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Report on the individual review of the annual submission of Switzerland 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 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 9 to 14 September 2019 in Bonn.

* 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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Contents

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AAU	assigned amount unit
AD	activity data
Annex A source	source category included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
ARR	annual review report
Article 8 review guidelines	"Guidelines for review under Article 8 of the Kyoto Protocol"
CaO	calcium oxide
CER	certified emission reduction
CH_4	methane
CM	cropland management
CO	carbon monoxide
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
Convention reporting adherence	adherence to the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
COPERT	software tool for calculating road transport emissions
CPR	commitment period reserve
CRF	common reporting format
DBH	diameter at breast height
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
FAOSTAT	the statistical database of the Food and Agriculture Organization of the United Nations
FM	forest management
FMRL	forest management reference level
FOEN	Swiss Federal Office for the Environment
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
KP-LULUCF activities	activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
MgO	magnesium oxide
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NF_3	nitrogen trifluoride
NFI	national forest inventory
NH_3	ammonia

NIR	national inventory report
NMVOC	non-methane volatile organic compound
NO	not occurring
NO_X	nitrogen oxides
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulfur hexafluoride
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	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*

I. Introduction[1]

1. This report covers the review of the 2019 annual submission of 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" (decision 13/CP.20). The review took place from 9 to 14 September 2019 in Bonn and was coordinated by Lisa Hanle and Jongikhaya Witi (secretariat). Table 1 provides information on the composition of the ERT that conducted the review of Switzerland.

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

Area of expertise	*Name*	*Party*
Generalist	Kristina Saarinen	Finland
	John Watterson	United Kingdom of Great Britain and Northern Ireland
Energy	Veronica Eklund	Sweden
	Renata Grisoli	Brazil
	Kaleem Anwar Mir	Pakistan
	Dingane Sithole	Zimbabwe
IPPU	Menouer Boughedaoui	Algeria
	Pia-Kristiina Forsell	Finland
	Erhan Ünal	Turkey
Agriculture	Sorin Deaconu	Romania
	Joel Gibbs	New Zealand
	Bernard Hyde	Ireland
LULUCF and KP-LULUCF activities	Esther Mertens	Belgium
	Dinh Hung Nguyen	Viet Nam
	Valentyna Slivinska	Ukraine
Waste	Pavel Gavrilita	Republic of Moldova
	Excellent Hachileka	Zambia
	Veronica Jakarasi	Zimbabwe
Lead reviewers	Menouer Boughedaoui	
	John Watterson	

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

[1] At the time of publication of this report, Switzerland 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.

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

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 shows annual GHG emissions for Switzerland, including totals excluding and including the LULUCF sector, indirect CO_2 emissions and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from KP-LULUCF activities, if elected by Switzerland, 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. Table 2 provides the assessment by the ERT of the 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 inventory of Switzerland

Assessment			*Issue or problem ID#(s) in table 3 and/or 5[a]*
Dates of submission	Original submission: 15 April 2019 (NIR), 15 April 2019 (CRF tables) version 2, 15 April 2019 (SEF tables)		
Review format	Centralized		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	No	
	(b) Selection and use of methodologies and assumptions?	Yes	E.8, L.8
	(c) Development and selection of EFs?	Yes	E.8
	(d) Collection and selection of AD?	Yes	L.8
	(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?	No	
	(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	I.9

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

Assessment			*Issue or problem ID#(s) in table 3 and/or 5[a]*
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes	
Supplementary information under the Kyoto Protocol	Have any issues been identified related to the following aspects of the national system:		
	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	No	
	(b) Performance of the national system functions?	No	
	Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry?	No	
	(b) Performance of the functions of the national registry and the technical standards for data exchange?	No	
	Have any issues been identified related to reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the standard independent assessment report?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	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?	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 and 34?	No	
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	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 the assessment of conformity with the	Yes	

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

[a] The ERT identified additional issues and/or problems in the general, energy, IPPU, agriculture, LULUCF and waste sectors that are not listed in this table but are included in table 5.

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 6 February 2018.[4] For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2019 annual submission and provided the rationale for its determination, which takes into consideration the publication date of the previous review report and national circumstances.

