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Report on the individual review of the annual submission of Switzerland submitted in 2022*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual inventory of emissions and removals of greenhouse gases for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention. This report presents the results of the individual review of the 2022 annual submission of Switzerland, 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 5 to 10 September 2022 in Bonn.

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

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Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AAU	assigned amount unit
AD	activity data
Annex A source	source category included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
Article 8 review guidelines	"Guidelines for review under Article 8 of the Kyoto Protocol"
CER	certified emission reduction
CH_4	methane
CM	cropland management
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
Convention reporting adherence	adherence to the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
CPR	commitment period reserve
CRF	common reporting format
dm	dry matter
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
FOEN	Swiss Federal Office for the Environment
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
MMS	manure management system(s)
MSW	municipal solid waste
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
Nex	nitrogen excretion
NF_3	nitrogen trifluoride
NIR	national inventory report
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_6	sulfur hexafluoride
SIAR	standard independent assessment report
UNFCCC Annex I inventory reporting guidelines	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
UNFCCC review guidelines	"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention"
VS	volatile solid(s)
WDR	wetland drainage and rewetting
Wetlands Supplement	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*

I. Introduction

1. This report covers the review of the 2022 annual submission of Switzerland, organized by the secretariat in accordance with the Article 8 review guidelines (adopted by decision 22/CMP.1 and revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention" (annex to decision 13/CP.20). The review took place from 5 to 10 September 2022 in Bonn and was coordinated by Claudia do Valle, Federico Brocchieri, Javier Hanna and Davor Vesligaj (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for Switzerland.

Table 1
Composition of the expert review team that conducted the review for Switzerland

Area of expertise	*Name*	*Party*
Generalist	Valentina Idrissova	Canada
	Eva Krtkova	Czechia
Energy	Renata Grisoli	Brazil
	Yves Marenne	Belgium
	Dingane Sithole	Zimbabwe
	Anand Sookun	Mauritius
IPPU	Joseph Baffoe	Ghana
	Siriluk Chiarakorn	Thailand
	Pia Forsell	Finland
	Maria Purzner	Austria
Agriculture	Jorge Alvarez	Peru
	Yauheniya Bertosh	Belarus
	Anais Durand	France
	Steen Gyldenkaerne	Denmark
LULUCF and KP-LULUCF	Tatenda Gotore	Zimbabwe
	Inge Jonckheere	Belgium
	Sekai Ngarize	Zimbabwe
Waste	Mayra Rocha	Brazil
	Sergii Shmarin	Ukraine
Lead reviewers	Valentina Idrissova	
	Mayra Rocha	

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

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

[1] Issues are defined in decision 13/CP.20, annex, para. 81.
[2] Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

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

5. Annex I presents the annual GHG emissions of Switzerland, including totals excluding and including LULUCF, indirect CO_2 emissions, and emissions by gas and by sector, and contains background data on emissions and removals from KP-LULUCF, if elected by the Party, by gas, sector and activity.

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

II. Summary and general assessment of the Party's 2022 annual submission

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

Table 2
Summary of review results and general assessment of the 2022 annual submission of Switzerland

Assessment			*Issue/problem ID#(s) in table 3 or 5*[a]
Date of submission	Original submission: NIR, 14 April 2022; CRF tables (version 1), 14 April 2022; SEF tables (SEF-2021-CP1 and SEF-2021-CP2), 14 April 2022		
Review format	Centralized		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	No	
	(b) Selection and use of methodologies and assumptions?	No	
	(c) Development and selection of EFs?	No	
	(d) Collection and selection of AD?	No	
	(e) Reporting of recalculations?	No	
	(f) Reporting of a consistent time series?	No	
	(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, or completeness?[b]	Yes	W.4, W.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?	Yes	
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	No	I.1
Supplementary information under the Kyoto Protocol	Have any issues been identified related to the following aspects of the national system:		
	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	No	
	(b) Performance of the national system functions?	No	

Assessment			*Issue/problem ID#(s) in table 3 or 5[a]*
	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 adherence to technical standards for data exchange?	No	
	Have any issues been identified related to the reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the SIAR?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of the reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	No	
	Have any issues been identified related to the following reporting requirements for KP-LULUCF:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	No	
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	No	
	(c) Reporting requirements of decision 6/CMP.9?	No	
	(d) Country-specific information to support provisions for natural disturbances in accordance with decision 2/CMP.7, annex, paragraphs 33–34?	No	
CPR	Was the CPR reported in accordance with decision 18/CP.7, annex; decision 11/CMP.1, annex; and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied any adjustments under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Has the Party submitted a revised estimate to replace a previously applied adjustment?	NA	Switzerland does not have a previously applied adjustment
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for assessing conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Yes	
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	No	
Questions of implementation	Did the ERT list any questions of implementation?	No	

[a] Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.
[b] Missing categories for which methods are provided in the 2006 IPCC Guidelines may affect completeness and are listed in annex III.

III. Status of implementation of recommendations included in the previous review report

8. Table 3 compiles the recommendations from previous review reports that were included in the most recent previous review report, published on 19 January 2022,[3] and had not been resolved by the time of publication of the report on the review of the Party's 2021 annual submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue or problem by the time of publication of this review report and has provided the rationale for its determination, which takes into consideration the publication date of the most recent previous review report and national circumstances.

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

ID#	*Issue/problem classification*[a, b]	*Recommendation from previous review report*	*ERT assessment and rationale*
General			
G.1	QA/QC and verification (G.2, 2021) Convention reporting adherence	Ensure consistency in the data reported on recalculations of total emissions (in CO_2 eq), including LULUCF, between section 10 of the NIR and CRF table 8s4.	Resolved. Switzerland reported consistent data on emissions in NIR tables 10-4 (p.519) and 10-5 (p.522) and CRF table 8s4.
Energy		No previous issues identified.	
IPPU		No previous issues identified.	
Agriculture			
A.1	3.B.1 Cattle – CH_4 and N_2O (A.5, 2021) Transparency	Explain the mass balance approaches developed to track VS and N flows excreted by cattle (by subcategory) and handled in each MMS and transparently describe the methods used to estimate CH_4 and N_2O emissions from manure management for cattle (for each subcategory) in the NIR.	Resolved. Switzerland reported in its NIR (annex A3.3.4, p.608) a detailed explanation of its estimation of the distribution of VS and N for each MMS for cattle, including a reference to the method for estimating N distribution (Kupper et al., 2022). Switzerland indicated that, as VS are excreted mainly in dung and N is excreted mainly in urine (NIR table A-28, p.608), the resulting distribution per MMS of VS differs from the distribution per MMS of N. The Party included two examples of the distribution of VS and N in MMS for mature dairy cattle, namely, for tie stall and loose housing systems (simultaneous production of liquid slurry and solid manure) in NIR table A-28 (p.609). The methods used for estimating CH_4 and N_2O emissions from manure management for each subcategory of cattle are transparently described in NIR section 5.3.2 (pp.295–308).
A.2	3.B.1 Cattle – N_2O (A.6, 2021) Transparency	Provide information in the NIR on the algorithms and background input data (e.g. crude protein intake, milk protein content and N retention, to the extent possible) used	Addressing. Switzerland did not provide in its NIR details on the algorithms and background input data to explain how N intake and the subsequent Nex rates were estimated. The ERT noted that some relevant information is included in the NIR (pp.304–305), in particular for dairy cows (e.g. protein content of milk (0.033 g/kg milk) and some feeding rations), however, this information does not resolve the transparency

