, which are planned to be completed by the end of 2021.
E.5	1.A.3.b Road transportation – liquid fuels – CO <sub>2</sub> (E.9, 2017) (E.17, 2016) (E.16, 2015) Accuracy	Use a tier 2 approach to estimate CO <sub>2</sub> emissions from liquid fuels used in road transportation, applying a country-specific carbon content for fuels, since CO <sub>2</sub> emissions from road transportation (liquid fuels) is identified as a key category and therefore it is good practice to apply a tier 2 approach to estimate the emissions.	Resolved. Czechia developed country-specific hydrogen to carbon and oxygen to carbon ratios and implemented them in the COPERT model in order to apply a tier 2 approach for estimating CO <sub>2</sub> emissions from liquid fuels used in road transportation. The data from the fuel analysis are included in the NIR (section 3.2.17.8.3.1).
E.6	1.A.5.b Mobile – all fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.20, 2017) Transparency	Revise the description of emissions under category 1.A.5.b.i (mobile (other)) to indicate that they are emissions from agriculture, forestry and fishing and not from aviation by the army, State institutions or private air transport.	Not resolved. Czechia reported emissions from agricultural machinery under category 1.A.4.c.ii (off-road vehicles and other machinery). However, the subcategory agriculture and forestry and fishing is used under category 1.A.5.b in CRF table 1.A(a)s4, creating some confusion. In addition, the explanations of the categories in the NIR do not use the same naming convention as used in CRF table 1.A(a)s4. For example, the subcategory agriculture and forestry and fishing under category 1.A.5.b in the CRF table corresponds to subcategory 1.A.5.b.iii in the explanatory notes in the NIR (section 3.2.21.1, p.150). During the review, the Party clarified the correspondence between the subcategories in the CRF tables and the NIR. The ERT considers that consistent use of the same category naming conventions for the subcategories added to CRF table 1.A(a)s4 under category 1.A.5.b in the NIR and the CRF tables, in combination with the descriptions of the categories provided in the

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E.7	1.B.2.a Oil – liquid fuels – CO <sub>2</sub> and CH <sub>4</sub> (E.13, 2017) (E.20, 2016) (E.19, 2015) Completeness	Change the notation key for oil exploration to “NE” and indicate in both the NIR and the CRF completeness table why those emissions or removals have not been estimated; and provide in the NIR a justification for the exclusion in terms of the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	<p>NIR, will improve the transparency of the reporting.</p> <p>Addressing. Czechia reported the AD and CO<sub>2</sub> and CH<sub>4</sub> emissions in CRF table 1.B.2 as “NE”. During the review, the Party explained that emissions for this subcategory are not estimated due to lack of AD. Oil exploration is not regularly carried out in the country. According to the only company with a licence for exploration (Moravian Oil Mines), no systematic exploration has been performed in the last few years. The Party also explained that oil samples extracted during exploration account for only a small fraction of the percentage of the total domestic extraction and the emissions are considered negligible. However, the ERT noted that the NIR (section 3.3.2.1.1) does not contain a justification for the exclusions in terms of the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.</p>
IPPU			
I.1	2.A.4 Other process uses of carbonates – CO <sub>2</sub> (I.1, 2017) (I.10, 2016) (I.10, 2015) Completeness	Collect the missing AD for 1990–2006 on mineral wool production and estimate and report CO <sub>2</sub> emissions.	<p>Addressing. Czechia reported emissions from mineral wool production for 2000–2017 and “NE” for 1990–1999 in table 4-8 of the NIR and in CRF table 2(I).A-Hs1. In the NIR, the Party explained that AD are available for 2000–2002 and 2007–2017, and that CO<sub>2</sub> emissions for 2003–2006 were interpolated (section 4.2.4.2). The Party provided in the NIR a justification for considering that the CO<sub>2</sub> emissions before 2000 are below the significance threshold in line with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines (p.186 and table 4-8), which is consistent with the emission trend for 2000–2017. The ERT noted that the provisions in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines regarding the exclusion of emissions for categories that fall below the threshold of significance are not applicable when only a part of the time series has not been estimated.</p> <p>The ERT considers that the estimation of the emissions for the missing year using one of the techniques included in the 2006 IPCC Guidelines (vol. 1, chap. 5.3.3) and explaining the method used in the NIR will resolve the issue.</p>
I.2	2.B.4 Caprolactam, glyoxal and glyoxylic acid production – N <sub>2</sub> O (I.17, 2017) Accuracy	Explore the possibility of obtaining additional data directly from the plant (e.g. operating conditions, AD, abatement technology) in order to increase the accuracy of the EF used and the N <sub>2</sub> O emissions reported.	Addressing. In the NIR, Czechia provided an explanation of the methodology used for estimating the N <sub>2</sub> O emissions from caprolactam production (section 4.3.4.2) (see ID# I.4 below). The sole producer of caprolactam in the country provided data on ammonia consumption (1,177 kg/hour) and

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I.3	2.B.4 Caprolactam, glyoxal and glyoxylic acid production – N <sub>2</sub> O (I.17, 2017) Accuracy	Review the EF used in the estimates for caprolactam production to ensure that emissions are not underestimated.	caprolactam production capacity (5.4 t/hour). Using this information and country-specific studies, an EF of 5.7 kg N <sub>2</sub> O/t caprolactam was established from the mass balance. During the review, the Party confirmed that the data used for calculating emissions were verified by the producer and reflect actual production in the country. However, no information on the abatement technology was included in the NIR.  Resolved. In the NIR, Czechia explained that the production unit at the caprolactam plant in the country works at atmospheric pressure and thus the EF used is comparable with the IPCC default (vol. 3, chap. 3, table 3.3) for that type of unit (5 kg N <sub>2</sub> O/t nitric acid) (section 4.3.4.2). The ERT accepted the explanation. During the review, the Party informed the ERT that the data used for calculating emissions were verified by the producer.
I.4	2.B.4 Caprolactam, glyoxal and glyoxylic acid production – N <sub>2</sub> O (I.17, 2017) Accuracy	If necessary, recalculate N <sub>2</sub> O emissions from caprolactam production for the entire time series.	Resolved. An analysis of the data conducted by the Party proved that there was no need for recalculations. The reported emissions for 1990–2013 are consistent with the emission trend for 2014–2017 based on EU ETS verified reports.
I.5	2.B.7 Soda ash production – CO <sub>2</sub> (I.2, 2017) (I.11, 2016) (I.11, 2015) Completeness	Undertake comprehensive surveys to ensure that possible emissions from soda ash production are covered in the national inventory for the whole time series and report the outcome of the studies.	Resolved. In the NIR, Czechia explained that its only soda ash production plant was closed in 1991 and since then soda ash has not been produced in the country (section 4.3.7). During the review, the Party clarified that the soda ash was produced by the traditional Solvay process and used by glass manufacturers and emissions in 1990 were covered under glass production (2.A.3). The Party reaffirmed that, since the closure of the plant in 1991, soda ash has not been produced in Czechia.
I.6	2.C.1 Iron and steel production – CO <sub>2</sub> (I.3, 2017) (I.2, 2016) (I.2, 2015) (38, 2014) (54, 2013) Transparency	Include information in the NIR on the changes in iron and steel production processes.	Addressing. In the NIR, Czechia provided some description of the processes in the iron and steel industry and the equations used for emission estimation (section 4.4.1). Explanations for the shares of electric arc furnaces included in the calculations and of the recycling of scrap iron (to explain the evolution of the CO <sub>2</sub> IEFs and emissions for the category) are, however, missing.
I.7	2.C.1 Iron and steel production – CO <sub>2</sub> (I.18, 2017) Transparency	Include a description of the different processes in iron and steel production occurring in the country, including the different mass flows and the mass balance of inputs and outputs of carbon in each process.	Addressing. Czechia provided information on reducing agents used in iron and steel production and the mass balance of carbon (NIR, section 4.4.1. and table 4-21). However, the Party did not explain the limestone and dolomite use estimates reported under this category (see ID# I.22 below).
I.8	2.C.3 Aluminium production – CO <sub>2</sub> , CH <sub>4</sub> and PFCs	Include in the NIR information justifying why the CO <sub>2</sub> , CH <sub>4</sub> and PFC emissions are reported as	Resolved. In the NIR, Czechia explained the use of “NO” for reporting emissions from aluminium production by clarifying that no

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	(I.5, 2017) (I.3, 2016) (I.3, 2015) (46, 2014) Transparency	“NO”, together with an explanation of the ‘cover salts’ (fluxes) method.	primary production occurs in the country (section 4.4.3). The sole aluminium recycling plant uses the ‘cover salts’ (salt-flux) method to avoid the use of F-gases in the recycling process and to prevent oxidation.
I.9	2.E.1 Integrated circuit or semi-conductor – CF <sub>4</sub> (I.19, 2017) Convention reporting adherence	Correct the mention of 1997 as the base year in section 4.6.3 of the NIR.	Resolved. NIR section 4.6 refers to 1997 as the year when the use of CF <sub>4</sub> began.
I.10	2.F Product uses as substitutes for ozone-depleting substances – HFCs, PFCs and SF <sub>6</sub> (I.11, 2017) (I.5, 2016) (I.5, 2015) (40, 2014) Accuracy	Consistently implement the new methods, data sources and EFs for the estimation of emissions from refrigeration and mobile air conditioning and transparently document the underlying information in the NIR, specifying, in particular, from which subcategories (domestic, commercial, industrial and transport refrigeration, and mobile and stationary air conditioning) the emissions come, and provide documentation on the AD sources, lifetimes and EFs used.	Resolved. In the NIR (section 4.7.1.2 and tables 4-29–4-36), Czechia described the method used in the new model for F-gas estimation, as well as AD sources, lifetimes and EFs for domestic, commercial, industrial and transport refrigeration, and mobile and stationary air conditioning. During the review, the Party explained that the calculation model is updated every year such that it uses the most reliable data disaggregation, as presented in the NIR.
I.11	2.F Product uses as substitutes for ozone-depleting substances – HFCs, PFCs and SF <sub>6</sub> (I.12, 2017) (I.6, 2016) (I.6, 2015) (41, 2014) Transparency	Describe in the NIR how the percentage of F-gases captured and the percentage of F-gases emitted are identified and explain the storage of large amounts of F-gases practised in the country.	Resolved. In the NIR (section 4.7), Czechia described the new model for F-gas estimation for categories 2.F.1 (refrigeration and air conditioning), 2.F.2 (foam blowing agents), 2.F.3 (fire protection), 2.F.4 (aerosols) and 2.F.5 (solvents). The new model and associated data gathering process allow the most reliable and recent data to be used in the estimations.
I.12	2.F Product uses as substitutes for ozone-depleting substances – HFCs, PFCs and SF <sub>6</sub> (I.20, 2017) Transparency	Report on the new model used and on the methodology for AD collection in order to ensure national coverage of all F-gas consumers.	Resolved. In the NIR, Czechia described the new model (see ID# I.13 below) and the AD collection process and data sources at the national level for that model for F-gas estimation (section 4.7). The data sources are ISPOP (the reporting system of the Czech Ministry of the Environment), the Customs Administration of the Czech Republic and the F-gas register. The Party indicated that verification is undertaken for the AD used for all subcategories (NIR, section 4.7.7). During the review, Czechia highlighted that the model is updated annually with complete and reliable data.
I.13	2.F Product uses as substitutes for ozone-depleting substances – HFCs, PFCs and SF <sub>6</sub> (I.20, 2017) Transparency	Disaggregate the model into submodules for each subcategory in order to improve the transparency of the AD and the EFs.	Resolved. The NIR (section 4.7) includes subsections for categories 2.F.1 (refrigeration and air conditioning), 2.F.2 (foam blowing agents), 2.F.3 (fire protection), 2.F.4 (aerosols) and 2.F.5 (solvents). Each subsection includes a description of the methodology used. Details of the model, AD sources and EFs applied are presented for category 2.F.1, with the

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I.14	2.F Product uses as substitutes for ozone-depleting substances – HFCs and PFCs (I.21, 2017) Transparency	Report a complete time series for emissions of F-gases from 1990, for example by using proxy data from comparable countries or any other method as suggested in chapter 5 of the 2006 IPCC Guidelines (if data are unavailable, temporarily change the notation key from “NO” to “NE”; if emissions do not occur, explain this in the NIR).	note that data sources and input data preparation are the same for each subcategory under 2.F.  Not resolved. Czechia uses 1995 as the base year for F-gases under the Kyoto Protocol and reported “NO” for 1990–1994. During the review, the Party explained that F-gases were not used in the country at the beginning of the 1990s according to information from the possible emitters. In addition, Czechia verified that the neighbouring countries with similar circumstances also report “NO” for 1990–1994. The ERT noted that this explanation is not included in the NIR.
I.15	2.F.1 Refrigeration and air conditioning – HFCs and PFCs (I.13, 2017) (I.16, 2016) (I.16, 2015) Transparency	Provide in the NIR an explanation of AD, customs statistics and ISPOP data in order to prove the completeness of the estimation of F-gas emissions from imported products.	Addressing. In the NIR, Czechia explained that export and import data are collected annually from the F-gas register and the Customs Administration of the Czech Republic (section 4.7, p.218). However, the ERT noted it is not clear whether both bulk and product import and export of F-gases are covered by these data sources. Clarifying the information would improve the transparency of the reporting.
I.16	2.F.1 Refrigeration and air conditioning – HFCs (I.22, 2017) Accuracy	Investigate the average age of vehicles in the country and the level of implementation of HFC recovery from destroyed cars.	Resolved. In the NIR, Czechia explained that detailed data for COPERT about vehicle stocks in the country are obtained by the Czech Transport Research Centre (section 4.7.2.1, p.224). Data on the numbers of passenger cars, light-duty vehicles, heavy-duty trucks and buses classified by fuel type, segment and Euro emission standard are provided in table 4-34 of the NIR. During the review, the Party confirmed that the data used to calculate emissions from mobile refrigeration and air conditioning were investigated and explained that the estimates were based on the data from the main Czech used car bazaar (see ID# I.23 in table 6).
I.17	2.G.2 SF <sub>6</sub> and PFCs from other product use – PFCs and SF <sub>6</sub> (I.15, 2017) (I.9, 2016) (I.9, 2015) (45, 2014) Completeness	Further investigate any possible other uses of PFCs and SF <sub>6</sub> (military, scientific or other), and, if they occur, estimate and report these emissions to ensure completeness of the estimates.	Resolved. No other uses of PFCs or SF <sub>6</sub> were detected and reported in the 2019 submission besides for double-glazed soundproof windows and accelerators (the latter use added since the 2018 submission). In the NIR (section 4.8.2.6), Czechia stated that in future submissions it plans to investigate the use (although negligible) of SF <sub>6</sub> in the particle accelerator at its Nuclear Physics Institute (Tanderson) in more detail. Regarding military use of PFCs and SF <sub>6</sub> (in radars and drones), the data confidentiality concerns in the sector do not allow easy data collection, but the Party stated in the NIR (section 4.8.2.6) that additional efforts would be made to survey this. As for scientific use, during the review, the Party explained that data on the possible use of SF <sub>6</sub> are gathered annually from research laboratories and the research institutes are contacted for more detailed information, if