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

ID#	*Issue and/or problem classification[a,b]*	*Recommendation made in previous review report*	*ERT assessment and rationale*
General			
G.1	Recalculations (G.4, 2017) Transparency	Provide in the NIR information on recalculations for the whole time series.	Resolved. Figures showing the implications of recalculations by gas and by source category, in addition to the aggregated impact of recalculations on total emissions including and excluding LULUCF for the entire time series, have been added to the NIR (chap. 10). The figures show the differences between the latest submission and the previous submission in terms of absolute values.
G.2	CPR (G.5, 2017) KP reporting guidelines	Report the correct value of the CPR.	Resolved. The CPR value was reported correctly in the NIR (section 12.5). See also ID# G.3 in table 5.
Energy			
E.1	Fuel combustion – reference approach – solid fuels – CO_2 (E.16, 2017) Comparability	Make efforts to acquire statistical data to allow disaggregation of AD and GHG emissions for anthracite and coke oven coke use, or, if this is not possible, change the reported notation key for anthracite and coke oven coke in CRF tables 1.A(b) and 1.A(d) from "NO" to "IE" for 1990–2015, providing a description in the NIR and in CRF table 9 to explain that anthracite and coke oven coke have been	Resolved. The Party has changed the notation key from "NO" to "IE" for anthracite and coke oven coke in CRF table 1.A(b). In CRF table 1.A(d) the data for anthracite use for feedstocks were reported as confidential, but confidential information was provided to the ERT in a separate document. The explanation regarding the use of the notation key is missing from CRF table 9 but was provided in the NIR (section 3.2.3) and in CRF tables 1.A(b) and 1.A(d). The Party explained that CRF Reporter does not allow explanations of notation keys to be included in tables other than the sectoral tables. Therefore, Switzerland explained the use of the

[4] FCCC/ARR/2017/CHE.

ID#	*Issue and/or problem classification*[a,b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
		aggregated under other bituminous coal.	notation keys in the documentation boxes of CRF tables 1.A(b) and 1.A(d).
E.2	Fuel combustion – reference approach – gaseous fuels – CO_2 (E.17, 2017) Comparability	Report the amount of natural gas production under the column "Production" instead of under "Imports" for 1990–1994 in CRF table 1.A(b).	Resolved. The Party reported the natural gas production values for 1990–1994 in CRF table 1.A(b) under the column "Production" instead of under "Imports". The values match the values reported in CRF table 1.B.2.
E.3	1.A.1.a Public electricity and heat production – other fuels – CH_4 (E.3, 2017) (E.10, 2016) (E.10, 2015) Transparency	Either estimate and include in the inventory CH_4 emissions from waste incineration on the basis of the study conducted by the Swiss Federal Laboratories for Material Testing and Research in 2013, or report emissions as "NE" instead of "NA" and provide a justification in the NIR, consistently with the UNFCCC Annex I inventory reporting guidelines, of why these emissions are considered insignificant.	Addressing. The notation key has been changed to "NE" in CRF table 1.A(a)s1 for this category and for category 1.A.1.a.iv (other fossil fuels). In addition, an explanation was included in the NIR (section 3.2.5.2.1) specifying that these emissions are insignificant; however, in CRF table 9 (row 7), the Party still reported the emissions as "NO", instead of as "insignificant". During the review, the Party confirmed that the explanation provided in CRF table 9 will be updated accordingly in the next submission.
E.4	1.A.2 Manufacturing industries and construction – biomass – CO_2, CH_4 and N_2O (E.18, 2017) Comparability	Make efforts to acquire statistical data to allow the reporting of GHG emissions from biomass split between categories 1.A.2.d, 1.A.2.e, 1.A.2.f and 1.A.2.g.iv. Where this is not possible, report the notation key "IE" instead of "NO" and indicate in CRF table 9 (completeness table) that emissions for the relevant categories are reported under category 1.A.2.g.viii.	Resolved. The Party has changed the notation key as recommended by the previous ERT, as the wood energy statistics disaggregate wood consumption by technology (which is necessary for accurate emission estimates) but not by industry subcategories (which has no impact on total emission estimates). Where bottom-up information on wood consumption is available, this was reported for the appropriate source categories. Where no data on wood consumption are available (categories 1.A.2.d and 1.A.2.e), "IE" is used instead of "NO".
E.5	1.A.2.f Non-metallic minerals – biomass – CH_4 (E.7, 2017) (E.14, 2016) (E.14, 2015) Convention reporting adherence	Change the reported notation key for CH_4 emissions from biomass used as fuel in non-metallic minerals from "NO" to "IE" for 1990–1999 and explain where the emissions are reported.	Resolved. The Party has changed the notation key as recommended by the previous ERT. The NIR (section 3.2.6.2.7) explains that all CH_4 emissions from biomass used as fuel under non-metallic minerals (cement production) were reported in category 1.A.2.f under other fossil fuels. An explanation of the use of the notation key "IE" was provided in CRF table 9.
E.6	1.A.3.b Road transportation – biomass – CO_2, CH_4 and N_2O (E.8, 2017) (E.15, 2016) (E.15, 2015) Accuracy	Estimate accurately CO_2, CH_4 and N_2O emissions from biodiesel used in road transportation.	Resolved. The net calorific values for biodiesel and bioethanol were changed to their respective specific values (which differ from those for diesel and gasoline), emissions were recalculated accordingly and the updated results were presented in both the 2018 and 2019 NIRs (section 3.2.4.2).
E.7	1.A.3.b Road transportation – liquid and gaseous fuels – CO_2, CH_4 and N_2O (E.19, 2017) Transparency	Correct the description of the allocation of fuel tourism and associated emissions in the NIR to explain that data for fuel tourism are added to category 1.A.3.b.i (cars) if the fuel is gasoline and to category 1.A.3.b.iii (heavy-duty trucks and buses) if the fuel is diesel.	Resolved. The Party has implemented the recommendation in the NIR (p.157), which states explicitly that GHG emissions from fuel tourism are included in CRF table 1.A(a)s3, with gasoline emissions from cars added to category 1.A.3.b.i and diesel oil emissions from heavy-duty trucks and buses added to category 1.A.3.b.iii.
E.8	1.A.3.b Road transportation –	Estimate cold-start excess emissions of N_2O using the Swiss	Not resolved. The NIR (pp.159–160) states that cold-start N_2O emissions are not accounted for