[3] FCCC/ARR/2021/CHE.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
		to evaluate the Nex rates for cattle (by subcategory).	issue. During the review, the Party explained that the estimation of most Nex rates is based on the requirements and the assumption that feeding schedules are adjusted accordingly. The actual N content of the feed and the actual N intake are thus much less important in the calculation procedure and all relevant data on these requirements are contained in the literature cited in the NIR.
A.3	3.D.a.4 Crop residues – N_2O (A.7, 2021) Transparency	Clarify the model used to estimate N_2O emissions from crop residues left on fields by including in the NIR information on the reference source for the model, the data sources and the calculation parameters used.	Addressing. Switzerland reported in its NIR (pp.318–319) and NIR tables A-24 (p.604) and A-25 (p.605) the data (i.e. fractions and parameters) used in the model for estimating N_2O emissions from crop residues; however, the reference sources for the parameters in these tables were not provided. Furthermore, it was difficult for the ERT to verify, using the information in the references cited in the NIR (FAL/RAC, 2001; Richner et al., 2017), how the Party had estimated the "residue/crop ratio" and N content. The ERT noted that "residue/crop ratio" and N content differ from the methodology in the 2006 IPCC Guidelines but are similar to that in the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. During the review, the Party clarified that in order to avoid double counting, it does not account for emissions from bedding material under manure management and subsequent emissions from manure application to agricultural soils. Therefore, in the model, all crop residues from cereals are assumed to be directly applied to soils. The Party also clarified that it is currently revising the methodology for estimating emissions from crop residues in order to better align it with the reporting of carbon fluxes in agricultural soils under the LULUCF sector. Switzerland indicated that it will consider changing the model approach in order to take into account all N flows through MMS.
A.4	3.D.b.1 Atmospheric deposition – N_2O (A.8, 2021) Transparency	Justify the use of the country-specific N_2O EF for atmospheric deposition by including information in the NIR on the calculation of the mean N_2O EF for atmospheric deposition (e.g. reporting in tabular format the areas of land-use categories that were subject to N inputs and the relevant N_2O EF for atmospheric deposition for each category of managed land) or use the IPCC default EF for N_2O emissions from atmospheric deposition of N inputs to soil and water provided in table 11.3 of the 2006 IPCC Guidelines (vol. 4, chap. 11).	Resolved. Switzerland provided detailed information in its NIR (p.303) to justify the use of the country-specific N_2O EF for atmospheric deposition. The Party reported in NIR table 5-16 (p.303) the land-use categories subject to N inputs for indirect N_2O emissions from atmospheric deposition and also reported the N_2O EF for indirect N_2O emissions from atmospheric deposition (EF_4) for agricultural land (semi-natural ecosystems) and the weighted EF_4. The EF_4 applied for agricultural land is the default value from the 2006 IPCC Guidelines (vol. 4, table 11.3) while the EF_4 applied for semi-natural ecosystems is a country-specific value that differs from year to year depending on where the estimated N emission is deposited. The IPCC methodology used to estimate EF_4 is based on an increase in N_2O emissions owing to an increased N load, as for mineral fertilizers, taking into account the background emissions. The country-specific EF_4 for semi-natural ecosystems is based on measured total emissions from these ecosystems regardless of the origin of the background emissions. Hence, the Party used a higher value for the EF than the default provided in the 2006 IPCC Guidelines; consequently, higher emissions are reported compared with the estimates made using the methodology in the 2006 IPCC Guidelines. The ERT considers the approach used by the Party as conservative and that no underestimation of emissions has occurred.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
LULUCF			
L.1	4.A Forest land – CO_2 (L.4, 2021) (L.8, 2019) Accuracy	Either include trees with a diameter at breast height of below 12 cm with branches, foliage and roots, in addition to non-tree understory vegetation, including shrubs, ferns, grasses, sedges and herbs, in the estimates of living biomass, deadwood and litter, or provide justification as to why these small trees and non-tree vegetation are not included in the calculation of living biomass, deadwood and litter.	Resolved. Switzerland included in its NIR (section 6.4.2.1, p.366) a justification for not considering trees with a diameter at breast height of below 12 cm and non-tree vegetation in the calculation of living biomass, deadwood and litter. The Party explained that the omission of the trees with a diameter at breast height of below 12 cm and of non-tree understory vegetation is justified because of their negligible effect on the carbon stocks and carbon stock change estimates of living biomass, deadwood, litter and soil in productive forests in Switzerland, referencing He et al. (2012) in its NIR (p.366) as the source of this assumption.
L.2	4.C.2 Land converted to grassland – CO_2 (L.5, 2021) Transparency	Include a justification for the use of a one-year conversion period for land converted to woody grassland types in the NIR.	Resolved. Switzerland included in its NIR (section 6.6.4.5, p.427) a justification for the use of a one-year conversion period for land converted to the different types of woody grassland. The Party explained that the use of a one-year conversion period, for example, for forest land converted to grassland is evident for all subdivisions (i.e. permanent, unproductive and woody). Land-use changes to vineyards, low-stem orchards and tree nurseries (land type CC33) and orchards (land type CC35) have taken place almost exclusively on cropland or grassland since 1990 (NIR table 6-9, p.356). New planting of these crops (CC33 and CC35) is usually not done with seedlings but with already established plants (except for tree nurseries, which are negligible in terms of area). In subcategory 4.C.2.5 (other land converted to grassland), CO_2 removals of the subgroup woody are mainly due to the shift of vegetation zones in the mountain regions as a result of climate change. The ERT agreed with the explanation provided by the Party in the NIR for the use of a one-year conversion period for the most important (in quantitative terms) land conversions to woody grassland (namely, for all land-use changes to CC33 and CC35 land types).
Waste			
W.1	5.B.1 Composting – CH_4 (W.2, 2021) Transparency	Describe in the NIR the process for composting of MSW to justify the low country-specific CH_4 EF of 1.00 g/kg.	Resolved. Switzerland provided a comprehensive description of the process for composting of MSW, including references justifying the low country-specific CH_4 EF of 1.00 g/kg (NIR p.462), which is now reported in CRF table 5.B on a dry-weight basis (1.83 g CH_4/kg) (see ID# W.2 below).
W.2	5.B.1 Composting – CH_4 (W.3, 2021) Convention reporting adherence	Correct the AD for composting of MSW on a dry-weight basis (kt dm) in CRF table 5.B, instead of on a wet-weight basis, to ensure comparability of the resulting IEF across reporting Parties.	Resolved. Switzerland corrected the AD for composting of MSW for the whole time series by recalculating them from a wet-weight basis to a dry-weight basis (kt dm), applying a transfer factor from wet matter to dm of 54.5 per cent (see NIR p.463). The Party reported the recalculated AD for composting of MSW on a dry-weight basis in both CRF table 5.B and NIR table 7-12. The documentation box in CRF table 5.B was also revised accordingly for the whole time series.
W.3	5.C.1 Waste incineration – N_2O	Improve the transparency of reporting by referencing the sources used to obtain the	Resolved. Switzerland provided in its NIR a clear explanation of how it obtained the country-specific N_2O EF for sewage sludge incineration for the whole time series,