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I.18	2.G.4 Other (other product manufacture and use) – PFCs and SF <sub>6</sub> (I.23, 2017) Completeness	Further investigate whether SF <sub>6</sub> was used by research laboratories between 1990 and 2003 and from 2007 onward, document the findings in the NIR and, if necessary, estimate and report emissions for the whole time series under category 2.G.2.	necessary, to estimate the emissions for a particular year (see ID# I.18 below).  Resolved. In the NIR (section 4.8.4.2), Czechia stated that data on the possible use of SF <sub>6</sub> in research laboratories are gathered annually and thus AD are collected for every year. The Party reported SF <sub>6</sub> use by research laboratories under category 2.G.4 but only for 2004–2006. “NO” was reported for all remaining years because no use of SF <sub>6</sub> was identified for those years.
Agriculture			
A.1	3. General (agriculture) (A.1, 2017) (A.2, 2016) (A.2, 2015) (49, 2014) Convention reporting adherence	Enforce the sector-specific QA/QC analysis and report on the category-specific checks and results in the category-specific subchapters of the NIR.	Resolved. Czechia provided details on the implemented category-specific QA/QC activities in the category-specific QA/QC and verification sections of the NIR. For example, section 5.2.1.4 includes a comparison of the IPCC default and country-specific EFs for enteric fermentation for non-dairy cattle (57 and 55.25 kg CH <sub>4</sub> /head/year, respectively) and for dairy cattle (117 and 148.05 kg CH <sub>4</sub> /head/year, respectively).
A.2	3. General (agriculture) (A.21, 2017) Convention reporting adherence	Correct the errors in the NIR, specifically: (a) Switch the headings of the last two columns in NIR table 5-1 (percentage of total GHG emissions including and excluding LULUCF, respectively); (b) Adjust the wording on the share of CH <sub>4</sub> emissions from enteric fermentation in NIR section 5.2.1.1; (c) Report the correct numbers for dairy cows and suckler cows for 1995–1998 in NIR table 5-6 (the NIR indicates 20 days but it should be 36 days).	Resolved. Czechia improved the structure of the NIR and made textual corrections to resolve the errors identified in the 2017 submission.
A.3	3. General (agriculture) (A.23, 2017) Transparency	Report the recalculations conducted for the current annual submission compared with the annual submission for the previous year in the category-specific subchapters of the NIR and also in NIR chapter 10, and ensure that the information in the two chapters is consistent. If recalculations from previous annual submissions are mentioned, clearly indicate for which submission they were conducted.	Resolved. Czechia improved the reporting of recalculations in chapters 5 and 10 of the NIR. The ERT detected no inconsistencies in the reporting of recalculations for the agriculture sector in the 2019 submission. When recalculations from previous annual submissions were mentioned, it was clearly indicated for which submission they were conducted (see NIR tables 5-11 and 5-13).
A.4	3.A Enteric fermentation – CH <sub>4</sub> (A.3, 2017) (A.3, 2016) (A.3, 2015) (52, 2014) Consistency	Correct the erroneous reporting of the values for body weights in the NIR (table 5-4) and transparently describe how time-series consistency is assured regarding the shift in the age limits of “calves” and “young bulls and heifers”	Resolved. Czechia corrected the body weight values in the NIR (table 5-5). During the review, the Party provided the ERT with the body weight time series for all of the cattle subcategories (for time-series consistency issues for the category, see ID# A.32 in table 6).

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		between 2009 and 2010 in the relevant subchapter of the NIR.	
A.5	3.A.1 Cattle – CH <sub>4</sub> (A.4, 2017) (A.17, 2016) (A.17, 2015) Transparency	Increase transparency by including some of the assumptions behind gross energy estimation in the NIR and a whole time series of gross energy values in order to explain the fluctuating EFs for non-dairy cattle.	Addressing. In the NIR, Czechia included information on some of the assumptions behind the gross energy estimates, such as the main feed ration used for every subcategory (section 5.2.1.2, p.242). However, the details of these rations and the gross energy time series for the subcategories under non-dairy cattle were not included in the NIR. During the review, the Party provided the ERT with the body weight time series for the subcategories and the calculations used to estimate CH <sub>4</sub> emissions from suckler cows.
A.6	3.A.1 Cattle – CH <sub>4</sub> (A.5, 2017) (A.17, 2016) (A.17, 2015) Transparency	Report the feeding situation and weighted pregnancy percentage in the CRF tables (not reported in the 2016 submission) and explain the values in the NIR.	Resolved. Czechia reported the feeding situation and weighted pregnancy percentage for dairy and non-dairy cattle in CRF table 3.As2 and provided explanations in the NIR (section 5.2.1.2, pp.243–244).
A.7	3.B Manure management – CH <sub>4</sub> (A.6, 2017) (A.6, 2016) (A.6, 2015) (57(b), 2014) Transparency	Provide the data used to estimate the weighted EF for non-dairy cattle at an animal subcategory level in the NIR, including livestock population statistics, body weight, excretion of volatile solids, B <sub>0</sub> and AWMS allocation.	Addressing. Czechia included data for volatile solids, B <sub>0</sub> and AWMS for dairy cattle and other cattle in the NIR (table 5-19), but not data for other cattle at the subcategory level, in order to show how the estimates of weighted values were calculated.
A.8	3.B Manure management – CH <sub>4</sub> (A.7, 2017) (A.18, 2016) (A.18, 2015) Transparency	Improve the transparency of the reporting of the CH <sub>4</sub> EF for swine by including in the NIR the information provided that the Party's average annual temperature is lower than 10 °C, and that the respective default parameter was chosen for this temperature.	Resolved. Czechia reported its average annual temperature in the overview section of the NIR (section 5.1, p.237).
A.9	3.B Manure management – CH <sub>4</sub> and N <sub>2</sub> O (A.8, 2017) (A.20, 2016) (A.20, 2015) Transparency	Provide in the NIR transparent information on the sources of data for AWMS distribution for non-cattle species.	Resolved. In the NIR (section 5.2.2.2.1), Czechia explained that the country-specific AWMS distribution is based on the study by Hons and Mudřík (2003) and was updated several times during the reporting period by expert opinion, with the latest update, in 2011, made on the basis of the judgment of experts from the Institute of Animal Science. During the review, the Party further explained that the AWMS distribution is being revised. The new version, which will be ready for the annual submission in 2020, will reflect the statistical survey conducted on anaerobic digesters by the Institute of Agricultural Economics and Information as well as the opinions of experts from the Crop Research Institute and the Institute's published results.
A.10	3.B Manure management – CH <sub>4</sub> (A.9, 2017) (A.7, 2016) (A.7, 2015)	Provide in the NIR all background information on the development of agricultural policies and structures that support the trends in AWMS allocation.	Resolved. Czechia reported details on agricultural policies affecting the distribution of AWMS in the NIR (section 5.2.2.2.1, p.251). The Party referred to

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	(57(c), 2014) Transparency		relevant national (377/2013 Col) and European Union (91/676/EES) regulations.
A.11	3.B Manure management – CH <sub>4</sub> and N <sub>2</sub> O (A.25, 2017) Accuracy	Use consistent parameters for manure management of solid manure when estimating CH <sub>4</sub> and N <sub>2</sub> O emissions from manure management, or provide the rationale for using default values for different AWMS in the NIR.	Resolved. Czechia corrected the default values used for solid manure storage in tables 5-19 and 5-25 of the NIR such that they are now consistent with the suggested values for solid manure storage in tables 10.17 and 10.21 of the 2006 IPCC Guidelines (vol. 4, chap. 10), and recalculated the emissions accordingly.
A.12	3.B Manure management – CH <sub>4</sub> and N <sub>2</sub> O (A.27, 2017) Transparency	Provide in the NIR the rationale for the use of region-specific parameters.	Not resolved. Czechia generally applied Western European default values from the 2006 IPCC Guidelines without sufficient explanation for doing so in the NIR. The footnote to table 5-19 indicates that for non-dairy cattle the default B <sub>0</sub> for Eastern Europe is used. In addition, in the NIR (section 5.2.2.2.2) the Party states that it uses parameters corresponding to the “Czech climate zone” without specifying what that is. During the review, Czechia indicated that the climate zone is defined in the introductory chapter of the NIR and that the reasoning behind using the Eastern European B <sub>0</sub> for non-dairy cattle is the similarity in cattle mass.
A.13	3.B.1 Cattle – CH <sub>4</sub> (A.14, 2017) (A.24, 2016) (A.24, 2015) Transparency	Clarify in the NIR which methane conversion factors are derived from which source.	Addressing. Czechia used default values for methane conversion factors (NIR table 5-19) in line with the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.17), and for liquid systems it could be deduced that the value for systems without natural crust cover was used. During the review, the Party provided the ERT with calculations showing the methane conversion factors used. The ERT noted that a justification of the value used for liquid systems, for which table 10.17 of the 2006 IPCC Guidelines provides options for natural crust cover (with or without) and temperature, was not provided in the NIR.
A.14	3.B.2 Sheep – N <sub>2</sub> O (A.28, 2017) Accuracy	Correct the erroneous reporting of Nex for sheep for 2008 and report the correct value in CRF table 3.B(b).	Resolved. Czechia corrected the error in the calculation of Nex for sheep in CRF table 3.B(b).
A.15	3.B.3 Swine – CH <sub>4</sub> (A.15, 2017) (A.25, 2016) (A.25, 2015) Accuracy	Consider swine a significant species for CH <sub>4</sub> emissions from manure and apply a tier 2 method to estimate CH <sub>4</sub> emissions from manure management for swine.	Addressing. Czechia explained its plans to develop tier 2 methods (see NIR section 5.2.2.6) (see ID# A.17 below).
A.16	3.B.3 Swine – CH <sub>4</sub> and N <sub>2</sub> O (A.27, 2017) Accuracy	Use the default values for the same region (either Western or Eastern Europe) from the 2006 IPCC Guidelines in estimating CH <sub>4</sub> and N <sub>2</sub> O emissions from manure management of swine.	Resolved. Czechia consistently used default values for Western Europe from the 2006 IPCC Guidelines to estimate CH <sub>4</sub> and N <sub>2</sub> O emissions from manure management of swine (see NIR section 5.2.2).
A.17	3.B.3 Swine – CH <sub>4</sub> and N <sub>2</sub> O (A.29, 2017)	Include the plans to apply a higher-tier method for the estimation of CH <sub>4</sub> and N <sub>2</sub> O emissions from	Resolved. Czechia reported that a higher-tier method for estimating CH <sub>4</sub> and N <sub>2</sub> O emissions from manure management of

ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
	Convention reporting adherence	manure management of swine in the inventory development plan with a specific timeline.	swine would be prepared in cooperation with relevant experts and institutions, and a significant improvement in this regard is planned for the annual submission in 2021 (see NIR section 5.2.2.6).
A.18	3.B.3 Swine – N <sub>2</sub> O (A.30, 2017) Transparency	Provide a rationale for the decreases in typical animal mass and Nex for swine in the NIR by explaining that they are mainly a consequence of the food market requirements for low-fat pork and by including any other relevant information.	Addressing. The values for Nex continued to decrease in 2017 (to 14.64 kg N/head/year). The ERT noted that, to justify the values, Czechia included a table in the NIR (table 5-26) showing a comparison of the Nex estimated for all livestock categories with the data contained in Czech regulation 377/2013 Coll (indicating a Nex for swine of 12 kg N/head/year), which, according to the Party, implies a possible overestimation of emissions. During the review, the Party explained that the decreasing trends are a consequence of market preferences, which are confirmed by both the judgment of experts (M Rozkot, personal communication) and statistics from the Ministry of Agriculture. The Nex corresponds to the average weight of pigs calculated as the average weight of the different pig breed subcategories (these data are obtained from the Czech statistical yearbook). The ERT considers that including in the NIR the data used to estimate N excretion for all swine subcategories will further clarify the reported trends.
A.19	3.B.4 Other livestock – CH <sub>4</sub> (A.31, 2017) Accuracy	Correct the EF for CH <sub>4</sub> emissions from manure management of poultry (for layers in wet systems), applying the default EF from the 2006 IPCC Guidelines (1.20 kg CH <sub>4</sub> /head/year).	Resolved. Czechia recalculated the emissions for poultry for 2015, and the IEF was changed from 0.173 to 0.095 kg CH <sub>4</sub> /head/year. Only broilers and other poultry are reported, so it is assumed that other poultry refers to layers. The default EF from the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.15) was used for wet systems (1.20 kg CH <sub>4</sub> /head/year) (see ID# A.27 in table 5).
A.20	3.D Direct and indirect N <sub>2</sub> O emissions from agricultural soils – N <sub>2</sub> O (A.32, 2017) Accuracy	Report the correct amount of N applied to soils as animal manure for 2013 and ensure consistency between the reporting of N <sub>2</sub> O emissions from manure management and from agricultural soils.	Resolved. Czechia revised the amount of N applied to soils as animal manure in CRF table 3.D for 2013, and the reporting of N <sub>2</sub> O emissions from manure management and from agricultural soils is consistent.
A.21	3.D.a.2 Organic N fertilizers – N <sub>2</sub> O (A.34, 2017) Completeness	Further investigate the availability of AD on the application of sewage sludge before 2002 and/or use a proxy method (e.g. as suggested in vol. 1, chap. 5, of the 2006 IPCC Guidelines) to estimate N <sub>2</sub> O emissions from the application of sewage sludge to agricultural soils for 1990–2001 (e.g. by calculating the share of total sewage sludge produced that is used in agriculture	Resolved. Czechia explained that the missing data on the amount of sewage sludge applied to agricultural soils have been added to the reported time series following a retrospective statistical analysis of the data on sewage sludge production that were available for the previous submission (see NIR section 5.4.3). The Party specified in the 2018 NIR the statistical method used (linear fitting) (section 5.4.5) and presented the resulting time series (figure 5-6) (see ID# A.37 in table 6).

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		for 2002–2015 and applying this share for 1990–2001).	
A.22	3.D.a.5 Mineralization/immo- bilization associated with loss/gain of soil organic matter – N <sub>2</sub> O (A.35, 2017) Completeness	Report only N <sub>2</sub> O emissions from the mineralization of soil organic matter under cropland remaining cropland in category 3.D.a.5 in CRF table 3.D, or, if there is no mineralization of soil organic matter under cropland remaining cropland, use the notation key “NO”.	Resolved. Czechia corrected the reporting of N <sub>2</sub> O emissions from the mineralization of soil organic matter under cropland remaining cropland. Since the 2018 submission, these emissions have been consistently reported under category 3.D.a.5 in CRF table 3.D.
A.23	3.D.b Indirect N <sub>2</sub> O emissions from managed soils – N <sub>2</sub> O (A.19, 2017) (A.13, 2016) (A.13, 2015) (63, 2014) (68, 2013) Accuracy	Improve the reporting of indirect emissions from soils by, for example, harmonizing the reporting of ammonia emissions to different international bodies or by using well-documented national data.	Not resolved. The ERT noted that Czechia did not carry out any improvements or include an improvement related to this recommendation in its improvement plan (see NIR section 5.4.6). During the review, the Party explained that improving the estimation of indirect emissions from soils is planned as part of the research project on developing methodologies for reporting and projecting GHG emissions and removals, which will run from 2019 to 2022, is funded by the Technology Agency of the Czech Republic and involves experts from the Crop Research Institute and the Institute of Forest Ecosystem Research. Relevant results of this project will be ready for inclusion in the annual submission in 2021.
A.24	3.D.b Indirect N <sub>2</sub> O emissions from managed soils – N <sub>2</sub> O (A.37, 2017) Accuracy	Correct the erroneous reporting of AD for indirect N <sub>2</sub> O emissions from agricultural soils for the time series in CRF table 3.D and revise the respective emission estimates.	Resolved. Czechia corrected the errors in its reporting of indirect N <sub>2</sub> O emissions from agricultural soils in CRF table 3.D of the 2018 submission. The Party explained the reason for the recalculation and its impacts in the 2018 NIR (p.347).
A.25	3.D.b.1 Atmospheric deposition – N <sub>2</sub> O (A.36, 2017) Convention reporting adherence	Include the use of a higher-tier method for the estimation of indirect N <sub>2</sub> O emissions from atmospheric deposition in the inventory development plan, with a corresponding timetable (harmonization with the reporting under the Convention on Long-range Transboundary Air Pollution is suggested).	Not resolved. The ERT noted that section 5.4.6 of the NIR on planned improvements for category 3.D mentions only the establishment of an informal working group by the Ministry of the Environment on the national N balance, N emission inventories and N emission projections, without indicating specific measures for implementing a higher-tier method. During the review, the Party stated that developing a specific methodology is part of the research project in the sector (see ID# A.23 above). The ERT considers that including details on this project in the planned improvements section of the NIR will improve the transparency of the reporting.
A.26	3.G Liming – CO <sub>2</sub> (A.38, 2017) Accuracy	Estimate the emissions from the application of dolomite separately under category 3.G liming using the appropriate EF.	Resolved. Czechia reported CO <sub>2</sub> emissions from the application of limestone and dolomite separately (see ID# A.39 in table 6).
<b>LULUCF</b>			
L.1	4. General (LULUCF) (L.6,	Review all references in the NIR to the IPCC good practice guidance for LULUCF and confirm that the	Resolved. Czechia referenced the 2006 IPCC Guidelines correctly in the LULUCF chapter of the NIR (chapter 6), and, where