ID#	*Issue and/or problem classification*[a,b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	liquid and gaseous fuels – N_2O (E.20, 2017) Accuracy	road transportation model and describe in the NIR the method and assumptions used.	in the Swiss road transportation model and that the Party still uses the COPERT model. Cold-start N_2O emissions will be considered in the forthcoming update of the Swiss road transportation model as the update is ongoing, and the result will be provided in the next submission. The NIR further states that this action is mentioned under planned improvements (section 3.2.9.6); however, that section states that no category-specific improvements are planned. During the review, the Party explained that cold-start N_2O emissions were estimated using a workaround with the COPERT values (NIR, p.160). However, the Handbook of Emission Factors for Road Transport software has been developed over the past few years, and the EFs for cold-start N_2O emissions were only included in 2019. Therefore, Switzerland will recalculate cold-start N_2O emissions for the next submission.
E.9	1.A.3.b.ii Light-duty trucks – gaseous fuels – CO_2, CH_4 and N_2O (E.21, 2017) Accuracy	Correct the error related to the AD for bifuel light-duty vehicles during the ongoing full update of the road transportation model and report the results in the NIR.	Resolved. As described in the 2018 NIR (p.153), the Party has corrected the use of compressed natural gas as a gaseous fuel as it was determined that liquefied petroleum gas was the correct fuel to use. Specifically, the CO_2 EF for liquefied petroleum gas is 17 per cent higher than that of compressed natural gas (65.5 t CO_2/TJ and 56.1 t CO_2/TJ, respectively; see NIR table 3-12). This correction led to a 17 per cent rise in estimated CO_2 emissions for all vehicles with liquefied petroleum gas engines. The 1990–2017 time series has been corrected accordingly.
E.10	1.A.3.b.iv Motorcycles –lubricant oil – CO_2, CH_4 and N_2O (E.22, 2017) Transparency	Either provide additional information to justify why the CH_4 and N_2O emissions not estimated due to their current allocation under category 2.D.1 are below the significance threshold as contained in decision 24/CP.19, annex I, paragraph 37(b), or estimate the emissions of CO_2, CH_4 and N_2O for lubricants blended with motorcycle fuel, reporting them under category 1.A.3.b.iv.	Resolved. As described in the NIR (p.159), CO_2 emissions from combustion of lubricants in two-stroke engines were reported under category 2.D.1 (lubricant use), assuming complete oxidation (NIR, pp.228–230). The EFs for CH_4 and N_2O emissions under category 1.A.3.b.iv (motorcycles) are based on exhaust measurements. Therefore, the combustion of lubricants in two-stroke engines is included in these EFs and the emissions from lubricants are automatically included in category 1.A.3.b.iv. Additional information regarding the EFs was provided in annex A3.1.3 to the NIR (p.558).
E.11	1.A.4.b Residential – biomass – CO_2, CH_4 and N_2O (E.23, 2017) Accuracy	Justify why the per capita consumption of wood for bonfires decreased from 2 to 1.5 kg/capita between 1990 and 2015 (owing mainly to an increase in the use of gas barbecue grills) or revise the estimates of CH_4 and N_2O emissions assuming constant per capita consumption between 1990 and 2015.	Resolved. The NIR (p.145) states that the wood demand for bonfires is assumed to be constant, and refers to background documentation that describes the assumptions on which the AD are based. As the emissions from bonfires are well below the threshold of significance, the changes due to constant per capita consumption compared with constant total wood consumption would be even smaller. As there are no available statistics on wood consumption for bonfires, and the effort to produce reliable data would be disproportionate to the effect it