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
	(W.4, 2021) Transparency	country-specific N_2O EF of 4.10 kg/t waste for sewage sludge incineration.	including (1) references to the sources of the N_2O EF of 4.10 kg/t waste, applied for 1990–2014 (NIR p.469) and (2) scientific background information relevant to the revision of the N_2O EF applied for 2015–2019, implemented for the 2022 submission (NIR p.472).
W.4	5.D.1 Domestic wastewater – CH_4 (W.5, 2021) Completeness	Estimate CH_4 emissions from wastewater treatment systems not connected to the public sewer system, specifically from those systems that are very similar to centralized wastewater treatment plants, and include the emissions in the national total.	Not resolved. Switzerland did not estimate CH_4 emissions from wastewater treatment systems not connected to the public sewer system. During the previous review, the Party provided the ERT with an estimate of these emissions for 2019. The estimate, 4.63 kt CO_2 eq, was below the threshold of significance. During the current review, the ERT, following the same approach the Party used during the previous review, estimated these potential emissions for 2020. They amounted to 4.66 kt CO_2 eq – well below 0.05 per cent of Switzerland's total GHG emissions excluding LULUCF for 2020 (21.71 kt CO_2 eq) and therefore below the threshold of significance. Thus, this issue was not included in the list of potential problems and further questions raised by the ERT. Also during the current review, the Party clarified that estimating CH_4 emissions from wastewater treatment systems not connected to the public sewer system is included in the list of planned improvements in the NIR (section 10.4, p.523) and that in this regard, a study, "Estimation of greenhouse gas emissions from decentralized wastewater treatment", has been commissioned by FOEN. The study will focus on obtaining CH_4 emission estimates for several types of wastewater treatment systems not connected to the public sewer system (see also ID#s W.5, W.6 and W.7 below). The Party explained that the planned completion date for the study was 31 August 2022, but it has been delayed. If the final report becomes available early enough in 2022, the results of the study could be implemented for the 2023 submission. The ERT notes that, if emissions from wastewater treatment systems not connected to the public sewer system occur but the Party continues not to report them, it should provide justification in the NIR.
W.5	5.D.1 Domestic wastewater – CH_4 (W.6, 2021) Transparency	Provide in the NIR a justification that simple systems serving as alternatives for wastewater treatment plants not connected to the public sewer system do not produce CH_4 emissions, for example by providing air and soil temperature profiles for the regions where these systems are typically used.	Not resolved. Switzerland did not provide in its NIR any additional information, compared with the previous annual submission, that would support the assumption that wastewater treatment systems not connected to the public sewer system do not produce CH_4 emissions. During the review, the Party clarified that a study on GHG emissions from decentralized wastewater treatment has been commissioned by FOEN and when it is completed, its results will be implemented in the GHG inventory, as appropriate (see also ID# W.4 above).
W.6	5.D.1 Domestic wastewater – CH_4 (W.7, 2021) Transparency	Explain in the NIR that the sewage sludge treated in centralized wastewater treatment plants or municipal waste incineration plants includes all sludge from wastewater treatment systems not connected to the public sewer system.	Not resolved. Switzerland did not clarify in its NIR whether the sewage sludge treated in centralized wastewater treatment plants and municipal waste incineration plants includes all sludge from wastewater treatment systems not connected to the public sewer system. In particular, no clear explanation was provided regarding the treatment of sewage sludge generated in septic tanks. During the review, the Party clarified that a study on GHG emissions from decentralized wastewater treatment has been commissioned by FOEN and when it is completed, its results will be implemented in the GHG inventory, as appropriate (see also ID# W.4 above).