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	2017) Transparency	methods and factors applied in these instances are consistent with the 2006 IPCC Guidelines.	these references have changed from the previous submission, the methods and factors applied are now consistent with the 2006 IPCC Guidelines.
L.2	4. General (LULUCF) (L.6, 2017) Transparency	Remove additional references to the IPCC good practice guidance for LULUCF to improve transparency and comparability and to avoid potential confusion regarding the application of up-to-date methods and factors from the 2006 IPCC Guidelines.	Resolved. All references in the LULUCF chapter of the NIR refer to the appropriate guidance for estimating emissions and removals for the LULUCF sector. In the NIR (section 6.1, p.270), Czechia explained that the inventory is based on the 2006 IPCC Guidelines and that it also uses the Kyoto Protocol Supplement for the estimates for KP-LULUCF activities.
L.3	4. General (LULUCF) (L.7, 2017) Transparency	Include in the NIR details of the area-weighted average carbon stocks in mineral soils for the reporting year for categories 4.A, 4.B and 4.C.	Resolved. Czechia provided information on the area-weighted average carbon stocks in mineral soils for categories 4.A (forest land), 4.B (grassland) and 4.C (cropland) in the NIR (section 5.4.2.2, p.289).
L.4	4. General (LULUCF) (L.8, 2017) Transparency	Include in the NIR a table of AD and EF parameters for each category for which tier 1 calculations are applied (and where higher-tier approaches are used, provide average or country-specific factors instead), including the rationale for choosing the parameters.	Resolved. The ERT noted that the NIR has been enhanced by the Party including AD and EFs and relevant rationale for their use in the correct sections. Where possible, Czechia included tables of the AD, EFs and other parameters used, which has increased the transparency of the reporting for the LULUCF sector. For example, for biomass burning, the NIR (section 6.4.2.1) references the method used (equation 2.27 of the 2006 IPCC Guidelines, vol. 2, chap. 2), and NIR table 6-8 includes specific input data and factors used to estimate CH <sub>4</sub> and N <sub>2</sub> O emissions from prescribed burning in forests for 1990 and 2017. Soil CSC factors for tillage (F <sub>MG</sub> ), land use (F <sub>LU</sub> ) and input (FI) for cropland remaining cropland and grassland remaining grassland are now reported transparently in NIR tables 6.9 and 6.10, respectively.
L.5	4.A Forest land – CO <sub>2</sub> (L.10, 2017) Transparency	Include a more detailed description of the bottom-up FM plan reporting of forest data collection under Czech legislation in the NIR, clarifying that temporarily unstocked areas are not included in the estimates.	Resolved. Czechia reported information on the FM plans in the forest land section of the NIR (section 6.4.1) and clarified that the temporarily unstocked area, not accounted for in the forest biomass estimates, represents 2.4 per cent of the forest land according to Czech cadastral data (p.279).
L.6	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.3, 2017) (L.2, 2016) (L.2, 2015) (71, 2014) (76, 2013) (90, 2012) Accuracy	Use the results of the next NFI, when they are available, to estimate CSC in the dead organic matter pool.	Addressing. For the dead organic matter pool, Czechia reported CSC estimates for 2004–2015 and “NO” for the remaining years for deadwood (see ID# L.11 below and ID# L.24 in table 6) and “NO” for litter over the entire time series (see ID#s L.11 below and L.23 in table 6). The Party explained in the NIR that there have been two cycles of the NFI: 2001–2004 and 2011–2015 (section 6.4.1, p.279). Data from the second cycle of the NFI were gradually released during 2016 and 2017. Not all of the data required for preparing the 2019 submission were available for use. The Party noted that the

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L.7	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.11, 2017) Transparency	Report separately the CSCs in forest land caused by disturbances and the CSCs due to other biomass losses.	emissions inventory is still primarily based on data from the FM plans, which are also the main source of data used by Czechia for international reporting on forests. Whenever feasible, information from the NFI and other sources have also been used for the emissions inventory, specifically for standing and ground deadwood and litter. During the review, the Party clarified that all available information on dead organic matter, from the NFI and the CzechTerra landscape inventory (both are sample-based inventories), is used for preparing the 2019 inventory.  Resolved. Czechia included disaggregated information on the CSCs in forest land caused by disturbances and other biomass losses in the NIR (section 6.4.1). Table 6-5 of the NIR provides information on reported harvest, total share of salvage logging in the reported harvest, quantity of salvage logging by disturbance type and total applicable additional harvest loss for 1990, 2000, 2005, 2010 and 2015–2017.
L.8	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.11, 2017) Transparency	Identify separately in the NIR the share of carbon stock losses that is included in reported production (arriving at processing facilities or retail destinations) and the estimated share of additional harvest losses between the forest and processing facilities (e.g. as two separate components of the “annual harvest drain” shown in figure 6-8 of the NIR).	Resolved. Czechia included disaggregated information on the annual carbon stock losses (annual harvest drain) in the 2018 and 2019 NIRs (section 6.4.1). An additional table (NIR table 6-5) was added with information on the shares of salvage logging and additional losses in addition to figure 6-8 of the NIR.
L.9	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.12, 2017) Transparency	Provide additional information in support of the estimates of biomass losses due to disturbances using AD on harvest volumes and not disturbance areas, for example by including in the NIR (1) a description of common types of disturbance occurring in the country, including a qualitative or quantitative description of their relative frequency; (2) a description of harvesting practices in salvage and conventional harvesting operations; (3) an indication of the uncertainty of the estimate of additional harvest losses (as defined on p.266 of the NIR); (4) a description or results of any verification of the estimates of total harvest drain, for example by comparison with independent data from CzechTerra or official statistics from CZSO.	Resolved. Czechia included information on the types of disturbance that have caused biomass losses in the forest land section of the NIR (section 6.4.1), including information on the common types of disturbance and how they have changed over time, a description of harvesting practices and an indication of the uncertainty of these values. The Party also provided an explanation of how data from CzechTerra and statistics from CZSO compare.
L.10	4.A.1 Forest land remaining forest land	Justify in the NIR the estimates of additional harvest loss, for example	Resolved. Czechia provided additional information on harvest loss and salvage

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	– CO <sub>2</sub> (L.13, 2017) Transparency	by using a version of the disturbance matrix shown in table 2.1 of the 2006 IPCC Guidelines, noting that the matrix could be simplified to reflect only the relevant pools included in the reporting and that the matrix should show for planned and salvage harvest operations the modelled average proportion of growing stock transferred to wood products and to dead organic matter (and indicate if the dead organic matter proportion was assumed in effect to be instantaneously oxidized, in accordance with the tier 1 reporting methodology).	harvest operations in the NIR (sections 6.4.1 and 6.4.2.1). This information is similar to what would be provided in a disturbance matrix.
L.11	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.14, 2017) Accuracy	Use the auxiliary data to estimate CSC in deadwood and litter, or review and document in the NIR the likely significance of the deadwood and litter pools.	Addressing. During the previous review, Czechia explained that the deadwood, litter and soils pools are not significant and therefore a higher-tier estimation method is not required. However, the ERT considers that additional evidence of the likely insignificance of these pools should be provided in the NIR so as to allow determination of the appropriate tier for forest land remaining forest land. The ERT noted that, for deadwood, estimates are reported in the NIR (p.285) for 2004–2015 using data from the first cycle of the NFI and the first (2008–2009) and second (2014–2015) campaigns of the CzechTerra landscape inventory (see ID# L.24 in table 6). For litter, the AD available from the first campaign of the CzechTerra landscape inventory are insufficient for moving from the tier 1 assumption of no change for this category (see NIR p.286) (see ID# L.23 in table 6).
L.12	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.14, 2017) Accuracy	Review and document in the NIR the likely significance of the soils pool.	Not resolved. Czechia did not include any information in the NIR on the significance of the soils pool to justify the use of a tier 1 method. During the review, the Party explained that the AD for estimating CSC for soil under forest land remaining forest land are insufficient for higher-tier estimation.
L.13	4.B.1 Cropland remaining cropland – CO <sub>2</sub> (L.15, 2017) Accuracy	Implement a more disaggregated stratification of cropland remaining cropland by land use (F <sub>LU</sub> ) using cadastral information, and develop a more disaggregated classification of management systems (F <sub>MG</sub> ) and rates of input (F <sub>I</sub> ) in accordance with the guidance on the choice of AD in the 2006 IPCC Guidelines (vol. 4, pp.5.19–20).	Resolved. The previous ERT noted that stratifying cropland by two management regimes (conventionally managed agriculture and ecological agriculture) is not in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 5.2.3.3) as it does not reflect the specific management practices occurring. The current ERT noted that Czechia now reports on seven subcategories of cropland: non-perennial arable land – no fallow, non-perennial arable land – fallow, non-perennial gardens, non-perennial hop fields, perennial gardens,



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			perennial orchards and perennial vineyards. The values for $F_{LU}$ , $F_{MG}$ and $F_I$ used for each cropland subcategory are transparently described in NIR table 6.9 and the justifications for using these values follow the table. The values selected are consistent with the 2006 IPCC Guidelines (vol. 4, chap. 5.2.3.2) (see ID# L.25 in table 6).
L.14	4.B.1 Cropland remaining cropland – CO <sub>2</sub> (L.15, 2017) Accuracy	Select appropriate relative stock change factors from table 5.5 of the 2006 IPCC Guidelines to reflect the actual land use, tillage and input rates for pre-1990 intensive agricultural production (which will affect initial carbon stocks in 1990 and therefore the trend in CSC over the reporting period), contemporary conventional agricultural practices and ecological agriculture.	Resolved. Czechia improved its reporting on cropland and now reports on seven subcategories (see ID# L.13 above). The appropriate relative stock change factors from the 2006 IPCC Guidelines (vol. 4, table 5.5), which depend on the management practices in use, are used for the subcategories of cropland remaining cropland.
L.15	4.C.1 Grassland remaining grassland – CH <sub>4</sub> and N <sub>2</sub> O (L.16, 2017) Transparency	Provide a transparent description in the NIR of why CH <sub>4</sub> and N <sub>2</sub> O emissions are not reported for grassland remaining grassland, explaining that they do not occur in the country.	Resolved. Czechia reported that biomass burning does not occur on grassland in section 6.6.1.1 of the NIR, and sections 5.4.2.2 and 6.5.2.2 contain details on why N <sub>2</sub> O emissions from N mineralization and immobilization and indirect N <sub>2</sub> O emissions from N leaching and run-off do not occur. Estimating CH <sub>4</sub> and N <sub>2</sub> O emissions from drainage and rewetting of organic and mineral soils is not mandatory because the estimation methods are from the Wetlands Supplement.
L.16	4.C.1 Grassland remaining grassland – CO <sub>2</sub> (L.17, 2017) Accuracy	Review the two-class stratification (i.e. ecological agricultural projects and conventionally managed grassland) for grassland remaining grassland by land use ( $F_{LU}$ ) and demonstrate that it is in accordance with the guidance provided in the 2006 IPCC Guidelines (vol. 4, chap. 6), and develop a more disaggregated classification of management systems ( $F_{MG}$ ) and rates of input ( $F_I$ ) in accordance with the guidance on the choice of AD in the 2006 IPCC Guidelines (vol. 4, p.6.17–19).	Resolved. Czechia changed the stratification for grassland remaining grassland, which now has four subcategories: permanent grassland – improved, permanent grassland – nominally managed, grassland for rough grazing, and grassland not used for production. The AD are obtained from farm structure surveys conducted in 2013 and 2016 and from the agricultural census conducted in 2010 in the country. The $F_{LU}$ , $F_{MG}$ and $F_I$ values for the subcategories of grassland were reported in NIR table 6-10. The ERT considers that this is in accordance with the 2006 IPCC Guidelines.
L.17	4.C.1 Grassland remaining grassland – CO <sub>2</sub> (L.17, 2017) Accuracy	Select appropriate relative stock change factors from table 6.2 of the 2006 IPCC Guidelines (vol. 4, chap. 6) to reflect the actual management and input rates for conventional and ecological agriculture.	Resolved. Czechia changed the stratification for grassland remaining grassland, which now has four subcategories (see ID# L.16 above). The relative stock change factors for the subcategories of grassland were transparently reported in NIR table 6-10 and the justification for the choices was included in the NIR (section 6.6.2). The Party stated in the NIR (p.300) that the EFs listed in NIR table 6-10 correspond to the recommended values for GM in temperate moist regions from the 2006 IPCC Guidelines (vol. 4,

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			chap. 6, table 6.2). The ERT agrees with this statement.
L.18	4.D Wetlands (L.18, 2017) Transparency	Explain in the NIR which IPCC wetlands subcategories (flooded land and peat extraction lands) are not estimated and the reason for not estimating them (e.g. because no guidance is provided in the 2006 IPCC Guidelines or because they are not occurring). Or, if subcategories are not estimated because the Party considers that the emissions are insignificant, provide a calculation of the likely level of emissions to demonstrate that they are below the significance threshold described in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines; for categories for which emissions or removals are occurring but they have not been estimated, report “NE” in the CRF tables.	Addressing. Czechia provided the reasons for not including peat and flooded land under category 4.D.1 in the NIR (section 6.7.2, p.303) and explained that the tier 1 approach was used for 4.D.2 subcategories. However, “NO” was reported for most of the subcategories and pools in CRF table 4.D. The ERT noted that “NA” should be used in the CRF tables for the tier 1 assumption provided in the 2006 IPCC Guidelines for “carbon stocks in equilibrium” in the LULUCF sector. The ERT also noted that including a table such as table 7.3 from the 2006 IPCC Guidelines (vol. 4, chap. 7) with the wetlands classification and allocation of emissions and removals or reason for not estimating them would increase the transparency of the reporting.
L.19	4.D Wetlands (L.18, 2017) Transparency	Explain transparently the definition or criteria applied under the cadastral subcategories used in the national definition of wetlands and the procedure for allocating these to the IPCC definitions.	Addressing. Czechia provided the national definitions being used for wetlands in table 6-3 of the NIR. According to the table, wetlands include land with watercourses and riverbeds, reservoirs, marshes, wetlands, swamps and land with areas that are waterlogged (by marsh, wetland or swamp). Czechia made reference to the amendment to act 357/2013 Coll. (on cadastre) where definitions and further details on the land-use category are given in the NIR (section 6.7.1, p.302). No information on the procedure for allocating the subcategories to the IPCC definitions was included.
L.20	4.E.2 Land converted to settlements – CO <sub>2</sub> (L.19, 2017) Completeness	Estimate CSC for soil organic carbon in mineral soils for land converted to settlements, either on the basis of an estimated proportion of green space within settlements and the broad cadastral land-use categories and default stock change factors provided in the 2006 IPCC Guidelines (p.8.24) or using country-specific information on settlement land uses.	Resolved. Czechia estimated CSC for soil organic carbon in mineral soils for land converted to settlements, describing the methodology followed in the NIR (section 6.8.2). The description includes an explanation of how the proportion of land-cover types (trees, arable land, grass and paved surfaces) was assessed and a reference carbon stock for soils under settlements calculated. This calculation allows estimation of soil carbon change associated with land-use change.
Waste			
W.1	5. General (waste) (W.9, 2017) Convention reporting adherence	Correct the errors identified in the NIR: inconsistent reporting of CH <sub>4</sub> oxidized in table 7-6 (p.295) (CH <sub>4</sub> oxidized constitutes 10 per cent of the CH <sub>4</sub> generated in 1990–2010 but lower in 2011–2015) and incorrect unit provided for biochemical oxygen demand in	Resolved. Czechia corrected the errors identified in tables 7-6 and 7-15 of the 2017 NIR (which correspond to tables 7-6 and 7-14 of the 2019 NIR). The ERT did not find any inconsistencies in the discussions of the recalculations in the 2019 submission.