ID#	*Issue and/or problem classification*[a,b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			would have on the emission estimates, the ERT considers the expert judgment to be sufficient.
E.12	1.B.2.b Natural gas – natural gas – CH_4 (E.15, 2017) Transparency	Ensure that the next recalculations for the energy sector are reported in a comprehensive and transparent manner.	Resolved. A calculation tool was used to calculate gas transmission and distribution losses. The recalculations of gas transmission and distribution losses made for the 2019 submission are described on page 188 of the 2019 NIR, while those made for the 2018 submission are described on page 192 of the 2018 NIR. In addition, the effects of the recalculations were reported in the NIR (section 10.1.2.1). During the review, the Party explained that it is difficult to document the recalculations in the NIR without direct reference to the tool, and offered to provide the tool to the ERT.
E.13	1.B.2.c Venting and flaring – natural gas – CO_2, CH_4 and N_2O (E.12, 2017) (E.19, 2016) (E.19, 2015) Completeness	Estimate and report CO_2, CH_4 and N_2O emissions from flaring of natural gas using a methodology consistent with the 2006 IPCC Guidelines.	Resolved. The emissions for 1990–1994 were reported; for 1995 up to the latest year of the time series, "NO" was reported because there was no further production of gas in Switzerland. The Party has therefore corrected the issue in CRF table 1.B.2 and documented it in the NIR (section 3.3.4).
IPPU			
I.1	2. General (IPPU) – CO_2 (I.1, 2017) (I.3, 2016) (I.3, 2015) Transparency	Improve the transparency of the reporting of indirect CO_2 emissions from the IPPU sector by including detailed information on the AD and methodology used for the estimation.	Resolved. The level of detail of the information on the AD and methodology used to estimate indirect CO_2 emissions has improved. For each category of the IPPU sector, it is now indicated whether the indirect emissions were calculated from precursor emissions and where they are reported.
I.2	2.A.1 Cement production – CO_2 (I.13, 2017) Transparency	Summarize in the NIR the information concerning the composition of the raw material and the methodology used to derive the country-specific EF.	Resolved. Information concerning the composition of the raw material and the methodology used to derive the country-specific EF was included in the NIR (section 4.2.2.1) as recommended. See also ID# I.8 in table 5.
I.3	2.C.1 Iron and steel production – CO_2 (I.14, 2017) Comparability	Allocate CO_2 emissions from bituminous coal and limestone used in cupola furnaces under category 2.C.1.	Addressing. Bituminous coal acts primarily as a fuel in cupola furnaces of iron foundries and secondarily as a reductant, which explains its allocation to category 1.A.2.a (iron and steel). The allocation ensures consistency with the other reported uses of bituminous coal as fuel in the national statistics and is transparently explained in the NIR (sections 3.2.6.2.2 and 4.4.2.1). However, emissions from limestone used in cupola furnaces were still included under category 2.A.4.d (other process uses of carbonates – other). During the review, the Party explained that it will reallocate the emissions from limestone use in cupola furnaces to category 2.C.1 (iron and steel production) in its next submission.
I.4	2.C.3 Aluminium production	Include in the NIR, to the extent possible, more detailed information	Resolved. The NIR (section 4.7.2.1) provides detailed information on the measurements of