ID#	*Issue/problem classification*[a, b]	*Recommendation from previous review report*	*ERT assessment and rationale*
W.7	5.D.1 Domestic wastewater – CH_4 (W.7, 2021) Transparency	Include in the NIR additional information on the fraction of wastewater in rural areas not connected to the public sewer system that is possibly spread to agricultural soils as a fraction of slurry.	Not resolved. Switzerland did not provide in the NIR any additional information, compared with the previous annual submission, on the fraction of wastewater in rural areas not connected to the public sewer system that is possibly spread to agricultural soils as a fraction of slurry. During the review, the Party clarified that a study on GHG emissions from decentralized wastewater treatment has been commissioned by FOEN and when it is completed, its results will be implemented in the GHG inventory, as appropriate (see also ID# W.4 above).
KP-LULUCF			
KL.1	General (KP-LULUCF) (KL.1, 2021) Comparability	Use the notation key "R" or, if technically feasible, "R, NR" (which appears to be possible for reporting in CRF table NIR-1, on the basis of input provided by the secretariat during the review), as this more accurately reflects the completeness of the Party's reporting.	Resolved. Switzerland reported multiple notation keys, namely, "R, NR" in CRF table NIR-1 for the litter and deadwood pools under AR to reflect more accurately the completeness of the Party's reporting, considering that it reports estimated values for litter and deadwood for some AR areas and "NE" for some other areas in CRF tables 4(KP-I)A.1 and 4(KP-I)B.1. The reporting of "NR" in CRF table NIR-1 reflect the cases in which the Party uses a tier 1 approach, that is, when a specific carbon pool is considered to be in balance. In CRF tables 4(KP-I)A.1 and 4(KP-I)B.1, these pools are indicated as "NE" because "NR" is not available in these tables (NIR section 11.3.1.2, p.536). The ERT noted that reporting "NE" in CRF tables 4(KP-I)A.1 and 4(KP-I)B.1 is in accordance with the conclusions and recommendations from the 16th meeting of the GHG inventory Lead Reviewers: "that the notation key "NA" (not applicable) is to be used in CRF tables for the tier 1 assumption provided in the 2006 IPCC Guidelines for 'carbon stocks in equilibrium' in the LULUCF sector and the notation key "NE" (not estimated) is to be used for reporting carbon pools for which the Party has reported verified information that the pool is 'not a net source' under KP-LULUCF activities, in accordance with decision 2/CMP.8, annex II, paragraph 2(e)" (para. 27(e), available at https://unfccc.int/sites/default/files/resource/04_GHG-LRs-2019-conclusions_0.pdf).
KL.2	Deforestation – CO_2, CH_4 and N_2O (KL.3, 2021) Convention reporting adherence	Correct the error in the sum of the deforested areas under the information item of CRF table 4(KP-I)A.2 and implement a QA check to ensure that the total areas reported under the information item are consistent with the total areas reported for deforestation and with the deforested areas reported in CRF table NIR-2.	Resolved. Switzerland corrected the error in the sum of the deforested areas under the information item ("Land areas under deforestation by land-use category in the reporting year") of CRF table 4(KP-I)A.2 (the value is 0.3 kha). The Party indicated in its NIR (section 11.1.3, p.527) that an additional check of the areas reported in CRF table 4(KP-I)A.2 was performed and added to the checklist described in the NIR (section 1.2.3, p.32) to ensure that the total areas reported under the information item are consistent with the total areas reported for deforestation and with the deforested areas reported in CRF table NIR-2.
KL.3	Article 3.4 activities – CO_2, CH_4 and N_2O (KL.2, 2021) Transparency	Explain in the NIR (section 11.1.3) the reason for the expansion of the FM area over time owing to the inclusion of naturally regenerated forests that have achieved the forest definition.	Resolved. Switzerland included in its NIR (section 11.1.3, p.528) a clarification of the origin of the area of other land converted to FM, explaining that the expansion of the FM area over time is due to the inclusion of naturally regenerated forests that have met the requirements to be defined as forests.

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

[b] The reports on the reviews of the 2020 and 2018 annual submissions of Switzerland were not available at the time of this review. Therefore, 2020 and 2018 are excluded from the list of review years in which issues could have been identified.

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

9. In accordance with paragraph 83 of the UNFCCC review guidelines, and as documented in table 4, the ERT assessed that there were no issues identified in three or more successive reviews that had not been addressed by the Party.

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

ID#	*Previous recommendation for issue*	*Number of successive reviews issue not addressed*
General	No issues identified.	
Energy	No issues identified.	
IPPU	No issues identified.	
Agriculture	No issues identified.	
LULUCF	No issues identified.	
Waste	No issues identified.	
KP-LULUCF	No issues identified.	

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

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

Table 5
Additional findings made during the individual review of the 2022 annual submission of Switzerland

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
General		No general findings additional to those included in table 3 were made by the ERT during the review.	

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
Energy			
E.1	1. General (energy sector) – CO_2, CH_4 and N_2O	The ERT noted that the Party left some cells blank in CRF tables 1.A(a)s1, 1.A(a)s3–1.A(a)s4, 1.A(b) and 1.A(d). During the review, the Party clarified that the blank cells in these tables correspond to fuels that are not used in the country. The Party explained that, because of the way CRF Reporter works, using "NO" in this case would require significant additional resources that are currently prioritized for increasing the quality of the inventory and improving QA/QC procedures. The ERT understands the challenges in using CRF Reporter, which are faced by all Parties, and notes that the blank cells in the CRF tables are related to non-entry cells (coloured cells). The ERT encourages Switzerland to consult with the secretariat on how to use CRF Reporter to report "NO" in CRF tables 1.A(a)s1, 1.A(a)s3–1.A(a)s4, 1.A(b) and 1.A(d) in all cases where cells have been left blank when the corresponding fuel is not used in the country (and thus there are no AD).	Not an issue/problem
IPPU			
I.1	2.F.1 Refrigeration and air conditioning – HFCs	Switzerland reported in NIR figure 4.8 (p.253) the overall trend in emissions of F-gases. The ERT noted that for category 2.F.1, the figure shows an increasing trend in emissions since the 1990s, with a peak in 2015 and a decreasing trend from 2016 to 2020. There is no explanation in the NIR of the reasons for the decreasing trend in 2016–2020. The ERT also detected a downward trend in product life factors for category 2.F.1.a (commercial refrigeration) between 2019 and 2020 (from 7.79 to 7.23 per cent), and no information on the drivers of this trend was provided in the NIR either. The Party provided detailed information only for the trend in emissions for category 2.F.1.e (mobile air conditioning) in the NIR (annex 3-2, p.594). During the review, the Party clarified that the main driver of the decreasing trend in emissions for 2016–2020 is the restrictions on F-gas use in Swiss legislation and in European Union legislation (which affects the Swiss market). An additional trigger of the declining trend is a reduction in the values of EFs for F-gases that were provided by the refrigeration and air-conditioning industry in recent years. The ERT recommends that Switzerland provide in the NIR the reasons for the decreasing trends in the EFs and emissions for this category and the drivers behind the trends (in AD and EFs) in the most significant subcategories.	Yes. Transparency
I.2	2.F.1 Refrigeration and air conditioning – HFCs	Switzerland reported in its NIR (p.258) that subcategory 2.F.1.e (mobile air conditioning) represents 33 per cent of total emissions under this category (2.F.1 (refrigeration and air conditioning)), which is a higher share than Switzerland's neighbouring countries (12–20 per cent in Austria, France and Italy; 43 per cent in Germany, but here, 60 per cent of emissions for the subcategory are attributed to ships and aircraft). During the review, the Party clarified that the comparatively high share of emissions from mobile air conditioning is due to the large number of cars per capita in Switzerland, with a high share of new cars, resulting in almost 100 per cent of cars on the road having air conditioning. The ERT believes that emissions could be overestimated because the per capita number of cars of neighbouring countries is similar to or higher than the Swiss value of 0.54, while the share of emissions of mobile air conditioning of total emissions under category 2.F.1 is lower. The Party provided further clarification, indicating that the main driver of emissions for category 2.F.1.e is not the per capita number of cars (0.54) but the relatively high share of new cars, which have air conditioning.	Not an issue/problem