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W.2	5.A Solid waste disposal on land – CH <sub>4</sub> (W.1, 2017) (W.2, 2016) (W.2, 2015) (78, 2014) (84, 2013) Transparency	<p>table 7-15 (p.305) (it should be g/person/day not g/person/year); and ensure the consistency and accuracy of any discussions on recalculations.</p> <p>Improve the transparency of the inventory by including in the NIR the information that, in Czechia, waste legislation was established before the European Union landfill directive and that management conditions of landfills were gradually improving even before 1990, together with a description of the national legislation concerning landfill management practices.</p>	<p>Not resolved. The ERT noted that no information was included in the NIR on the timeline of legislation for solid waste disposal on land before Czechia joined the European Union. In addition, no supporting information was provided for the MCF values reported in NIR table 7-5. During the review, the Party referred to table 7-5 of the NIR, which shows a gradual improvement in the controlled environment of landfills, and explained that logic had been used in addition to expert judgment to select the MCF values. The ERT considers that providing the following in the next NIR would improve the transparency of the reporting on solid waste disposal on land: a timeline for national waste legislation prior to Czechia joining the European Union; and more information on the expert judgment used to determine the MCFs for the entire time series, including the expert(s) involved, the logical basis for the judgment and the resulting values. The guidance on documenting expert judgment provided in the 2006 IPCC Guidelines (vol. 1, chap. 2, annex 2A-1) could be followed.</p>
W.3	5.A Solid waste disposal on land – CH <sub>4</sub> (W.2, 2017) (W.3, 2016) (W.3, 2015) (79, 2014) (85, 2013) Transparency	<p>Improve the transparency of the inventory and include in the NIR waste composition data, including the degradable organic carbon values, for 1950–1989.</p>	<p>Resolved. NIR table 7-3 shows that the same waste composition and degradable organic carbon values are used throughout 1950–1995; these values are based on the default values for waste composition for Eastern Europe from the 2006 IPCC Guidelines (vol. 5, table 2.3).</p>
W.4	5.A Solid waste disposal on land – CH <sub>4</sub> (W.3, 2017) (W.4, 2016) (W.4, 2015) (79, 2014) (85, 2013) Accuracy	<p>Update the information on waste composition for 1950–1989.</p>	<p>Resolved. Czechia investigated the availability of existing data and has concluded that it is not possible to further improve the data for 1950–1989 (NIR, section 7.2.1.2, p.314).</p>
W.5	5.A.1 Managed waste disposal sites – CH <sub>4</sub> (W.10, 2017) Transparency	<p>Provide sufficient explanation of waste categorization AD, including information on industrial waste, in the NIR.</p>	<p>Addressing. Czechia included in the NIR an explanation of the data source for solid waste disposal, including industrial waste, and how data from this source are reconciled with data from other sources (section 7.2.1.2, p.315). Czechia has hybridized the data sources on waste so that ISOH (public information system of waste management) data, which contains industrial waste data (but do not differentiate between types) are still used, but the amounts are increased by a residual factor from CZSO based on industrial waste statistics to avoid underestimation. However, it is not completely clear how the hybrid approach of</p>

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W.6	5.A.1 Managed waste disposal sites – CH <sub>4</sub> (W.10, 2017) Accuracy	Compare the two data sources (the ISOH database and Eurostat) as a verification analysis to confirm that the AD reported in the annual submission are complete, and include the results of the verification of the data from ISOH in the NIR.	merging the two data sources (the ISOH database of the Ministry of the Environment and CZSO) has been implemented and there is no information on the residual factors used. In the NIR (p.315), the Party states that more details and explanations can be found in annex A5.4; however, the referenced annex is on oxidation factors for waste incineration. During the review, Czechia confirmed that this annex reference is an error and that no further explanations are included in the NIR.  Addressing. Czechia reported some additional information on the data sources used for the category in the NIR (section 7.2.1.2, p.315). However, a comparison of the two data sources (the ISOH database of the Ministry of the Environment and Eurostat) has not been made. The ERT considers that a table comparing the waste amounts from the two data sources and the waste amount used in the inventory following the hybrid approach currently used could be included in the next NIR as a way of presenting the results of the verification analysis of the ISOH data.
W.7	5.A.1 Managed waste disposal sites – CH <sub>4</sub> (W.11, 2017) Accuracy	Provide in the NIR a description of the investigation of the share of sewage sludge disposal streams related to the data from ISOH, including verification by comparing with Eurostat data. If there is sewage sludge disposal to solid waste disposal sites in the country, estimate and report CH <sub>4</sub> emissions from sewage sludge disposal.	Not resolved. From the information provided in the NIR, which indicates that sludge is not calculated in the waste stream separately, although in practice small amounts of sludge might end up in landfill (section 7.2.1.2, p.316), it is not clear whether sewage sludge is landfilled in Czechia, and if it is, what quantity. During the review, the Party referred for explanation to the NIR and the 2017 in-country review discussions. However, the 2019 NIR includes no description of the sewage sludge disposal streams and no information on what extent (if any) landfilling of sludge occurs. The ERT considers that including in the NIR a description of the investigation of the share of sewage sludge disposal streams in the data from the ISOH database, including verification by comparison with Eurostat data, will improve the reporting on managed waste disposal sites.
W.8	5.B Biological treatment of solid waste – CH <sub>4</sub> and N <sub>2</sub> O (W.12, 2017) Completeness	Implement the improvements planned for this category (estimating emissions from composting for before 2005 and from household compost, reviewing the data sources for emissions before 2007 and verifying the factor used for estimated leakages from digestion facilities) and explain the recalculations in the NIR.	Addressing. For composting, Czechia continued to report CH <sub>4</sub> and N <sub>2</sub> O emissions for after 2005 and “NE” for 1990–2004. The Party indicated in the NIR that research has been initiated regarding the planned improvements (section 7.3.1.6). During the review, the Party informed the ERT that the project had started in 2019 and is expected to run for three years. For anaerobic digestion, Czechia indicated in the NIR that the planned improvement has medium priority (section 7.3.2.6), but no timeline

ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
			was provided in the NIR or during the review.
W.9	5.C.1 Waste incineration – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (W.4, 2017) (W.5, 2016) (W.5, 2015) (83, 2014) (91, 2013) Transparency	Improve the transparency of the inventory and include in the NIR information regarding the decreasing trend in waste incinerated.	Not resolved. The ERT noted that in 2017 there was an increase in incinerated waste according to the data in CRF tables 5.C. The graph of emissions from waste incineration for 1990–2017 in the NIR (figure 7-5) shows a relatively stable trend over the later years of the time series but there is no discussion on the trend in the NIR (p.324). During the review, Czechia reported that the share of waste incineration without energy recovery is decreasing, that in 2017 there was an increase in incinerated waste and an increase in waste incineration for energy purposes, and that the explanation of the trend in the NIR will be elaborated in the next submission.
W.10	5.C.1 Waste incineration – CO <sub>2</sub> (W.5, 2017) (W.7, 2016) (W.7, 2015) Transparency	Correct the information in NIR table 7-12 on the source of the CO <sub>2</sub> EF for hazardous and industrial waste incineration.	Resolved. The NIR (section 7.4.1.2) refers to the 2006 IPCC Guidelines and the values in table 7-11 of the NIR are correctly referenced and in line with the default values presented in table 5.2 of the 2006 IPCC Guidelines (vol. 5).
W.11	5.C.1 Waste incineration – CO <sub>2</sub> (W.13, 2017) Accuracy	Provide information in the NIR on the dry matter content ratio of incinerated waste and explain any recalculation in the NIR.	Resolved. In the NIR (section 7.4.1.2, p.325), Czechia explained that all waste data that are used for the calculation (including data in NIR table 7.11) are given as wet weight, and that a correction factor of 0.9 was used for water content on the basis of table 2.4 in the 2006 IPCC Guidelines (vol. 5, chap. 2.3) for other waste. The recalculation was carried out and documented in the 2018 submission.
W.12	5.D.1 Domestic wastewater – CH <sub>4</sub> (W.7, 2017) (W.9, 2016) (W.9, 2015) Transparency	Include a detailed description of the calculation of CH <sub>4</sub> emissions from domestic wastewater in the NIR.	Resolved. Czechia reported detailed information on TOW flows and the methodology and parameters used for estimating CH <sub>4</sub> emissions from domestic wastewater in the NIR (section 7.5.1.1) (see ID#s W.14 and W.15 below for the pending transparency issues).
W.13	5.D.1 Domestic wastewater – CH <sub>4</sub> (W.14, 2017) Transparency	Provide a more transparent and accurate explanation of the biogas reduction in the NIR (e.g. clarifying in NIR table 7-16 that the biogas reduction is a fraction of collected TOW, not treated TOW).	Not resolved. Inconsistency remains as NIR table 7-16 still refers to the fraction of treated TOW, while the methodological explanation preceding the table in the NIR (section 7.5.1.1, p.328) still refers to collected TOW.
W.14	5.D.1 Domestic wastewater – CH <sub>4</sub> (W.15, 2017) Transparency	Justify in the NIR the selection of MCFs for the three streams of domestic wastewater treatment (uncollected TOW, untreated TOW and treated TOW).	Not resolved. Czechia did not report any information on the selection of MCFs for the three streams of domestic wastewater treatment in the NIR. During the review, the Party indicated that default values from the 2006 IPCC Guidelines for aerobic, anaerobic and river discharge treatments had been used. However, the ERT noted that the MCF values selected do not match any system according to table 6-3 of the 2006 IPCC Guidelines (vol. 5, chap. 6), and hence must be weighted between different systems.

ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
			<p>Czechia provided the ERT with the TOW for each stream and the MCF used and, in response to a question from the ERT, clarified that central treatment plants are usually, but not always, well managed. To avoid an underestimation of emissions a value of 0.1 was chosen as the MCF for the central plants and was also used for untreated wastewater. Further, the Party clarified that treatment “on site” (NIR figure 7-8) is a group category that contains a mixture of treatment systems, both aerobic (mostly household wastewater plants, root plants and sump tanks) and anaerobic (septic tanks and latrines), and that an MCF value of 0.3 is the midpoint between aerobic plants and latrines. The value is based on expert judgment of the shares of aerobic and anaerobic treatment in the country. The ERT noted that the explanation provided during the review on the selection of MCFs for the three streams of domestic wastewater treatment should be documented in the NIR.</p>
W.15	<p>5.D.1 Domestic wastewater – CH<sub>4</sub> (W.16, 2017) Transparency</p>	<p>Provide in the NIR information justifying the use of a constant ratio for biogas reduction prior to 2002.</p>	<p>Not resolved. Czechia did not include in the NIR a justification for the use of a constant ratio for biogas reduction (fraction of treated TOW) prior to 2002 (NIR table 7-15). During the review, the Party clarified that it has no specific data prior to 2002, but explained that biogas harvesting was included under this category. The Party also clarified that an average ratio determined from the period for which data are available was used for the estimates for biogas reduction prior to 2002.</p>
W.16	<p>5.D.2 Industrial wastewater – CH<sub>4</sub> (W.17, 2017) Transparency</p>	<p>Provide in the NIR information on the MCFs used in the estimations (the ERT noted that the Party provided such information in NIR table 7-22 of its 2016 annual submission).</p>	<p>Addressing. Czechia included information on the default MCF values used for industrial wastewater in NIR table 7-19. The table specifies the MCFs for the following systems: sea, river and lake discharge; aerobic treatment plant (both well and poorly managed); and aerobic reactor and anaerobic lagoon (both shallow and deep). However, the Party did not provide the proportions of industrial wastewater treated in the different systems.</p>
<p>KP-LULUCF activities</p>			
KL.1	<p>Article 3.3 activities (KL.9, 2017) Transparency</p>	<p>Report in the NIR the area of clear-cut forests that have not yet regained forest cover, and any additional unstocked forest land, and provide information on the proportion that is expected to return to forest cover.</p>	<p>Resolved. Czechia included the percentages of forest land that have not yet regained forest cover for two subdivisions, unstocked forest land required for forest activity and clear-cut area that is expected to regain forest cover, in the NIR (section 11.4.3, p.377). The area of clear-cut forests in 2017 was 1.2 per cent of the country’s forest land (NIR table 11-2).</p>
KL.2	<p>Article 3.3 activities (KL.9, 2017) Transparency</p>	<p>Provide additional information on the expected periods for the regeneration of cadastral forest</p>	<p>Resolved. Czechia provided information on the expected periods of regeneration for temporarily unstocked areas in the NIR</p>

ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
		areas that are temporarily unstocked.	(p.377). The mandatory period is two years according to the Czech Forestry Act. This regeneration period is in line with the 2013 Kyoto Protocol Supplement.
KL.3	AR – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (KL.2, 2017) (KL.4, 2016) (KL.4, 2015) Accuracy	Provide information on biomass burning in AR areas and, if it occurs, report the associated emissions.	Addressing. Czechia reported biomass burning as “NO” for AR areas (in CRF table 4(KP-II)4) and stated in the NIR that biomass burning is confined to FM lands (section 11.3.1.1, p.374). CH <sub>4</sub> and N <sub>2</sub> O emissions from burning were not estimated for land converted to forest land because this practice does not occur in the country (see NIR p.290). The available AD for biomass burning from wildfires are not spatially explicit and, although the area of biomass burning is complete (in the sense that all burned biomass is accounted for), it is not possible to accurately allocate the AD between AR and FM areas (see NIR section 6.4.2.1). The Party applied expert judgment to allocate all of the AD to FM lands (see NIR section 6.4.2.1, p.286). In response to questions from the ERT during the review on the inaccuracy that the approach may lead to, the Party referred to a project with its Ministry of the Interior, running from 2017 to 2021, which will provide spatially explicit data. Czechia intends to use the improved AD, when they become available, in future submissions.
KL.4	AR – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (KL.12, 2017) Accuracy	Correct the error in the attribution of FM area in the biomass carbon stock calculations and improve the QC processes.	Resolved. Czechia corrected the error in the attribution of FM area to AR in the biomass carbon stock calculations. The Party noted in the 2018 submission that it also rectified a minor error in the area-based attribution (for 2010–2015) of the biomass CSC to FM (see the 2018 NIR, section 11.3.1.4, p.373).
KL.5	AR – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (KL.12, 2017) Accuracy	Review the methodological discrepancy between the AR reporting under the Kyoto Protocol and the Convention for forests planted since 1990 but greater than 20 years of age, and apply appropriate methodologies.	Resolved. Czechia added an explanation of the difference between AR reported under the Kyoto Protocol and the Convention to the NIR (section 11.2.2, pp.369–370). During the review, the Party confirmed, as noted in the NIR (section 11.2.1.1), that there is no methodological discrepancy in estimating biomass CSCs in new (afforested, young) and mature forest stands.
KL.6	AR – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (KL.12, 2017) Transparency	Provide additional explanation in the NIR regarding the differences in calculations for above- and below-ground biomass in new forest stands and mature forests, and the reason for these differences, as provided to the ERT during the review.	Resolved. Czechia included information on the difference between estimates reported under the Convention and the Kyoto Protocol and the differences in related carbon stocks in the NIR (section 11.2.2).
KL.7	Deforestation – CO <sub>2</sub> (KL.3, 2017) (KL.2, 2016) (KL.2, 2015) (87 and 89, 2014)	Improve the tracking of deforested land, including information on subsequent land-use change and the management practices applied to them.	Not resolved. There was no improvement in the tracking of deforested land, including information on subsequent land-use changes, for the 2019 submission. Czechia outlined in the NIR (section 6.2.5) its plans to address