ID#	*Issue and/or problem classification*[a,b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	– PFCs (I.5, 2017) (I.7, 2016) (I.7, 2015) Transparency	on the analysis of the measurements resulting in a lower EF for PFC emissions from aluminium production.	PFC emissions from operating smelters built in 1990, 1999 and 2000, including clarification of the use of a lower EF. In addition, a comparison between the measured values and the European average values was included.
I.5	2.E.1 Integrated circuit or semiconductor – HFCs, PFCs, SF_6 and NF_3 (I.15, 2017) Transparency	Describe in the NIR: the results of the survey carried out among users of the substances about the presence of exhaust treatments; the criteria used to characterize emission abatement at smaller installations for which no information was provided by the survey; and the reason why default EFs were used instead of the consumption and abatement data made available through the survey.	Resolved. The survey collected information only on the types of substances applied and not on EFs. The results of the survey were reported in the NIR (section 4.6.2).
I.6	2.F.1 Refrigeration and air conditioning – HFCs and PFCs (I.9, 2017) (I.11, 2016) (I.11, 2015) Comparability	Continue efforts to acquire statistical data to allow the reporting of emissions to be split between industrial and commercial refrigeration, or, if this is not possible, report the appropriate notation key "IE" for HFC and PFC emissions from industrial refrigeration with the information that emissions for that category are reported under commercial refrigeration.	Resolved. The reporting of emissions from industrial and commercial refrigeration has been split between industrial and commercial refrigeration (NIR section 4.7.2.1).
I.7	2.G.4 Other (other product manufacture and use) – CO_2 (I.12, 2017) Accuracy	Provide a correct time series for NMVOC emissions from de-icing of aeroplanes and update the respective indirect CO_2 emissions reported in CRF table 6 and in the national totals.	Resolved. The double counting of NMVOC emissions from de-icing of aeroplanes for 1990–2006 was corrected. Revised information on AD based on a comprehensive study, including information and data on three Swiss airports, was used to recalculate NMVOC emissions and the respective indirect CO_2 emissions, which were reported for the entire time series (NIR section 4.8.2.4).
Agriculture			
A.1	3. General (agriculture) – N_2O (A.1, 2017) (A.3, 2016) (A.3, 2015) Convention reporting adherence	Correct the information on methodologies and EFs for N_2O emissions from manure management and agricultural soils in CRF table summary 3s2 to make it consistent with the EFs and methodologies actually used in the estimations.	Resolved. Switzerland has amended the text in sections 5.3.2.1 and 5.5.2.1 of the NIR so that it is consistent with the reporting of the EFs and methodology in CRF table summary 3s2 for N_2O emissions from manure management (category 3.B) and agricultural soils (category 3.D). Both the NIR and CRF table summary 3s2 now state that country-specific tier 3 methodology was used for calculating N_2O emissions from manure management, while tier 1 and tier 3 methods were used for calculating N_2O emissions from agricultural soils.
A.2	3. General (agriculture) – CH_4 and N_2O (A.7, 2017) Transparency	Provide a clear definition and description of the animal species reported under categories 3.A.4.a and 3.B.4.a (buffalo) and include some additional information in the NIR to give a short explanation of the data and assumptions that were	Resolved. Switzerland has provided more information in the NIR (section 5.2.2.3, p.284) on bison, the animal species reported under categories 3.A.4.a and 3.B.4.a (buffalo). It has also added an explanatory comment in the documentation box in CRF table 3.As1.