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
		The ERT encourages Switzerland to provide in its NIR a rationale for the main driver(s) of the high share (33 per cent) of emissions for category 2.F.1.e (mobile air conditioning) in the total emissions for category 2.F.1.	
Agriculture			
A.5	3.A.1 Cattle – CH_4 and N_2O	Switzerland reported in NIR table 5.5 (p.283) and CRF table 3.As2 the population size of mature dairy cattle and average daily milk yield, which refers to milk production based on a lactation period of 305 days and not the whole year of 365 days (e.g. for 2020, the population is reported as 546,479 head and daily milk yield is reported as 23.26 kg/day).	Yes. Transparency
		The ERT noted that according to the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.10), data on milk production (kg/day) should be "expressed in terms of kilograms of whole fresh milk produced per year per dairy cow" (i.e. 365 days). The ERT checked the milk statistics in Switzerland (MISTA, 2021) and found that the total average annual milk yield for mature dairy cattle is approximately 7,000 litres/head/year, which is equivalent to approximately 19.2 litres/head/day. The ERT also noted that reporting milk yield in accordance with the 2006 IPCC Guidelines (i.e. considering 365 days) does not change the reported emission estimates for enteric fermentation and manure management, because feed intake is based on annual data. During the review, the Party acknowledged the issue and stated that it will report milk yield considering 356 days.	
		The ERT recommends that Switzerland report in NIR table 5.5 and CRF table 3.As2 milk production for mature dairy cattle based on annual milk production, that is, a period covering 365 days, rather than on a lactation period of 305 days.	
LULUCF		No findings for the LULUCF sector additional to those included in table 3 were made by the ERT during the review.	
Waste			
W.8	5.C.1 Waste incineration – CH_4	Switzerland reported in NIR table 7-16 (p.468) the EFs used for estimating emissions of CO_2 and non-CO_2 gases from incineration plants. In this table, "NA" was reported for the CH_4 EFs for hospital waste incineration, industrial waste incineration and cremation. The Party indicated in the NIR (pp.468–469) that hospital waste was incinerated from 1990 to 2001 and industrial waste from 1990 to 1994, while cremation occurred throughout the entire time series. The ERT noted that no explanation was provided in the NIR on why CH_4 emissions from the incineration of hospital waste, the incineration of industrial waste and cremation were not estimated.	Yes. Transparency
		During the review, the Party clarified that the incineration of hospital waste and industrial waste and cremation is performed at high temperatures resulting in complete combustion. Thus, according to the 2006 IPCC Guidelines (vol. 5, chap. 5, section 5.2.2.3, p.5.13), the CH_4 EFs for the incineration of hospital waste, industrial waste and cremation are considered as zero. The ERT agrees with the Party's reason for not estimating CH_4 emissions but considers that clarification should be provided in the NIR.	
		The ERT recommends that Switzerland include in the NIR the explanation provided during the review as to why CH_4 emissions from the incineration of hospital waste, the incineration of industrial waste and cremation are not estimated, that is, that incineration of these sources is performed at high temperature with complete combustion processes and therefore CH_4 EFs can be considered as zero, in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 5, section 5.2.2.3, p.5.13).	
W.9	5.C.1 Waste incineration – N_2O	Switzerland reported in NIR table 7-16 (p.468) the EFs used for estimating emissions of CO_2 and non-CO_2 gases from incineration plants. In this table, "NA" was reported for the N_2O EFs for industrial waste incineration and cremation.	Yes. Completeness

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
		However, in CRF table 5.C, "NO" was reported for the N_2O IEFs and N_2O emissions from industrial waste incineration and cremation. The Party indicated in the NIR (pp.468–469) that industrial waste was incinerated from 1990 to 1994 while cremation occurred throughout the entire time series. The ERT noted that no explanation was provided in the NIR on why N_2O emissions from the incineration of industrial waste and cremation were not estimated. During the review, the Party clarified that the question of whether N_2O emissions occurred from incineration of industrial waste (cable insulation materials) for 1990–1994 was not addressed when estimating emissions from waste incineration for reasons of relevance, considering that the process ceased in 1995. Regarding cremation, the Party explained that N_2O emissions tend to be low, so denitrification plants are not required, thus no additional N_2O emissions are expected for cremation. The ERT acknowledged that the 2006 IPCC Guidelines do not provide a default EF for calculating N_2O emissions from cremation and therefore these emissions are not mandatory and should be reported as "NA" in CRF table 5.C; however, it considers that "NE" should be reported for industrial waste in CRF table 5.C for 1990–1994. The ERT recommends that Switzerland correct the notation keys reported in CRF table 5.C for industrial waste for 1990–1994 (from "NO" to "NE" for the N_2O IEFs and N_2O emissions) and in NIR table 7-16 (from "NA" to "NE" for the N_2O EFs). The ERT recommends that the Party either estimate and report these emissions for industrial waste or justify the use of "NE" based on the likely level of emissions, in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. The ERT also encourages the Party to explain in the NIR why N_2O emissions from cremation were not estimated.	
KP-LULUCF		No findings for KP-LULUCF additional to those included in table 3 were made by the ERT during the review.	