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	(94, 97 and 98, 2013) Accuracy		this issue, and highlighted the work of the Czech Office for Surveying, Mapping and Cadastre (see <a href="http://www.cuzk.cz">www.cuzk.cz</a> ) on digitalizing cadastral land-use information, which is planned to be finalized in 2019. This major reconciliation of land-use information will clarify the nature of the ongoing area rectifications in the official reporting on areas of land and land-use categories in the country.
KL.8	FM – CO <sub>2</sub> (KL.1, 2017) (KL.1 and KL.3, 2016) (KL.1 and KL.3, 2015) (86, 2014) (93, 2013) Transparency	Report the correct notation key, “NR”, in CRF table NIR-1 for the deadwood pool, which is reported as “NO” in CRF table 5(KP-I)B.1.	Addressing. Czechia reported estimates for the deadwood pool for 2004–2015 and reported “NO” for the other years (in CRF table 5(KP-I)B.1) as constant stock is assumed under the tier 1 method where no AD are available. In response to ID# KL.9 below, the Party indicated that it would extend the time series so as to report estimates for the entire time series. The ERT noted that the correct notation keys for CRF table NIR-1 are “R” for 2004–2015 and “NR” for 2016 and 2017.
KL.9	FM – CO <sub>2</sub> (KL.5, 2017) (KL.6, 2016) (KL.6, 2015) Completeness	Assess whether CSC in deadwood occurs and, if necessary, report it on the basis of the NFI.	Addressing. Czechia reported CSCs in deadwood for FM for up until 2015, that is the years for which data are available. The ERT noted that extending the estimates for the time series using one of the time-series estimation methods outlined in the 2006 IPCC Guidelines (vol. 1, chap. 5.3.3) would improve the reporting. During the review, the Party indicated that for the next submission it is planning to revise its extrapolation approach, such that the trend in, for example, 2009–2015 will be assumed to continue to 2016–2018, until new data are available. The ERT believes this would resolve this issue.
KL.10	FM – CO <sub>2</sub> (KL.13, 2017) Comparability	Report as “NE” any pools that are intended to be excluded from accounting under decision 2/CMP.7, annex, paragraph 26.	Resolved. Czechia included a description of the use of “NE” for FM (mineral soils) and “IE” for litter (which is included in the same model) in the NIR (section 11.3.1.2). The justification for omitting any carbon pool or GHG emissions or removals from activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, was also included.
KL.11	FM – CO <sub>2</sub> and N <sub>2</sub> O (KL.14, 2017) KP reporting adherence	Provide information to demonstrate consistency between the FMRL and the reporting of FM, for example by including in the NIR a table comparing the historical time series used in the construction of the FMRL and the reported emissions for the same historical period from the latest inventory submission.	Not resolved. Czechia indicated in the NIR (section 11.5.3.3) that a technical correction to the FMRL was not calculated for the 2019 submission as resources were directed to other priority work and the inventory team does not currently have the capacity to prepare a technical correction. During the review, the Party informed the ERT that it intends to start work in 2020 on a technical correction to be included in the 2021 submission. The ERT noted that the Party providing additional information on the changes in the time series for AD would



ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
			increase the transparency of the reporting until a technical correction can be applied.
KL.12	FM – CO <sub>2</sub> and N <sub>2</sub> O (KL.14, 2017) Transparency	Increase the transparency of the demonstration of the methodological consistency between FM and the FMRL by providing additional information on the main drivers of the accounting quantities for FM, in accordance with the Kyoto Protocol Supplement (chap. 2.7.5.2), for example if the increased sink in 2013, 2014 and 2015 relative to the FMRL is caused by a lower harvest rate than applied in the FMRL projection or by a different driver.	Not resolved. The Party did not provide information to demonstrate methodological consistency between FM and the FMRL (see ID# KL.11 above).
KL.13	FM – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (KL.16, 2017) Accuracy	Review the checklist in table 2.7.1 of the Kyoto Protocol Supplement and calculate and report a technical correction to ensure methodological consistency between the FMRL and the reporting on FM in the second commitment period.	Not resolved (see ID# KL.11 above).
KL.14	HWP – CO <sub>2</sub> (KL.7, 2017) (KL.8, 2016) (KL.8, 2015) Transparency	Extend the part of the NIR that describes the development of the FMRL and HWP, for increased transparency.	Not resolved. The ERT noted that, while section 11.5.3.2 of the NIR describing the FMRL has been extended compared with the corresponding section in the 2017 NIR, the changes do not increase transparency. During the review, the Party provided the ERT with projected net emissions for the HWP pool for current reporting methods and the method used for constructing the FMRL. The ERT considers that this information could be included in the next NIR to increase transparency of reporting.
KL.15	HWP – CO <sub>2</sub> (KL.8, 2017) (KL.9, 2016) (KL.9, 2015) Transparency	Include information on HWP according to the requirements of decision 2/CMP.8.	Resolved. Czechia included information relating to decision 2/CMP.8, annex II, paragraph 2(g)(i), (iii), (iv), (vi) and (vii), in the NIR (section 11.5.3.5, p.380).

<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 and/or problem was raised. Issues are identified in accordance with paras. 80–83 of the UNFCCC review guidelines and classified as per para. 81 of the same guidelines. Problems are identified and classified as problems of transparency, accuracy, consistency, completeness or comparability in accordance with para. 69 of the Article 8 review guidelines in conjunction with decision 4/CMP.11.

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

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

9. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues included in table 4 have been identified in three successive reviews, including

the review of the 2019 annual submission of Czechia, and have not been addressed by the Party.

Table 4

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

<i>ID#</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed<sup>a</sup></i>
<b>General</b>		
G.4	Provide in the NIR a key category analysis that is prepared in accordance with the 2006 IPCC Guidelines by identifying as key also the first category that goes over the threshold	3 (2015/2016–2019)
<b>Energy</b>		
E.7	Change the notation key for oil exploration to “NE” and indicate in both the NIR and the CRF completeness table why those emissions or removals have not been estimated; and provide in the NIR a justification for the exclusion in terms of the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines	3 (2015/2016–2019)
<b>IPPU</b>		
I.1	Collect the missing AD for 1990–2006 on mineral wool production and estimate and report CO <sub>2</sub> emissions	3 (2015/2016–2019)
I.6	Include information in the NIR on the changes in iron and steel production processes	5 (2013–2019)
I.15	Provide in the NIR an explanation of AD, customs statistics and ISPOP data in order to prove the completeness of the estimation of F-gas emissions from imported products	3 (2015/2016–2019)
<b>Agriculture</b>		
A.5	Increase transparency by including some of the assumptions behind gross energy estimation (body weight, daily weight gain, pregnancy percentage, share of milk energy for calves) in the NIR and a whole time series of gross energy values at a livestock subcategory level in order to explain the fluctuating EFs for non-dairy cattle	3 (2015/2016–2019)
A.7	Provide the data used to estimate the weighted EF for non-dairy cattle at an animal subcategory level in the NIR, including livestock population statistics, body weight, excretion of volatile solids, B <sub>0</sub> and AWMS allocation	4 (2014–2019)
A.13	Clarify in the NIR which methane conversion factors are derived from which source	4 (2015/2016–2019)
A.15	Consider swine a significant species for manure CH <sub>4</sub> emissions and apply a tier 2 method to estimate CH <sub>4</sub> from manure management for swine	3 (2015/2016–2019)
A.23	Improve the reporting of indirect emissions from soils by, for example, harmonizing the reporting of ammonia emissions to different international bodies or by using well-documented national data	5 (2013–2019)
<b>LULUCF</b>		
L.6	Use the results of the next NFI, when they are available, to estimate CSC in the dead organic matter pool	6 (2012–2019)
<b>Waste</b>		
W.2	Improve the transparency of the inventory by including in the NIR the information that, in Czechia, waste legislation was established before the European Union landfill directive and that management conditions of landfills were gradually	5 (2013–2019)

<i>ID#</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed<sup>a</sup></i>
	improving even before 1990, together with a description of the national legislation concerning landfill management practices	
W.9	Improve the transparency of the inventory and include in the NIR information regarding the decreasing trend in waste incinerated	5 (2013–2019)
KP-LULUCF activities		
KL.3	Provide information on biomass burning in AR areas and, if it occurs, report the associated emissions	3 (2015/2016–2019)
KL.7	Improve the tracking of deforested land, including information on subsequent land-use changes and the management practices applied to them	5 (2013–2019)
KL.8	Report the correct notation key, “NR”, in CRF table NIR-1 for the deadwood pool, which is reported as “NO” in CRF table 5(KP-I)B.1	5 (2013–2019)
KL.9	Assess whether CSC in deadwood occurs and, if necessary, report it on the basis of the NFI	3 (2015/2016–2019)
KL.14	Extend the part of the NIR that describes the development of the FMRL and HWP, for increased transparency	3 (2015/2016–2019)

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

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

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

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

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?<sup>a</sup></i>
<b>Energy</b>			
E.8	1.A.2 Manufacturing industries and construction – gaseous fuels – CO <sub>2</sub>	<p>Czechia made significant recalculations for the subcategory non-metallic minerals (1.A.2.f) for CO<sub>2</sub> emissions from gaseous fuels for 2016 between the 2018 and 2019 submissions. The reported emissions increased by 102.36 kt CO<sub>2</sub> in the 2019 submission. However, the Party provided no information on the recalculations in the energy sector chapter of the 2019 NIR. During the review, Czechia explained that the heading of NIR table 3-31, “Biomass”, is an error; the data in the table relate in fact to natural gas. Biomass was not recalculated for this subcategory. The reason for the natural gas recalculations was an update of the AD from CZSO, from 23,061 TJ in the 2018 submission to 24,863 TJ in the 2019 submission.</p> <p>The ERT recommends that Czechia correctly report in the NIR the recalculations made.</p>	Yes. Transparency
<b>IPPU</b>			
I.19	2.A.4 Other process uses of carbonates – CO <sub>2</sub>	<p>The impacts of the recalculations for subcategory 2.A.4.d (other (mineral wool production, flue-gas desulphurization, denitrification)) for 2015 and 2016 between the 2018 and 2019 submissions were reported in NIR table 4-9 (section 4.2.4.5). However, the reported recalculations in NIR table 4-9 are incorrect: 9.4 and 6.3 per cent reductions in emissions were reported for 2015 and 2016, respectively, whereas 10.4 and 6.8 per cent increases in emissions should have been reported for 2015 and 2016, respectively, according to CRF tables 2(I).A–H. During the review, Czechia acknowledged the error and indicated that the QC procedures for recalculations would be enhanced.</p> <p>The ERT recommends that Czechia ensure that the reporting of the results of recalculations is consistent between the data reported in the CRF tables and the NIR, implementing relevant QC procedures in order to do so.</p>	Yes. Convention reporting adherence
<b>Agriculture</b>			
A.27	3.B.4 Other livestock – CH <sub>4</sub>	<p>Following a previous recommendation (see ID# A.19 in table 3), Czechia recalculated CH<sub>4</sub> emissions from poultry. As explained in the footnote to NIR table 5-21, the EF for other poultry was calculated as the weighted average of two default EFs for different breeding systems (13 per cent wet and 87 per cent dry system: 1.2 kg CH<sub>4</sub>/head/year x 0.13 + 0.03 kg CH<sub>4</sub>/head/year x 0.87 = 0.182 kg CH<sub>4</sub>/head/year), which results in the correct EF for layers (hens that lay eggs) in line with the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.15). The value reported in the NIR, however, is not consistent with the IEF reported in CRF table 3.B(a) (0.09 kg CH<sub>4</sub>/head/year) owing to the aggregated reporting with broilers (chickens raised for meat production).</p> <p>The ERT recommends that Czechia improve the transparency of its reporting by providing in the NIR a more detailed description of the category poultry and ensuring consistent reporting of the category between the NIR and CRF table 3.B(a).</p>	Yes. Transparency

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?<sup>a</sup></i>
A.28	3.D.a Direct N <sub>2</sub> O emissions from managed soils – N <sub>2</sub> O	<p>Recalculations to the reported N<sub>2</sub>O emissions from urine and dung deposited by grazing animals on soils since the 2017 submission changed the emission estimates for the time series by more than 2 per cent since 2010 (e.g. for 2015, the decrease in the reported emissions was 5.3 per cent in the 2018 submission). The recalculations were not justified in the 2018 NIR (section 5.4.5). During the review, Czechia explained that the N<sub>2</sub>O emission estimates for this subcategory were updated for the 2018 submission and a new spreadsheet was created for the calculations. The Party also explained that the changes in N<sub>2</sub>O emissions for this subcategory corresponded to the corrections of technical errors made in the estimation of N<sub>2</sub>O emissions from manure management.</p> <p>The ERT recommends that Czechia improve its reporting on recalculations by clearly documenting and justifying all recalculations in the NIR in line with paragraph 45 of the UNFCCC Annex I inventory reporting guidelines. The ERT encourages Czechia to improve the transparency of its reporting by providing in the NIR specific information on the recalculations made at the subcategory level, including the type of recalculation (e.g. correcting an error, incorporating updated AD) and its impacts on the emission estimates for the subcategory.</p>	Yes. Transparency
A.29	3.D.b Indirect N <sub>2</sub> O emissions from managed soils – N <sub>2</sub> O	<p>Recalculations have been made since the 2017 submission to the reported N<sub>2</sub>O emissions from the atmospheric deposition of N that changed the emission estimates for the time series by more than 2 per cent (e.g. for 2015, the decrease in the reported emissions was 16.8 per cent in the 2018 submission). Czechia reported the reasons for the overall recalculations of direct and indirect emissions from managed agricultural soils and the amount of N applied to the soils before and after recalculation in the 2018 NIR (table 5-36). However, the recalculations that resulted in the changes in N<sub>2</sub>O emissions from the atmospheric deposition of N were not discussed and justified in the NIR. During the review, the Party explained that the change in the estimated emissions resulted from an error in estimating the amount of N from manure available for application to soils and the use of the fraction of total N loss.</p> <p>The ERT recommends that Czechia improve its reporting on recalculations by clearly documenting and justifying all recalculations in the NIR in line with paragraph 45 of the UNFCCC Annex I inventory reporting guidelines. The ERT encourages the Party to include information on the impacts on emission estimates for relevant subcategories and approximate estimates of the impact of individual recalculations.</p>	Yes. Transparency
LULUCF			
L.21	4. General (LULUCF)	Recalculations made for the LULUCF sector changed the emission and removal estimates for a category by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with the recalculations.	Not an issue/problem
Waste			
W.17	5.C.1 Waste incineration – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	Czechia stated in the NIR that no recalculations had been made to the estimated emissions from waste incineration between the 2018 and 2019 submissions (section 7.4.1.5). However, the ERT noted that recalculations had been made for 2016 for this category for all gases, resulting in increases of 5.0, 2.4 and 4.5 per cent for CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O emissions, respectively. During the review, the Party acknowledged that recalculations had been made as a	Yes. Transparency

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?<sup>a</sup></i>
		consequence of updated AD for 2016 being available for the 2019 submission, whereas only preliminary data had been available for the 2018 submission.  The ERT recommends that Czechia include in the NIR all recalculations made, together with detailed explanations.	
KP-LULUCF activities			
KL.16	General (KP-LULUCF activities)	Recalculations made under KP-LULUCF activities changed the emission or removal estimates for a category by more than 2 per cent and/or national total emissions by more than 0.5 per cent; however, the ERT did not identify any issues or problems with the recalculations.	Not a problem

<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.