ID#	Issue and/or problem classification[a,b]	Recommendation made in previous review report	ERT assessment and rationale
		used for the corresponding emission calculations.	
A.3	3. General (agriculture) – CH_4 and N_2O (A.8, 2017) Transparency	Explain in the NIR why fur animals (other than rabbits) are not included in the emission estimates under categories 3.A and 3.B and include references to the relevant documentation and national legislation.	Resolved. Switzerland has explained in the NIR (section 5.2.1) why emissions from fur-bearing animals do not occur in Switzerland. Animal protection law in Switzerland severely restricts the farming of fur-bearing animals, to the point where this activity is not economically viable. References to the relevant national legislation were included in the NIR. The ERT considers the additional information provided by the Party to be sufficient.
A.4	3.B.5 Indirect N_2O emissions – N_2O (A.9, 2017) Transparency	Provide information in the NIR that supports the expert judgment, clarifying whether N leaching from animal waste management systems is negligible or not occurring, in line with the 2006 IPCC Guidelines (e.g. through the provision of expert judgment protocols, minutes of panels or meetings, reports, peer-reviewed articles).	Resolved. Switzerland has provided references to literature to support the expert judgment on why N leaching from manure management systems does not occur (NIR, section 5.3.1). The ERT considers that this additional information justifies the conclusion that N leaching from manure management systems does not occur.
A.5	3.C.4 Other (rice cultivation) – CH_4 (A.10, 2017) Comparability	Report the harvested area for upland rice in CRF table 3.C instead of using the notation key "NO".	Resolved. Switzerland has reported the area of upland rice cultivation in CRF table 3.C. See also ID# A.8 in table 5.
A.6	3.D.a.4 Crop residues – N_2O (A.11, 2017) Transparency	Explain in the NIR that the use of crop residues for fuel and the (open) burning of crop residues are not common practices in the country and are subject to strong regulations, and are therefore not considered to be activities that reduce the amount of N returned to soil in the country.	Resolved. Switzerland has included information in the NIR (section 5.5.2.2.2, p.313) on why the burning of crop residues does not occur in the country. During the review, the Party provided references to the relevant legislation.
LULUCF			
L.1	Land representation – (L.1, 2017) (L.6, 2016) (L.6, 2015) Transparency	Clarify in the NIR that all land is managed or provide the definition of managed and unmanaged land and their areas over time.	Resolved. In the NIR (section 6.1.3), Switzerland clearly explains that all land besides other land is managed. Other land is unmanaged. The areas of land use in terms of land categories and percentage change over time are provided in table 6-8 of the NIR (p.349).
L.2	Land representation – (L.2, 2017) (L.7, 2016) (L.7, 2015) Transparency	Improve the description of the identification of the country-specific combination categories (i.e. land use and land-use change categories that are more detailed than those defined in the 2006 IPCC Guidelines) in order to increase the transparency of the information on the identification of IPCC land-use categories.	Resolved. Switzerland has provided a description of the identification of the country-specific combination categories in the NIR (section 6.2.1, p.343).
L.3	4.A Forest land – CO_2 (L.6, 2017) (L.11,	Accurately identify the areas of drained organic soils in forests by collecting data on areas of organic	Resolved. Switzerland identified the share of drained organic soils in forests to be 3 per cent by intersecting information on drainage from