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

VI. Application of adjustments

11. The ERT did not identify the need to apply any adjustments for the 2022 annual submission of Switzerland.

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

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

VIII. Questions of implementation

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

Annex I

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

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

Table I.1
Total greenhouse gas emissions and removals for Switzerland, base year–2020
(kt CO_2 eq)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions and removals including indirect CO_2 emissions*[a]		*Land-use change (Article 3.7 bis as contained in the Doha Amendment)*[b]	*KP-LULUCF (Article 3.3 of the Kyoto Protocol)*[c]	*KP-LULUCF (Article 3.4 of the Kyoto Protocol)*	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*			*CM, GM, RV, WDR*	*FM*
FMRL								220.00
Base year[d]	51 510.11	53 554.03	51 923.02	53 966.95	NA		NA	
1990	51 510.11	53 554.03	51 923.02	53 966.95				
1995	48 668.34	52 609.46	48 973.35	52 914.47				
2000	58 063.41	52 876.14	58 286.07	53 098.80				
2010	51 725.08	54 657.27	51 871.36	54 803.55				
2011	49 295.36	50 539.01	49 438.34	50 681.99				
2012	49 399.58	51 887.41	49 536.94	52 024.78				
2013	50 750.17	52 771.29	50 881.48	52 902.60		167.99	NA	–2 964.66
2014	48 530.50	48 833.51	48 658.54	48 961.54		169.77	NA	–1 592.72
2015	46 175.80	48 343.02	46 299.64	48 466.87		167.75	NA	–3 147.28
2016	46 487.39	48 619.18	46 612.81	48 744.61		168.08	NA	–3 017.74
2017	45 846.28	47 741.43	45 971.05	47 866.21		175.67	NA	–2 916.12
2018	45 338.69	46 243.41	45 457.29	46 362.01		179.14	NA	–1 678.94
2019	43 847.19	45 962.82	43 969.60	46 085.24		177.89	NA	–2 658.92
2020	41 574.11	43 279.37	41 693.70	43 398.96		180.25	NA	–2 330.00

Note: Emissions and removals reported for the sector other (sector 6) are not included in the total GHG emissions.
[a] The Party reported indirect CO_2 emissions in CRF table 6.
[b] The value reported in this column relates to GHG emissions from conversion of forests (deforestation) in 1990 as contained in the report on the review of the Party's report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol.

[c] Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.
[d] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases. Switzerland has not elected any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

Table I.2
Greenhouse gas emissions and removals by gas for Switzerland, excluding land use, land-use change and forestry, 1990–2020
(kt CO_2 eq)

	CO_2[a]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1990	44 561.84	5 791.13	3 360.45	0.02	116.52	NA, NO	136.99	NA, NO
1995	43 713.29	5 516.24	3 330.49	243.75	17.48	NA, NO	93.21	NA, NO
2000	43 833.21	5 140.47	3 275.89	636.00	60.92	NA, NO	152.31	NA, NO
2010	45 180.70	5 018.48	3 084.67	1 307.99	37.79	NA, NO	161.25	12.67
2011	41 116.04	4 966.69	3 005.43	1 379.92	36.06	NA, NO	168.53	9.32
2012	42 377.64	4 945.54	2 979.66	1 452.93	38.78	NA, NO	229.68	0.54
2013	43 305.91	4 873.71	2 986.89	1 432.19	27.75	NA, NO	276.00	0.14
2014	39 351.17	4 864.65	2 968.31	1 469.21	22.55	NA, NO	285.05	0.60
2015	38 844.32	4 837.54	2 973.09	1 507.64	25.55	NA, NO	278.00	0.73
2016	39 299.66	4 803.75	2 904.29	1 480.51	19.52	NO, NA	236.11	0.77
2017	38 291.90	4 745.99	3 058.24	1 504.40	32.01	NO, NA	232.87	0.80
2018	36 980.11	4 710.98	2 925.89	1 525.42	36.29	NO, NA	182.82	0.50
2019	36 845.41	4 632.48	2 993.59	1 429.44	31.78	NO, NA	151.99	0.54
2020	34 349.97	4 586.97	2 902.38	1 387.20	34.44	NO, NA	137.59	0.41
Percentage change 1990–2020	**–22.9**	**–20.8**	**–13.6**	**5 597 702.3**	**–70.4**	**NA**	**0.4**	**NA**

Note: Emissions and removals reported for the sector other (sector 6) are not included in this table.
[a] Including indirect CO_2 emissions as reported in CRF table 6.

Table I.3
Greenhouse gas emissions and removals by sector for Switzerland, 1990–2020
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	41 916.66	4 348.01	6 581.81	–2 043.92	1 120.47	13.31
1995	41 963.91	3 658.94	6 371.18	–3 941.12	920.45	13.24
2000	42 268.97	3 952.34	5 984.12	5 187.27	893.37	14.16
2010	43 243.99	4 642.94	6 052.98	–2 932.18	863.64	13.50

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
2011	39 185.52	4 643.79	6 010.82	–1 243.65	841.86	14.56
2012	40 575.71	4 624.08	6 013.40	–2 487.84	811.59	15.25
2013	41 499.45	4 626.43	5 953.95	–2 021.11	822.77	15.70
2014	37 449.57	4 632.65	6 069.15	–303.00	810.17	12.54
2015	37 116.47	4 575.50	5 993.51	–2 167.22	781.38	13.56
2016	37 514.67	4 522.27	5 957.19	–2 131.80	750.47	13.26
2017	36 527.83	4 685.03	5 936.42	–1 895.15	716.92	13.76
2018	35 234.46	4 546.56	5 882.33	–904.72	698.66	14.71
2019	35 111.52	4 502.40	5 783.05	–2 115.63	688.26	12.00
2020	32 675.31	4 291.90	5 756.97	–1 705.26	674.79	12.63
Percentage change 1990–2020	**–22.0**	**–1.3**	**–12.5**	**–16.6**	**–39.8**	**–5.1**

Note: Totals include indirect CO_2 emissions reported in CRF table 6.

Table I.4

Greenhouse gas emissions and removals from activities under Article 3, paragraphs 3–4, of the Kyoto Protocol by activity, base year–2020, for Switzerland
(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[a]	*Activities under Article 3.3 of the Kyoto Protocol*		*FM and elected activities under Article 3.4 of the Kyoto Protocol*				
	Land-use change	*AR*	*Deforestation*	*FM*	*CM*	*GM*	*RV*	*WDR*
FMRL				220.00				
Technical correction				–2 021.44				
Base year[b]	NA				NA	NA	NA	NA
2013		–19.38	187.37	–2 964.66	NA	NA	NA	NA
2014		–16.83	186.60	–1 592.72	NA	NA	NA	NA
2015		–18.11	185.86	–3 147.28	NA	NA	NA	NA
2016		–17.56	185.64	–3 017.74	NA	NA	NA	NA
2017		–17.24	192.92	–2 916.12	NA	NA	NA	NA
2018		–15.11	194.25	–1 678.94	NA	NA	NA	NA
2019		–16.94	194.83	–2 658.92	NA	NA	NA	NA
2020		–15.89	196.14	–2 330.00	NA	NA	NA	NA
Percentage change base year–2020					**NA**	**NA**	**NA**	**NA**

Note: Values in this table include emissions from land subject to natural disturbances, if applicable.
[a] The value reported in this column relates to 1990.