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

Table 6

**Additional findings made during the individual review of the 2019 annual submission of Czechia**

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?<sup>a</sup> If yes, classify by type</i>
General			
G.14	Key category analysis	The results of the key category analysis for approach 2, level and trend, presented in annex 1 to the NIR and discussed in section 1.5, are not correct. During the review, Czechia provided the calculation spreadsheet used for the approach 2 analysis. The ERT found that the calculations are not in line with the methodology in the 2006 IPCC Guidelines (vol. 1, chap. 4, equations 4.4 and 4.5). During the review, the Party informed that its methodology follows the 2006 IPCC Guidelines, although it is divided into more steps. The ERT confirmed that the results (key categories identified) obtained by the Party differ from the results that would have been obtained if the methodology were correctly applied. For example, in the approach 2 level analysis including LULUCF for 2017, Czechia identified 22 key categories while the correct calculation results in 26 key categories. Of the 22 key categories identified by the Party, three (1.A.1 (energy industries – gaseous fuels – CO <sub>2</sub> ), 2.A.1 (cement production – CO <sub>2</sub> ) and 1.A.4 (other sectors – liquid fuels – CO <sub>2</sub> )) are not identified if correctly applying approach 2, while correctly applying approach 2 identifies an additional seven (1.A.3.b (transport – road transportation – N <sub>2</sub> O), 1.A.4 (other sectors – solid fuels – CH <sub>4</sub> ), 1.A.4 (other sectors – biomass – CH <sub>4</sub> ), 1.B.2.b (natural gas – CH <sub>4</sub> ), 3.B (manure management – CH <sub>4</sub> ), 3.D.2 (agricultural soils – indirect N <sub>2</sub> O) and 4.A.2 (land converted to forest land – CO <sub>2</sub> )) categories.	Yes. Convention reporting adherence

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
The ERT recommends that Czechia review its key category analysis calculations and apply the IPCC approach 2 methodology (vol. 1, chap. 4.3.2) for key category analysis correctly.			
Energy			
E.9	1. General (energy sector) – all fuels – CO <sub>2</sub>	<p>Several issues related to differences between the data in the CRF tables and the IEA data set (see ID# E.11 below) were identified for the 2019 submission. During the review, the ERT asked the Party whether any ongoing QC procedures were in place to address such discrepancies, and, if not, whether there were any plans for establishing such procedures. In response, Czechia explained that it uses official data from CZSO for the inventory, and that CZSO is also the organization responsible for reporting to IEA and Eurostat. Czechia indicated that some of the differences observed could have been caused by the use of different net calorific values. The Party informed the ERT that it is working on a methodology for incorporating the QC of national AD into a comparison of the AD in the CRF tables with data published on the Eurostat and IEA websites.</p> <p>The ERT encourages Czechia to include in an annex to the NIR a comparison between data in the CRF tables and IEA and Eurostat data sets and provide an explanation for any significant differences for both combustion data and production data (i.e. coal production data).</p>	Not an issue/problem
E.10	1. General (energy sector) – all fuels	<p>The fuel data presented in annex 4 to the NIR, which contains energy balances per fuel, do not match the data reported in the CRF tables. For example, the values in CRF table 1.A(a)s3 for road transportation (66,139.11 TJ for gasoline and 177,543.80 TJ for diesel for 2017) differ from the values calculated using the data in annex 4 for fuel consumption and the net calorific values provided in annex 5 (66,079.10 TJ for gasoline and 189,837.74 TJ for diesel). During the review, Czechia explained that the data on fuel sold provided by CZSO for road transportation correspond to the values reported in the CRF tables. Emission estimates are based on vehicle-kilometres travelled, corrected with fuel balance data from CZSO. The official national data in annex 4 were not available at the time of the inventory preparation. The ERT considers that the fact that information provided in the NIR (annex 4) does not correspond to the data used in the inventory reduces transparency.</p> <p>The ERT recommends that Czechia either ensure that the energy balance information provided in the NIR matches the data reported in the CRF tables or include an explicit statement in the NIR explaining that the information provided has not been used in the inventory.</p>	Yes. Transparency
E.11	Comparison with international data – solid fuels – CO <sub>2</sub>	<p>The ERT noted significant differences between the waste amounts reported in the CRF tables (1.A(b)) and those reported to IEA. For many years, amounts are up to 70 per cent lower in the CRF tables compared with the IEA data. The ERT also noted that the description in the NIR of estimated emissions from waste across the energy and waste sectors was not sufficient. During the review, Czechia explained that it obtains data from two sources: the public information system for waste management in Czechia (VISOH) and its non-public version (ISOH), and CZSO. The data from the two sources have different strengths and weaknesses, and, following the recommendations made in previous reviews, the Party has implemented a hybrid approach utilizing both data sources. The ERT noted that the</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
		<p>Party's response did not explain the differences with the IEA data, or how emissions from waste were estimated and allocated across the energy and waste sectors.</p> <p>The ERT recommends that Czechia improve the transparency of its reporting on the AD and emissions from waste in the energy sector, for example, by providing in the NIR information on the number of waste incineration plants, the total waste incineration capacity and the waste amounts included in the inventory. The ERT also recommends that the Party clearly specify in the NIR the allocation of emissions from waste across the energy and waste sectors. The ERT encourages the Party to include a comparison of the waste amounts used for energy with the data reported to IEA and Eurostat (in a tabular format), explaining the differences and justifying the AD used in the inventory.</p>	
E.12	Feedstocks, reductants and other non-energy use of fuels – liquid fuels – CO <sub>2</sub>	<p>Czechia reported as “IE” CO<sub>2</sub> emissions from the non-energy use reported in the inventory of gas/diesel oil and LPG in column I of CRF table 1.A(d) rather than specifying the amount of CO<sub>2</sub> emissions in kt and the category where the emissions were included. During the review, Czechia explained that all of the LPG produced in the country is used for ethylene production, which occurs at the same refinery. Further, the Party clarified that naphtha is used as a feedstock for the ethylene and other petrochemical production and for this reason, the non-energy use of LPG is reported under the non-energy use of naphtha, that is under category 2.B.8 (petrochemical and carbon black production). The same goes for gas/diesel oil.</p> <p>The ERT recommends that Czechia transparently report on LPG and gas/diesel oil in CRF table 1.A(d) and the NIR, including providing information on the CO<sub>2</sub> emissions from the non-energy use reported in the inventory and the allocation of the emissions in the inventory.</p>	Yes. Convention reporting adherence
E.13	Feedstocks, reductants and other non-energy use of fuels – solid fuels – CO <sub>2</sub>	<p>The ERT noted that 786.17 kt CO<sub>2</sub> was reported in CRF table 1.A(d) for other bituminous coal for 2017 for CO<sub>2</sub> emissions from the non-energy use reported in the inventory (column I), which is higher than the value reported for the same fuel as CO<sub>2</sub> excluded (column G), which shows the CO<sub>2</sub> excluded from the reference approach in CRF table 1.A(b). The ERT considered this likely to be an error, as the CO<sub>2</sub> reported in column I of CRF table 1.A(d) should be a subset of the CO<sub>2</sub> reported in column G. During the review, Czechia explained that it had made an error in applying the reference approach: the wrong EF was used (the EF for coking coal rather than for bituminous coal). The Party indicated that the error will be corrected in the next submission.</p> <p>The ERT recommends that Czechia correct in CRF table 1.A(d) the reporting of other bituminous coal excluded from the reference approach and ensure consistency in reporting between CRF tables 1.A(d) and 1.A(b) for 2017.</p>	Yes. Convention reporting adherence
E.14	1.A.2.f Non-metallic minerals – other fossil fuels – CO <sub>2</sub>	<p>The ERT noted that several inter-annual changes in the CO<sub>2</sub> IEF (t/TJ) for other fossil fuels are significant, including for 2009–2010 (13.5 per cent) and 2016–2017 (–23.7 per cent). The 2017 value of the IEF (68.35 t/TJ) is below the default range in the 2006 IPCC Guidelines (vol. 2, chap. 2, table 2.3, 73.3–143 t/TJ). During the review, Czechia explained that EU ETS data were used to calculate the IEFs and that the composition and amount of alternative fuels vary significantly from year to year as a result of changes in their availability and price. The Party explained that because the IEFs are calculated from EU ETS data, they are different from the IPCC default EF values.</p>	Yes. Transparency



ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
E.15	International bunkers and multilateral operations – liquid fuels – CO <sub>2</sub>	<p>The ERT recommends that Czechia include in the NIR more information on the consumption of other fossil fuels and the EFs used for them for the CO<sub>2</sub> estimates from the subcategory. The ERT also recommends that the Party include in the NIR information on any significant changes in the fuel mix to explain the fluctuations in the CO<sub>2</sub> IEF.</p> <p>The ERT noted small discrepancies between the data in CRF tables 1.A(b) and 1.D for jet kerosene consumption (international aviation bunkers) for most years; for example, for 2015, 12,412.57 TJ is reported in CRF table 1.A(b) and 12,412.17 TJ in CRF table 1.D. For some years, the differences are larger; for example, for 2017, 14,851.90 TJ is reported in CRF table 1.A(b) whereas 15,016.13 TJ is reported in CRF table 1.D. The ERT also noted differences between the reported jet kerosene consumption for international aviation bunkers in CRF table 1.D and the IEA data. During the review, Czechia explained that the discrepancies result from the methodology that the Party uses for calculating emissions from jet kerosene (a brief description of which is included in the NIR (pp.107–108)). CZSO does not have exact information on the distribution of jet kerosene consumption within the transport sector. This is why, for the purpose of estimating emissions, the overall consumption of jet kerosene used in Czechia is divided between categories 1.D.1.a (international aviation bunkers), 1.A.3.a (domestic aviation) and 1.A.5.b.i (mobile), resulting in some discrepancies with the IEA data. The Party noted, however, that the reported sum of jet kerosene consumption (NIR table 3-36) aligns with the IEA data.</p> <p>The ERT recommends that Czechia report consistent information for bunker fuels between CRF tables 1.A(b) and 1.D, or, if this cannot be done, that the Party clearly explain any discrepancies in the NIR.</p>	Yes. Convention reporting adherence
IPPU			
I.20	2.A.2 Lime production – CO <sub>2</sub>	<p>The ERT noted a 7.5 per cent increase in the CO<sub>2</sub> IEF for lime production between 2009 and 2010. The IEF of 0.73 t/t for 1990–2009 was changed to 0.79 t/t for 2010. According to the NIR (p.182), the country-specific EF used for 1990–2009 was estimated as 0.7884 t CO<sub>2</sub>/t lime (Vácha, 2004) and was then adjusted to take into account purity (93 per cent). EU ETS data have been used for emission reporting since 2010. The ERT also noted that the initial, not that adjusted for purity, country-specific EF is comparable to the average EF obtained from EU ETS data (0.777 t/t), which have been verified independently. The ERT believes that the country-specific EF (0.7884 t CO<sub>2</sub>/t lime) was calculated on the basis of 93 per cent purity and thus no additional purity adjustment is required as this adjustment decreases the IEF applied for 1990–2009 and leads to inconsistency in the time series. During the review, Czechia repeated the explanation provided in the NIR that an adjustment for purity was applied to the EFs for the years for which data from the EU ETS were not available, despite the fact that the initial country-specific EFs and EU ETS data are consistent.</p> <p>The ERT recommends that Czechia investigate whether a purity adjustment is required for the country-specific CO<sub>2</sub> EF for lime production, and, if no purity adjustment is required, recalculate CO<sub>2</sub> emissions from lime production for 1990–2009 using the EF of 0.7884 t CO<sub>2</sub>/t lime. Otherwise, the ERT recommends that the Party explain the difference between the EF verified under the EU ETS and the EF used for the CO<sub>2</sub> emission estimates for 1990–2009 (0.733 t CO<sub>2</sub>/t lime) and justify in the NIR its approach of applying a purity adjustment to the country-specific EF.</p>	Yes. Consistency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
I.21	2.B.1 Ammonia production – CO <sub>2</sub>	<p>According to the NIR (section 4.3.1.2), emissions from ammonia production were reduced by the amount of CO<sub>2</sub> used for urea production for the years in which urea production occurred (1990–2013), which is in accordance with the 2006 IPCC Guidelines (vol. 3, chap. 3.2.2.1). However, the description in the NIR does not explain how urea-related emissions were accounted for in the national inventory (e.g. export, application in agriculture). During the review, Czechia informed the ERT that all urea-related emissions were allocated to the agriculture sector.</p> <p>The ERT recommends that Czechia improve the transparency of its reporting by including information on urea application and/or relevant cross references in the section of the NIR on ammonia production.</p>	Yes. Transparency
I.22	2.C.1 Iron and steel production – CO <sub>2</sub>	<p>The NIR (p.205) includes limited information on how values for limestone and dolomite use in metal production were obtained for the emission calculations. It is clear that, since the launch of the EU ETS, verified data have been used for reporting; however, no explanation is provided regarding the data used in the calculations before EU ETS data became available. During the review, Czechia explained that EU ETS data were extrapolated backwards for 1990–2009 as no detailed statistics on the use of limestone and dolomite in the metal industry are available for that period. The Party indicated that this approach was approved by the representative of the national iron and steel association, and that limestone and dolomite consumption was expected to be lower in that period than in recent years. Details of the extrapolation approach (e.g. whether it is based on metal production or bulk use) were not provided in the NIR. The ERT considers that, on the basis of the information provided, it cannot be concluded whether the time series is consistent, noting that the IEF for limestone and dolomite use in metal production increased from 0.52 t/t for 1990 to 0.84 t/t for 2017 (in CRF table 2(I).A-Hs2).</p> <p>The ERT recommends that Czechia review the estimated use of limestone and dolomite in iron and steel production for 1990–2009 and include in the NIR an explanation of the approach used to estimate the use of limestone and dolomite for the years before EU ETS data were available.</p>	Yes. Transparency
I.23	2.F.1 Refrigeration and air conditioning – HFCs	<p>The ERT noted that Czechia referred to the Czech car bazaar as a data source for the percentage share of cars equipped with air conditioning throughout the time series in the NIR (pp.224 and 227). During the review, in response to the issue referred to in ID# I.16 above, the Party confirmed that the data used to calculate emissions from mobile refrigeration and air conditioning were investigated, and explained that the estimates were based on data from the main Czech used car bazaar. The ERT welcomed the use of statistical information provided by the source. However, details of the information and data provided by the Czech car bazaar and how those were used in the inventory are not included in the NIR.</p> <p>The ERT recommends that Czechia include in the NIR details of the information (e.g. vehicle age, level of implementation of HFC recovery from destroyed cars) and data provided by the main Czech car bazaar as well as explain how the data are used for estimating the HFC emissions.</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
Agriculture			
A.30	3. General (agriculture) – CH <sub>4</sub> , N <sub>2</sub> O and CO <sub>2</sub>	<p>The ERT noted that the NIR contains some transparency issues, such as several references being incomplete or missing from the reference list (e.g. Hons and Mudřík, 2004), inconsistent reporting (e.g. the number of cattle categories listed on p.243 does not align with the information provided on p.242) and incorrect table headings (e.g. in table 5-1, 2018 written instead of 2019) and units (e.g. in table 5-24, the units for Nex). During the review, Czechia confirmed the errors and indicated that they will be corrected in the next submission. In addition, the Party indicated that, despite the errors in the NIR, the correct values and units were used for the estimations reported in the CRF tables.</p> <p>The ERT recommends that Czechia correct the errors in the NIR, ensure that an annual update is made of table headings and content, and incorporate specific QC procedures that result in up-to-date and consistent reporting in the NIR.</p>	Yes. Convention reporting adherence
A.31	3. General (agriculture) – CH <sub>4</sub> and N <sub>2</sub> O	<p>In NIR table 5-6, Czechia presented the cattle feeding situation as a percentage of 180 days (summer) instead of using a full year to define the percentage of grazing time for cattle. The 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.13) do not specify a reference period for feeding situation; however, the formulas used in chapter 10 refer to an annual basis. The Party specified in the NIR (p.244) that the 180 days (summer) are when cattle are on pasture, while cattle are in stalls for the rest of the year. During the review, the Party explained that only the period in which it is technically possible (due to suitable climatic conditions) to keep cattle outside the stables was taken into account. The ERT considers that the presentation of this information can be improved by the Party referring, in NIR table 5-6, to the percentage of grazing days per year, as in its calculation spreadsheets.</p> <p>The ERT recommends that Czechia revise the presentation of the feeding and grazing situation in NIR table 5-6, presenting the information on an annual basis.</p>	Yes. Transparency
A.32	3. General (agriculture) – CH <sub>4</sub> and N <sub>2</sub> O	<p>There are large inter-annual changes in body weight for some of the cattle subcategories (e.g. a sharp decrease of 18 per cent between 2016 and 2017 for bulls of 0.5–1 years and calves, as reported in the NIR (table 5-5)). During the review, Czechia explained that the average weight increased for some subcategories due to the increasing intensity of cattle breeding and an increase in the number of sucklers in the population. The weight data have been changed periodically on the basis of expert opinion. In addition, CZSO has changed the age categories used for calves several times: for 1990–2008, from 0–6 months to 6–12 months; for 2009–2016, from 0–8 months to 8–12 months; and for 2017, back to 0–6 months and 6–12 months in order to harmonize with national regulation 377/2013. The harmonization of Czech national reporting under the Convention, in line with the 2006 IPCC Guidelines and Eurostat, started in 2017. Since then, CZSO has harmonized the age categories with national legislation, and the relevant body weights of calves are used accordingly in the inventory estimates. The change in age categories affects, as well as body weight, the number of head of cattle in those categories. An overview of animal weight data used in the 2017, 2018 and 2019 submissions is presented in table 5-13 of the 2019 NIR. The ERT noted that the drop in weight reported for 2017 results in an inconsistency in the data but understands that the weight of animals over six months old and the resulting emissions are accounted for in the older age groups. The change in the</p>	Yes. Consistency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
		<p>methodology of CZSO of splitting subcategories of weight at the six-month rather than eight-month threshold as for the previous 16 years generates an inconsistency in the time series.</p> <p>The ERT recommends that Czechia improve consistency in the time series regarding the age categories used for cattle and clearly explain in the NIR the changes in the statistical information used in the inventory and their impact on the estimated emissions from livestock.</p>	
A.33	3.A.1 Dairy cattle – enteric fermentation – CH <sub>4</sub>	<p>There are several significant inter-annual changes in the CH<sub>4</sub> IEF (kg CH<sub>4</sub>/head/year) for dairy cattle reported in the 2019 submission, including for 1997–1998 (4.5 per cent), 1998–1999 (4.4 per cent) and 2001–2002 (3.2 per cent). After 2007, the CH<sub>4</sub> IEF is above the default range provided in the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.11), and Czechia’s 2017 value (148.05 kg CH<sub>4</sub>/head/year) is among the highest IEFs of reporting Parties (range: 81.90–159.17 kg CH<sub>4</sub>/head/year). During the review, Czechia explained that tier 2 methodology was used for estimating the CH<sub>4</sub> EF. Further, the Party stated that inter-annual changes are affected by the input data and the intensity and effectiveness of breeding. The Party indicated that the CH<sub>4</sub> IEF would be validated and compared with other scientific data as part of a research project led by the Czech Hydrometeorological Institute.</p> <p>The ERT recommends that Czechia report in the NIR the results of the planned validation of the tier 2 EF for dairy cattle. If the validation reveals inconsistencies in the time series, the ERT also recommends that the Party revise the calculation of the country-specific EF and recalculate the time series accordingly.</p>	Yes. Transparency
A.34	3.A.1 Non-dairy cattle – CH <sub>4</sub>	<p>There are significant inter-annual changes in the average CH<sub>4</sub> conversion rate for non-dairy cattle, particularly for 2009–2010 (–6.1 per cent) and 2016–2017 (5.7 per cent) reported in the 2019 submission. The increase between 1990 and 2017 (12.1 per cent) is the highest reported by Parties (most reporting Parties use constant values). During the review, Czechia explained that the CH<sub>4</sub> conversion rate is considered to be 0.065 for cattle and zero for calves, and for non-dairy cattle the weighted average CH<sub>4</sub> conversion rate was calculated for each year in the time series in response to an encouragement from a previous ERT. The Party added that changes in the non-dairy cattle population structure are the reason for the increasing CH<sub>4</sub> conversion rate. The Party provided the ERT with the calculation spreadsheet to show the changes in the cattle population; however, owing to formatting issues with the file, the ERT was not able to assess the change thoroughly or to check the calculations behind the weighted average of the CH<sub>4</sub> conversion rate.</p> <p>The ERT recommends that Czechia provide more detailed information on the input parameters used in estimating the weighted average of the CH<sub>4</sub> conversion rate and its trend in its next submission.</p>	Yes. Transparency
A.35	3.B.1 Dairy cattle – CH <sub>4</sub>	<p>The ERT noted several significant inter-annual changes in the CH<sub>4</sub> IEF (kg CH<sub>4</sub>/head/year) for dairy cattle, particularly in 1992–2003, including for 1995–1996 (–22.5 per cent), 1996–1997 (–19.3 per cent), 1999–2000 (24.9 per cent), 2001–2002 (24.6 per cent) and 2002–2003 (19.2 per cent). During the review, Czechia explained that tier 2 methodology was used for estimating the CH<sub>4</sub> emissions. The structure of the cattle population and the number of heads of cattle by subcategory changed periodically from 1990 to 2017. The input data, such as on AWMS, also changed periodically, which affects the inter-annual changes in the CH<sub>4</sub> IEF. Further, the Party explained that it used</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
		<p>an Excel data processing tool for estimating the CH<sub>4</sub> EF for enteric fermentation, the CH<sub>4</sub> EF for manure management and the annual Nex for the cattle category. The Party provided the ERT with the tool, as well as with the volatile solid values and the EFs used for 1990–2017. The ERT considers that adding details on the input parameters in the NIR would increase transparency.</p> <p>The ERT recommends that Czechia provide in the NIR the input data used for the tier 2 calculations for CH<sub>4</sub> emissions from dairy cattle across the time series as well as a description of the specific parameters used and the rationale for significant changes in their trends.</p>	
A.36	3.B.1 Non-dairy cattle – N <sub>2</sub> O	<p>The ERT noted several significant inter-annual changes in the N<sub>2</sub>O IEF (kg N<sub>2</sub>O/head/year) for non-dairy cattle, including for 1994–1995 (13.2 per cent), 1998–1999 (6.7 per cent), 2006–2007 (4.5 per cent), 2007–2008 (5.1 per cent) and 2008–2009 (4.7 per cent). During the review, Czechia explained that tier 2 methodology was used for estimating Nex. The structure of the cattle population and the number of heads of cattle by subcategory changed periodically from 1990 to 2017. The Party stated that the input “zoo technological data” (mainly on AWMS and typical animal mass) also changed periodically, which affects the emission estimates. Further, the Party explained that the calculations were made using an Excel data processing tool (see ID# A.35 above). The tier 2 calculations for N excretion were not initially included in the screenshot provided by the Party in response to questions raised by the ERT, and the specific parameters used could not be reconciled with those described in the NIR (section 5.2.2.2.3). Later, the Party provided a spreadsheet with the estimates. However, the file does not contain information on where the data (e.g. the value of 25 given for N retention) come from, or any units of parameters.</p> <p>The ERT recommends that Czechia include in the NIR details of the underlying parameters, including a reference to their sources, used in the tier 2 calculations to determine the N<sub>2</sub>O emissions across the time series.</p>	Yes. Transparency
A.37	3.D.a.2 Organic N fertilizers – N <sub>2</sub> O	<p>Following a previous recommendation (see ID# A.21 in table 3), Czechia provided estimates of the N<sub>2</sub>O emissions from the application of sewage sludge to agricultural soils for 1990–2001. When checking the data for the time series provided in section 5.4.5 of the 2018 NIR (implemented recalculations) and figure 5-6, as well as the data provided during the review, the ERT noted that, using the linear regression, the value for the amount of sewage sludge applied in 2002 of 32,970 t/year is much higher than the official AD used in the inventory (17,570 t/year).</p> <p>The ERT recommends that Czechia include in the NIR further information on the selected method for extrapolation of data for 1990–2001 and on how the consistency of the time series is ensured.</p>	Yes. Transparency
A.38	3.D.a.5 Mineralization/immobilization associated with loss/gain of soil organic matter – N <sub>2</sub> O	<p>Czechia reported N<sub>2</sub>O emissions from the mineralization of soil organic matter under cropland remaining cropland in category 3.D.a.5 in CRF table 3.D. However, in the NIR (section 5.4.2.2, p.264) there is no description of the AD used to estimate the emissions, only references to the LULUCF chapter of the NIR. During the review, the Party provided the ERT with the underlying data used for the estimation of emissions from the mineralization of soil organic matter under cropland remaining cropland and the relevant calculation spreadsheets. For 1993, Czechia reported emissions as “NO”, without explaining the reason for this break in the trend. Furthermore, in the NIR (section 5.4.2.2, p.264) the Party stated that it applied the IPCC default value of 15 for the carbon to nitrogen ratio.</p>	Yes. Transparency

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		<p>The ERT determined that, in the calculations provided by the Party during the review, the default value of 10 was applied (from the 2006 IPCC Guidelines, vol. 4, chap.11, p. 11.16), which is the correct ratio for cropland remaining cropland, but is inconsistent with the value reported in the NIR (p.264).</p> <p>The ERT recommends that the Party provide the correct value for the carbon to nitrogen ratio and all other underlying data used for estimating emissions from the mineralization of soil organic matter under cropland remaining cropland in the relevant section of the agriculture chapter of the NIR.</p>	
A.39	3.G Liming – CO <sub>2</sub>	<p>Czechia reported CO<sub>2</sub> emissions from the application of limestone and dolomite separately and used a split of 90/10 (limestone/dolomite) for the amounts applied (see ID# A.26 in table 3). In the NIR (section 5.7.2), the Party indicated that the Czech statistical yearbook does not provide data on the consumption of limestone and dolomite separately so the split is based on expert opinion, but no details of the source of the expert opinion were included. Further in the NIR (section 5.7.4), the Party explained that the share of dolomite use in fertilization of forest land and agricultural land was discussed with experts from the Crop Research Institute in 2016. During the review, Czechia also explained that the limestone/dolomite split was consulted on with plant nutrition experts and confirmed with the previous ERT. The Party further explained that dolomite is primarily used in forestry and most probably only limestone (as a pure substance) is used in agriculture.</p> <p>The ERT recommends that Czechia include in the NIR further details on the data source (e.g. expert judgment) for the share of dolomite applied and the justification for the 90/10 limestone/dolomite split used.</p>	Yes. Transparency
LULUCF			
L.22	4. General (LULUCF) – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	<p>There is a large inter-annual variation in the reported net LULUCF emissions and removals in the 2019 submission: net removals decreased by 58.6 per cent between 2016 and 2017, from 5,158.03 kt CO<sub>2</sub> eq in 2016 to 2,134.94 kt CO<sub>2</sub> eq in 2017. During the review, Czechia confirmed that a high level of salvage logging currently occurs in the country: 9.4 million m<sup>3</sup> were logged in 2017, which is the highest reported base harvest in the country for the entire reporting period (1990–2017), and this figure rose again in 2018. The Party indicated it plans to review the fraction of harvest residues associated with final cut that are burned. The ERT commends the Party for its plans.</p> <p>The ERT recommends that Czechia increase the transparency of its LULUCF reporting by including in the NIR a more detailed explanation of the changes occurring in relation to its forest resources, and in particular harvesting, to explain the large inter-annual variation in net LULUCF emissions and removals (net removals decreased by 58.6 per cent between 2016 and 2017). The ERT also recommends that the Party review all EFs and parameters associated with harvest emissions that may have changed due to the type of forest being harvested given the large changes that are currently being observed, revise the estimates if necessary, and ensure the consistency of the reported time series.</p>	Yes. Transparency
L.23	4.A.1 Forest land remaining forest land – CO <sub>2</sub>	<p>Czechia reported “NO” for CSCs in the litter and soils pools over the entire time series in CRF tables 4.A. In the NIR (section 6.4.2.1, p.286) and during the review, the Party explained that the available AD for estimating CSCs for litter under forest land remaining forest land are insufficient to proceed to a higher-tier estimation method besides the tier 1 method from the 2006 IPCC Guidelines (vol. 4, chap. 4.2.2, p.4.20) that is currently applied (see ID# L.11</p>	Yes. Convention reporting adherence

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
		<p>in table 3). For soils, the tier 1 assumption of CSC being equal to zero was used (see NIR section 6.4.2.1, p.286). The ERT noted that the correct notation key to be used in these cases is “NA”.</p> <p>The ERT recommends that Czechia revise the notation keys reported for the litter and soils pools in CRF table 4.A, noting that “NA” is to be reported in the CRF tables for the tier 1 assumptions provided in the 2006 IPCC Guidelines for carbon stocks in equilibrium.</p>	
L.24	4.A.1 Forest land remaining forest land – CO <sub>2</sub>	<p>For deadwood, CO<sub>2</sub> estimates were reported for 2004–2015 (see ID# L.11 in table 3) and “NO” was reported for the remaining years using the tier 1 approach. For the assessment of the net CSC for deadwood the tier 2 stock-difference method was applied in accordance with equation 2.8 of the 2006 IPCC Guidelines (vol. 4, chap. 2) (see NIR p.285). The ERT noted, however, that CSC estimates were still missing for 1990–2003 and 2016–2017. The Party informed the ERT that it will extrapolate estimates for the next submission, such that the trend in, for example, 2009–2015 will be assumed to continue to 2016, 2017 and 2018, until new data are available.</p> <p>The ERT recommends that Czechia report a consistent time series for deadwood by using a tier 2 approach as applied for 2004–2015 or by applying an appropriate technique in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 5.3.3).</p>	Yes. Consistency
L.25	4.B.1 Cropland remaining cropland – CO <sub>2</sub>	<p>In the 2019 submission, Czechia reported the carbon stock calculations for cropland remaining cropland by disaggregating cropland into seven subcategories (non-perennial arable land – no fallow, non-perennial arable land – fallow, non-perennial gardens, non-perennial hop fields, perennial gardens, perennial orchards and perennial vineyards) and assigning values for each of them (F<sub>I</sub>, F<sub>MG</sub> and F<sub>LU</sub>) to more accurate estimate emissions from cropland and the changes between cropland types (see NIR table 6-9) (see ID# L.13 in table 3). The Party reported on just one subcategory of cropland in CRF table 4.B despite the improvement of defining seven subcategories.</p> <p>The ERT encourages Czechia to improve the transparency of its reporting by reporting in CRF table 4.B CSCs for cropland remaining cropland disaggregated by the seven new subcategories identified.</p>	Not an issue/problem
L.26	4.E.2 Land converted to settlements – CO <sub>2</sub>	<p>In the 2019 submission, Czechia estimated CSC for soil organic carbon in mineral soils for land converted to settlements for the first time (see ID# L.20 in table 3) and thus improved the completeness of the inventory. The methodology followed is presented in the NIR (section 6.8.2). However, during the review, an issue with the estimate for reference soil organic carbon for settlements was detected and the Party indicated that this will be rectified in the next submission. The ERT noted that the correction (using 20 per cent soil carbon loss for paved areas in line with the 2006 IPCC Guidelines (vol. 4, chap. 8, p.8.24)) affects all soil CSC estimates involving land-use conversions to and from settlements.</p> <p>The ERT recommends that Czechia correct the error detected for reference soil organic carbon for settlements and recalculate all soil CSC estimates involving land-use conversions to and from settlements in line with the 2006 IPCC Guidelines (vol. 4, chap. 8, p.8.24).</p>	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
L.27	4.G HWP – CO <sub>2</sub>	<p>In the 2019 submission, CRF table 4.Gs2 contains data for 1990–2017 only, but in the NIR (section 6.10.2) Czechia described the method it used to calculate the share of AD (for sawnwood, wood-based panels, paper and paperboard) for 1961–1992. During the review, the Party provided the missing data.</p> <p>The ERT recommends that Czechia complete the data entry for CRF table 4.Gs2 by including the information for 1961–1989.</p>	Yes. Convention reporting adherence
Waste			
W.18	5.C.1 Waste incineration – CO <sub>2</sub>	<p>Czechia reported only emissions from industrial, hazardous and clinical waste incineration under this category (5.C.1 (waste incineration)) because all municipal waste incineration is covered under the energy sector (NIR, section 7.4). In CRF table 5.C, all other waste subcategories are reported together under hazardous waste and therefore, for industrial solid waste, clinical waste and sewage sludge, “IE” is reported and explained in CRF table 9. The NIR mentions plastics, rubber, liquid solvents and waste oil as waste fractions (p.324). However, for the estimation parameters (total carbon content and fossil carbon content) Czechia used default values for industrial waste, not taking into account any clinical waste or fossil liquid waste being incinerated, which have different default factors (see the 2006 IPCC Guidelines, vol. 5, chap. 5, table 5.2). No information on the split between industrial and hazardous waste was provided during the review.</p> <p>The ERT recommends that Czechia make an effort to report emissions for the different waste types separately, or, if this is not possible, provide information in the NIR on the specific types of waste incinerated and their estimated shares, including justification for using the default parameters for industrial waste instead of specific parameters for industrial, clinical and fossil liquid waste.</p>	Yes. Accuracy
KP-LULUCF			
KL.17	FM – CO <sub>2</sub> CH <sub>4</sub> and N <sub>2</sub> O	<p>The time series of net emissions and removals from FM shows a large change (reduction in removals) between 2016 and 2017, from –4,387.43 to –1,725.05 kt CO<sub>2</sub> eq. This change is the largest in all years for which FM is reported. During the review, Czechia provided an explanation (see ID# L.22 above). The ERT noted that the changes in harvested resources (in relation to the age, size and species of trees) may also affect the wood density and EFs used in the estimates.</p> <p>The ERT recommends that Czechia increase the transparency of its reporting on KP-LULUCF activities by including in the NIR a more detailed explanation of the changes occurring in relation to its forest resources, and in particular harvesting, to explain the large inter-annual variation in removals from FM (removals decreased from –4,387.43 kt CO<sub>2</sub> eq in 2016 to –1,725.05 kt CO<sub>2</sub> eq in 2017). The ERT also recommends that the Party review all EFs and parameters associated with harvest given the large changes to the type of harvesting that are being observed.</p>	Yes. Transparency