[b] Switzerland 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.

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

Table I.5
Accounting quantities for activities under Article 3, paragraph 3, and forest management and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol for Switzerland
(kt CO_2 eq)

GHG source/sink activity	*Net emissions/removals*										*Accounting parameters*	*Accounting quantities*[d]
	Base year[b]	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*Total*[c]		
A.1. AR		–19.378	–16.833	–18.105	–17.563	–17.242	–15.112	–16.942	–15.887	–137.065		–137.065
Excluded emissions from natural disturbances		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
Excluded subsequent removals from land subject to natural disturbances		–	–	–	–	–	–	–	–	–		–
A.2. Deforestation		187.370	186.600	185.855	185.643	192.915	194.250	194.830	196.137	1 523.603		1 523.604
B.1. FM										–20 306.376		–5 894.856
Net emissions/ removals		–2 964.660	–1 592.716	–3 147.283	–3 017.744	–2 916.115	–1 678.939	–2 658.915	–2 330.002	–20 306.376		
Excluded emissions from natural disturbances[d]		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
Excluded subsequent removals from land subject to natural disturbances		–	–	–	–	–	–	–	–	–		–
Any debits from newly established forest		–	–	–	–	–	–	–	–	–		–
FMRL[e]											220.000	

GHG source/sink activity	*Net emissions/removals*										*Accounting parameters*	*Accounting quantities*[a]
	Base year[b]	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*Total*[c]		
Technical corrections to FMRL											–2 021.440	
FM cap											15 037.884	–5 894.856
B.2. CM (if elected)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.3. GM (if elected)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.4. RV (if elected)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.5. WDR (if elected)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA

[a] The accounting quantity is the total quantity of units to be issued or cancelled for a particular activity.
[b] Net emissions and removals from CM, GM, RV and/or WDR, if elected, in the Party's base year as established in decision 9/CP.2.
[c] Cumulative net emissions and removals for all years of the commitment period reported in the annual submission under review.
[d] The Party indicated that it does not intend to exclude emissions from natural disturbances.
[e] As inscribed in the appendix to the annex to decision 2/CMP.7 in kt CO_2 eq per year.

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

Table I.6
Key data for Switzerland under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2022 annual submission

Parameter	*Data*
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: not elected (g) WDR: not elected
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	None
Election of application of provisions for natural disturbances[a]	No for AR; yes for FM
3.5% of total base-year GHG emissions, excluding LULUCF and including indirect CO_2 emissions	1 879.736 kt CO_2 eq (15 037.884 kt CO_2 eq for the duration of the commitment period)
Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for:	
1. AR	Issue 137 065 RMUs
2. Deforestation	Cancel 1 523 604 units
3. FM	Issue 5 894 856 RMUs

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

[a] The Party decided not to exclude emissions and subsequent removals from natural disturbances in its accounting for the 2022 annual submission

Annex II

Information to be included in the compilation and accounting database

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

Table II.1
Information to be included in the compilation and accounting database for 2020, including on the commitment period reserve, for Switzerland
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
CPR	**325 591 672**	–	–	**325 591 672**
Annex A emissions				
CO_2	34 349 972	–	–	34 349 972
CH_4	4 586 966	–	–	4 586 966
N_2O	2 902 379	–	–	2 902 379
HFCs	1 387 202	–	–	1 387 202
PFCs	34 441	–	–	34 441
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	137 592	–	–	137 592
NF_3	412	–	–	412
Total Annex A sources[a]	**43 398 964**	–	–	**43 398 964**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–15 887	–	–	–15 887
Deforestation	196 137	–	–	196 137
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–2 330 002	–	–	–2 330 002

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.2
Information to be included in the compilation and accounting database for 2019 for Switzerland
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	36 845 414	–	–	36 845 414
CH_4	4 632 481	–	–	4 632 481
N_2O	2 993 586	–	–	2 993 586
HFCs	1 429 442	–	–	1 429 442
PFCs	31 777	–	–	31 777
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	151 994	–	–	151 994
NF_3	543	–	–	543
Total Annex A sources[a]	**46 085 236**	–	–	**46 085 236**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–16 942	–	–	–16 942
Deforestation	194 831	–	–	194 831

	Original submission	*Revised submission*	*Adjustment*	*Final value*
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–2 658 916	–	–	–2 658 916

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.3
Information to be included in the compilation and accounting database for 2018 for Switzerland
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	36 980 112	–	–	36 980 112
CH_4	4 710 979	–	–	4 710 979
N_2O	2 925 895	–	–	2 925 895
HFCs	1 525 416	–	–	1 525 416
PFCs	36 293	–	–	36 293
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	182 816	–	–	182 816
NF_3	502	–	–	502
Total Annex A sources[a]	**46 362 013**	–	–	**46 362 013**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–15 112	–	–	–15 112
Deforestation	194 250	–	–	194 250
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 678 939	–	–	–1 678 939

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.4
Information to be included in the compilation and accounting database for 2017 for Switzerland
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	38 291 898	–	–	38 291 898
CH_4	4 745 991	–	–	4 745 991
N_2O	3 058 235	–	–	3 058 235
HFCs	1 504 402	–	–	1 504 402
PFCs	32 005	–	–	32 005
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	232 873	–	–	232 873
NF_3	803	–	–	803
Total Annex A sources[a]	**47 866 208**	–	–	**47 866 208**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–17 243	–	–	–17 243
Deforestation	192 916	–	–	192 916
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–2 916 115	–	–	–2 916 115

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.5
Information to be included in the compilation and accounting database for 2016 for Switzerland
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	39 299 656	–	–	39 299 656
CH_4	4 803 752	–	–	4 803 752
N_2O	2 904 291	–	–	2 904 291
HFCs	1 480 511	–	–	1 480 511
PFCs	19 520	–	–	19 520
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	236 109	–	–	236 109
NF_3	767	–	–	767
Total Annex A sources[a]	**48 744 606**	–	–	**48 744 606**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–17 564	–	–	–17 564
Deforestation	185 643	–	–	185 643
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–3 017 744	–	–	–3 017 744