<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 identified in para. 69 of the Article 8 review guidelines. Encouragements are made to the Party to address all findings not related to such issues or problems.



## **VI. Application of adjustments**

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

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

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

## **VIII. Questions of implementation**

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

## Annex I

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

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

Table 1  
Total greenhouse gas emissions for Czechia, base year<sup>a</sup>–2017  
(kt CO<sub>2</sub> eq)

	<i>Total GHG emissions excluding indirect CO<sub>2</sub> emissions</i>		<i>Total GHG emissions including indirect CO<sub>2</sub> emissions<sup>b</sup></i>		<i>Land-use change (Article 3.7 bis as contained in the Doha Amendment)<sup>c</sup></i>	<i>KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)<sup>d</sup></i>	<i>KP-LULUCF activities (Article 3.4 of the Kyoto Protocol)</i>	
	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>			<i>CM, GM, RV, WDR</i>	<i>FM</i>
FMRL								–4 686.00
Base year	192 198.38	197 424.29	194 047.71	199 273.61	NA		NA	
1990	192 166.80	197 392.70	194 016.12	199 242.03				
1995	149 721.89	156 717.54	151 133.43	158 129.08				
2000	141 446.06	149 333.52	142 607.16	150 494.63				
2010	134 194.82	139 733.69	135 163.23	140 702.10				
2011	130 901.65	137 753.14	131 849.77	138 701.26				
2012	127 007.26	133 697.71	127 913.10	134 603.55				
2013	122 715.84	128 691.10	123 521.28	129 496.54		–344.00	NA	–5 619.53
2014	120 838.48	126 758.46	121 640.15	127 560.13		–412.54	NA	–5 514.35
2015	122 695.51	127 777.83	123 482.61	128 564.93		–512.33	NA	–4 586.33
2016	124 598.65	129 756.68	125 350.87	130 508.90		–518.88	NA	–4 387.43
2017	126 540.11	128 675.05	127 248.59	129 383.52		–551.05	NA	–1 725.05

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

<sup>a</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs, SF<sub>6</sub> and NF<sub>3</sub>. Czechia 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.

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

<sup>c</sup> The value reported in this column refers to 1990.

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

Table 2

**Greenhouse gas emissions by gas for Czechia, excluding land use, land-use change and forestry, 1990–2017**(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	166 052.91	23 492.14	9 612.74	NO	NO	NE, NO	84.24	NO
1995	133 017.52	18 145.42	6 850.31	27.14	0.01	NE, NO	88.68	NO
2000	128 220.79	15 351.20	6 365.04	444.51	4.69	NE, NO	108.40	NO
2010	118 428.23	14 432.86	5 328.99	2 381.07	48.04	NE, NO	82.76	0.15
2011	115 953.59	14 466.20	5 544.80	2 639.20	8.24	NE, NO	88.64	0.59
2012	111 810.66	14 449.53	5 486.19	2 757.66	6.19	NE, NO	92.44	0.89
2013	107 182.02	13 868.73	5 450.67	2 906.60	4.08	NE, NO	83.04	1.41
2014	104 816.19	13 865.79	5 688.08	3 104.77	3.02	NE, NO	79.90	2.37
2015	105 573.54	13 926.62	5 664.58	3 317.83	1.93	NE, NO	78.27	2.15
2016	107 351.35	13 701.16	5 911.59	3 462.58	1.44	NE, NO	78.63	2.15
2017	106 315.75	13 510.83	5 837.72	3 640.80	1.37	NE, NO	74.31	2.75
<b>Per cent change 1990–2017</b>	<b>–36.0</b>	<b>–42.5</b>	<b>–39.3</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>–11.8</b>	<b>NA</b>

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

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

Table 3

**Greenhouse gas emissions by sector for Czechia, 1990–2017**(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	162 615.19	17 564.34	15 839.59	–5 225.91	3 222.91	NO
1995	130 413.69	14 495.45	9 616.63	–6 995.65	3 603.31	NO
2000	122 950.61	15 209.33	8 393.28	–7 887.46	3 941.40	NO
2010	113 094.36	15 265.08	7 386.47	–5 538.87	4 956.19	NO
2011	110 642.59	15 481.23	7 567.38	–6 851.49	5 010.06	NO
2012	106 608.24	15 240.12	7 585.97	–6 690.45	5 169.21	NO
2013	101 176.79	15 110.90	7 744.22	–5 975.26	5 464.63	NO
2014	98 155.12	15 968.26	7 940.86	–5 919.98	5 495.89	NO
2015	99 250.56	15 615.37	8 092.55	–5 082.32	5 606.45	NO
2016	100 575.15	15 789.13	8 482.36	–5 158.03	5 662.26	NO

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
2017	99 336.76	15 867.48	8 432.99	-2 134.94	5 746.31	NO
<b>Per cent change 1990–2017</b>	<b>-38.9</b>	<b>-9.7</b>	<b>-46.8</b>	<b>-59.1</b>	<b>78.3</b>	<b>NA</b>

*Notes:* (1) Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions; (2) totals include indirect CO<sub>2</sub> emissions reported in CRF table 6.

Table 4

**Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3–4, of the Kyoto Protocol by activity, base year<sup>a</sup>–2017, for Czechia**  
(kt CO<sub>2</sub> eq)

	<i>Article 3.7 bis as contained in the Doha Amendment<sup>b</sup></i>	<i>Activities under Article 3, paragraph 3, of the Kyoto Protocol</i>		<i>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol</i>				
	<i>Land-use change</i>	<i>AR</i>	<i>Deforestation</i>	<i>FM</i>	<i>CM</i>	<i>GM</i>	<i>RV</i>	<i>WDR</i>
FMRL				-4 686.00				
Technical correction				NA				
Base year	NA				NA	NA	NA	NA
2013		-634.49	290.49	-5 619.53	NA	NA	NA	NA
2014		-699.95	287.41	-5 514.35	NA	NA	NA	NA
2015		-746.09	233.76	-4 586.33	NA	NA	NA	NA
2016		-793.13	274.25	-4 387.43	NA	NA	NA	NA
2017		-851.82	300.77	-1 725.05	NA	NA	NA	NA
<b>Per cent change base year–2017</b>					<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

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

<sup>a</sup> Czechia has not elected to report on any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol, and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

<sup>b</sup> The value reported in this column refers to 1990.

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

Table 5

**Key relevant data for Czechia under Article 3, paragraphs 3–4, of the Kyoto Protocol in the 2019 annual submission**

<i>Key parameters</i>	<i>Values</i>
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: not elected (g) WDR: not elected
Election of activities under Article 3, paragraph 4	None
Election of application of provisions for natural disturbances	No
3.5% of total base-year GHG emissions, excluding LULUCF and including indirect CO <sub>2</sub> emissions	6 941.074 kt CO <sub>2</sub> eq (55 528.593 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	NA
2. Deforestation	NA
3. FM	NA
4. CM	NA
5. GM	NA
6. RV	NA
7. WDR	NA

## Annex II

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

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

Table 1

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

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

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>CPR</b>	468 463 683	–	–	468 463 683
<b>Annex A emissions for 2017</b>	–	–	–	–
CO <sub>2</sub> <sup>a</sup>	106 315 746	–	–	106 315 746
CH <sub>4</sub>	13 510 832	–	–	13 510 832
N <sub>2</sub> O	5 837 721	–	–	5 837 721
HFCs	3 640 800	–	–	3 640 800
PFCs	1 368	–	–	1 368
Unspecified mix of HFCs and PFCs	NO, NE	–	–	NO, NE
SF <sub>6</sub>	74 312	–	–	74 312
NF <sub>3</sub>	2 745	–	–	2 745
<b>Total Annex A sources</b>	<b>129 383 525</b>	–	–	<b>129 383 525</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2017</b>	–	–	–	–
AR	–851 820	–	–	–851 820
Deforestation	300 770	–	–	300 770
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2017</b>	–	–	–	–
— FM	–1 725 046	–	–	–1 725 046

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

Table 2

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

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

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions for 2016</b>	–	–	–	–
CO <sub>2</sub> <sup>a</sup>	107 351 355	–	–	107 351 355
CH <sub>4</sub>	13 701 160	–	–	13 701 160
N <sub>2</sub> O	5 911 588	–	–	5 911 588
HFCs	3 462 578	–	–	3 462 578
PFCs	1 441	–	–	1 441
Unspecified mix of HFCs and PFCs	NO, NE	–	–	NO, NE
SF <sub>6</sub>	78 629	–	–	78 629
NF <sub>3</sub>	2 150	–	–	2 150
<b>Total Annex A sources</b>	<b>130 508 901</b>	–	–	<b>130 508 901</b>

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2016</b>	–	–	–	–
– AR	–793 132	–	–	–793 132
– Deforestation	274 251	–	–	274 251
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2016</b>	–	–	–	–
– FM	–4 387 425	–	–	–4 387 425

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

Table 3

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

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions for 2015</b>	–	–	–	–
CO <sub>2</sub> <sup>a</sup>	105 573 539	–	–	105 573 539
CH <sub>4</sub>	13 926 623	–	–	13 926 623
N <sub>2</sub> O	5 664 583	–	–	5 664 583
HFCs	3 317 832	–	–	3 317 832
PFCs	1 933	–	–	1 933
Unspecified mix of HFCs and PFCs	NO, NE	–	–	NO, NE
SF <sub>6</sub>	78 267	–	–	78 267
NF <sub>3</sub>	2 150	–	–	2 150
<b>Total Annex A sources</b>	<b>128 564 929</b>	–	–	<b>128 564 929</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015</b>	–	–	–	–
– AR	–746 093	–	–	–746 093
– Deforestation	233 762	–	–	233 762
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015</b>	–	–	–	–
– FM	–4 586 326	–	–	–4 586 326

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

Table 4

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

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions for 2014</b>	–	–	–	–
CO <sub>2</sub> <sup>a</sup>	104 816 191	–	–	104 816 191
CH <sub>4</sub>	13 865 789	–	–	13 865 789
N <sub>2</sub> O	5 688 084	–	–	5 688 084
HFCs	3 104 767	–	–	3 104 767
PFCs	3 023	–	–	3 023
Unspecified mix of HFCs and PFCs	NO, NE	–	–	NO, NE
SF <sub>6</sub>	79 904	–	–	79 904
NF <sub>3</sub>	2 373	–	–	2 373
<b>Total Annex A sources</b>	<b>127 560 131</b>	–	–	<b>127 560 131</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014</b>	–	–	–	–
– AR	–699 951	–	–	–699 951
– Deforestation	287 410	–	–	287 410

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014</b>	–	–	–	–
FM	–5 514 349	–	–	–5 514 349

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

Table 5

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

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions for 2013</b>	–	–	–	–
CO <sub>2</sub> <sup>a</sup>	107 182 016	–	–	107 182 016
CH <sub>4</sub>	13 868 726	–	–	13 868 726
N <sub>2</sub> O	5 450 671	–	–	5 450 671
HFCs	2 906 598	–	–	2 906 598
PFCs	4 079	–	–	4 079
Unspecified mix of HFCs and PFCs	NO, NE	–	–	NO, NE
SF <sub>6</sub>	83 041	–	–	83 041
NF <sub>3</sub>	1 409	–	–	1 409
<b>Total Annex A sources</b>	<b>129 496 538</b>	–	–	<b>129 496 538</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013</b>	–	–	–	–
AR	–634 491	–	–	–634 491
Deforestation	290 491	–	–	290 491
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013</b>	–	–	–	–
FM	–5 619 529	–	–	–5 619 529

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



## **Annex III**

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

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

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

- (a) 1.B.2.a.1 oil exploration – liquid fuels (CO<sub>2</sub> and CH<sub>4</sub>) (see ID# E.7 in table 3 in this report);
- (b) 2.A.4 mineral wood production (CO<sub>2</sub> for 1990–1999) (see ID# I.1 in table 3 in this report);
- (c) 5.B.1 composting (CH<sub>4</sub> and N<sub>2</sub>O for 1990–2004) (see ID# W.8 in table 3 in this report);
- (d) FM – CSC in deadwood (see ID# KL.9 in table 3 in this report).

## Annex IV

### Reference documents

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

IPCC. 2000. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. J Penman, D Kruger, I Galbally, et al. (eds.). Hayama, Japan: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency/Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

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/gpglulucf/gpglulucf.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>.

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

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

#### B. UNFCCC documents

##### Annual review reports

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

##### Other

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

Annual status report for Czechia for 2019. Available at [https://unfccc.int/sites/default/files/resource/asr2019\\_CZE.pdf](https://unfccc.int/sites/default/files/resource/asr2019_CZE.pdf).

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

Responses to questions during the review were received from Eva Krtková (Air Quality Protection Division, Czech Hydrometeorological Institute), including additional material on the methodology and assumptions used. The following documents are reproduced as received:

Hons P., Mudřík Z. (2003): Czech country-specific data for estimation of methane emissions from enteric fermentation of cattle. AGROBIO report for CHMI, Prague (in Czech).

Vácha, D. (2004): Methodology for CO<sub>2</sub> emissions estimates for cement production and CO<sub>2</sub> emissions and removals from lime production and use, CHMI Report (in Czech).