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.6
Information to be included in the compilation and accounting database for 2015 for Switzerland
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	38 844 316	–	–	38 844 316
CH_4	4 837 545	–	–	4 837 545
N_2O	2 973 094	–	–	2 973 094
HFCs	1 507 638	–	–	1 507 638
PFCs	25 546	–	–	25 546
Unspecified mix of HFCs and PFCs	NA, NO	–	–	NA, NO
SF_6	277 998	–	–	277 998
NF_3	730	–	–	730
Total Annex A sources[a]	**48 466 867**	–	–	**48 466 867**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–18 106	–	–	–18 106
Deforestation	185 855	–	–	185 855
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–3 147 283	–	–	–3 147 283

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.7
Information to be included in the compilation and accounting database for 2014 for Switzerland
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	39 351 168	–	–	39 351 168
CH_4	4 864 650	–	–	4 864 650
N_2O	2 968 307	–	–	2 968 307

	Original submission	*Revised submission*	*Adjustment*	*Final value*
HFCs	1 469 215	–	–	1 469 215
PFCs	22 549	–	–	22 549
Unspecified mix of HFCs and PFCs	NA, NO	–	–	NA, NO
SF_6	285 048	–	–	285 048
NF_3	605	–	–	605
Total Annex A sources[a]	**48 961 541**	–	–	**48 961 541**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–16 833	–	–	–16 833
Deforestation	186 601	–	–	186 601
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 592 717	–	–	–1 592 717

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.8
Information to be included in the compilation and accounting database for 2013 for Switzerland
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	43 305 915	–	–	43 305 915
CH_4	4 873 714	–	–	4 873 714
N_2O	2 986 885	–	–	2 986 885
HFCs	1 432 191	–	–	1 432 191
PFCs	27 750	–	–	27 750
Unspecified mix of HFCs and PFCs	NA, NO	–	–	NA, NO
SF_6	276 000	–	–	276 000
NF_3	142	–	–	142
Total Annex A sources[a]	**52 902 598**	–	–	**52 902 598**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–19 378	–	–	–19 378
Deforestation	187 370	–	–	187 370
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–2 964 661	–	–	–2 964 661

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Annex III

Additional information to support findings in table 2

Missing categories that may affect completeness

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

(a) 5.D.1 domestic wastewater – CH_4 emissions from wastewater treatment systems not connected to the public sewer system (see ID# W.4 in table 3);

(b) 5.C.1 waste incineration – N_2O emissions from industrial waste incineration (1990–1994) (see ID# W.9 in table 5).

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: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency/Institute for Global Environmental Strategies. Available at https://www.ipcc.ch/publication/good-practice-guidance-and-uncertainty-management-in-national-greenhouse-gas-inventories/.

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IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva: IPCC. Available at https://www.ipcc.ch/publication/2013-supplement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories-wetlands/.

B. UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2019 and 2021 annual submissions of Switzerland, contained in documents FCCC/ARR/2019/CHE and FCCC/ARR/2021/CHE respectively.

Other

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at https://unfccc.int/documents/510888.

Annual status report for Switzerland for 2022. Available at https://unfccc.int/sites/default/files/resource/asr2022_CHE.pdf.

C. Other documents used during the review

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

Carbotech 2022: Confidential report for internal use (FOEN and review team): Swiss Greenhouse Gas Inventory 2020: PFCs, HFCs, SF_6 and NF3 Emissions; Cornelia Stettler, Carbontech AG, 2022; Reference.: P20-0417 confidential report.

FAL/RAC 2001: Grundlagen für die Düngung im Acker- und Futterbau 2001. [Principles of fertilization in crop and feed production]. Eidgenössische Forschungsanstalt für Agrarökologie und Landbau/Eidgenössische Forschungsanstalt für Pflanzenbau, Agrarforschung, June 2001, Zürich-Reckenholz, Nyon. http://www.climatereporting.ch [available in German and French].

He, L., Chen, J.M., Pan, Y., Birdsey, R., Kattge, J. 2012: Relationships between net primary productivity and forest stand age in U.S. forests. Global Biogeochemical Cycles 26. https://doi.org/10.1029/2010GB003942

Kupper, T., Häni, Ch., Bretscher, D., Zaucker, F. 2022: Ammoniakemissionen der schweizerischen Landwirtschaft 19902020. Hochschule für Agrar-, Forst- und

Lebensmittelwissenschaften (HAFL), Zollikofen, im Auftrag des Bundesamts für Umwelt (BAFU).Bern, Schweiz. http://www.climatereporting.ch.

MISTA 2021: Milchstatistik der Schweiz 2020. Schweizerischer Bauernverband (SBV), TSM Treuhand GmbH, Schweizer Milchproduzenten (SMP). https://www.sbv-usp.ch/de/services/agristat-statistik-der-schweizer-landwirtschaft/milchstatistik [18.03.2022].

Pfab, H., Palmer, I., Buegger, F., Fiedler, S., Müller, T., Ruser, R. 2012: Influence of a nitrification inhibitor and of placed N-fertilization on N_2O fluxes from a vegetable cropped loamy soil. Agriculture, Ecosystems & Environment, 150: 91-101. https://doi.org/10.1016/j.agee.2012.01.001.

Richner, W., Sinaj, S., Carlen, C., Flisch, R., Gilli, C., Huguenin-Elie, O., Kuster, T., Latsch, A., Mayer, J., Neuweiler, R., Spring, J. L. 2017: GRUD 2017: Grundlagen für die Düngung landwirtschaftlicher Kulturen in der Schweiz. [Principles for the fertilisation of agricultural crops in Switzerland]. Agrarforschung Schweiz 8 (6). https://www.bundespublikationen.admin.ch/cshop_mimes_bbl/8C/8CDCD4590EE41ED794D253E8F6D8F34D.pdf [30.03.2022]; for all issue contributions see also www.grud.ch, www.prif.ch or www.pric.ch for German, French and Italian website, respectively.

Weiske, A., Benckiser, G., Herbert, T., Ottow, J.C.G. 2001: Influence of the nitrification inhibitor 3,4-dimethylpyrazole phosphate (DMPP) in comparison to dicyandiamide (DCD) on nitrous oxide emissions, carbon dioxide fluxes and methane oxidation during 3 years of repeated application in field experiments. Biology and Fertility of Soils 34: 109–117. https://doi.org/10.1007/s003740100386.