ID#	Issue and/or problem classification[a,b]	Recommendation made in previous review report	ERT assessment and rationale
	2016) (L.11, 2015) Accuracy	soils under forest land affected by past draining activities.	NFI plots with the shapefile areas of organic soils (NIR, section 6.4.2.10, p.379).
L.4	4.A Forest land – CO_2 (L.9, 2017) Transparency	Improve the description of the quantification of stump biomass in the NIR and how stumps after cutting are included in the dead organic matter pool and subsequently transferred as input to the Yasso07 model.	Addressing. The quantification of stump biomass in standing and dying trees (i.e. including in stem wood over bark) is provided in the NIR (section 6.4.2.3). With regard to how stumps after cutting are included in the dead organic matter pool and subsequently transferred as input to the Yasso07 model, Switzerland explained during the review that stumps are included in residues remaining after a disturbance, including harvesting. The Party stated that the NIR cites the explanation in Didion and Thürig, 2018 (chapter 2.3.3), and explains how Yasso07 was used for estimating the emissions and removals reported in the NIR, including in section 6.4.2.7. The Party further explained that inputs for Yasso07 were derived on the basis of the status and dimensions of each tree with a DBH of more than 12 cm found on an NFI sample plot. If the above-ground part of a tree (i.e. higher than 1.30 m) – whether alive or dead – was present in the first of two consecutive inventories but not the second, then the below-ground part of this tree, including its stump, was included in the estimate of coarse-woody material that entered the Yasso07 model. As whole tree harvest does not occur in Switzerland, this approach resulted in an accurate estimate of biomass and therefore of carbon contained in stumps of harvested trees left in the forest that contribute to deadwood and ultimately to the soil carbon pool. The ERT noted that this explanation should be included in the NIR to enhance the explanation of how stumps after cutting are included in the dead organic matter pool.
L.5	4.A.1 Forest land remaining forest land – CO_2 (L.8, 2017) Consistency	Ensure that the time series is consistent in accordance with the 2006 IPCC Guidelines, or justify the reason behind the substantial inter-annual change in the time series for CO_2 emissions and removals from forest land remaining forest land between 2005 and 2006; and explain why this introduction of data from the fourth NFI4 only affects the time period from 2006 onward by, for example adding to the NIR the information given during the review and provided in Thürig et al. (2017).	Resolved. Switzerland included adequate information in the NIR section 6.4.2.1, p.357) on the consequences of the use of updated NFI data and explained why only the time period from 2006 onward is affected (see the NFI inventory cycles in NIR table 6-12 on p.356). The substantial inter-annual change in the time series for CO_2 emissions and removals from forest land remaining forest land between 2005 and 2006 was shown to be valid and in accordance with the 2006 IPCC Guidelines.
Waste			
W.1	5.A Solid waste disposal on land – CH_4 (W.1, 2017) (W.7,	Report the correct tier for the methodology used to estimate CH_4 emissions from solid waste disposal	Resolved. Switzerland has corrected the tier for the methodology used to estimate CH_4 emissions from solid waste disposal on land in CRF table summary 3s2 and in the NIR (section

ID#	*Issue and/or problem classification*[a,b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	2016) (W.7, 2015) Transparency	on land in CRF table summary 3s2 and in the NIR.	7.2.2, p.439) from country-specific to tier 2. The changes are consistent with the 2006 IPCC Guidelines (vol. 5, chap. 3, figure 3.1).
W.2	5.B.1 Composting – CH_4 (W.3, 2017) (W.9, 2016) (W.8, 2015) Accuracy	Since emissions from the biological treatment of solid waste (5.B) is a key category, review and, if necessary, revise the AD for composting and demonstrate that they are accurate by providing supporting documentation in the NIR.	Resolved. During the review, the Party confirmed that following recalculations performed in 2017, the biological treatment of solid waste is no longer a key category. However, the Party has addressed the issues raised and provided AD for composting. The Party indicated in the NIR that the AD for industrial composting (i.e. centralized composting activities with a capacity of more than 100 t organic matter/year in addition to the composting of organic material at the border of agricultural fields) are based on waste surveys (Schleiss, 2017). Reliable data on waste quantities for 2013 are also available to complement the Schleiss 2017 waste survey (FOEN, 2016a). The Party also indicated that all cantons were included, and that data on organic waste quantities, according to their respective treatment options, were collected under industrial composting. Switzerland further elaborated that AD for backyard composting were reassessed in 2017 (Schleiss, 2017) and noted that volume 5, section 4.1.2, of the 2006 IPCC Guidelines states that it is good practice for countries to use national, annually or periodically collected data, where available.
W.3	5.C.2 Open burning of waste (biogenic) – CH_4 and N_2O (W.8, 2017) (W.14, 2016) (W.13, 2015) Transparency	Correct the AD reported in CRF table 5.C for open burning of waste for natural residues and ensure consistency between the NIR and the CRF tables for these AD.	Resolved. Switzerland has corrected the AD reported in CRF table 5.C for open burning of waste and ensured consistency between the NIR and the CRF tables for the AD. CRF table 5.C provides consolidated AD, while the NIR provides detailed AD for various subcategories. The Party has provided a detailed table in the NIR (table 7.16) that also explains the AD reported in CRF table 5.C. The ERT considers that the Party has adequately implemented the recommendation.
W.4	5.C.2 Open burning of waste – CH_4 and N_2O (W.11, 2017) Transparency	Describe in the NIR how AD were obtained and which assumptions were made for estimating CH_4 and N_2O emissions from open burning of branches and garden waste.	Resolved. Switzerland explained that the AD were provided by cantons (NIR, p.452, table 7.17). With regard to the assumptions, given that there are a significant number of unreported cases, it is assumed that the actual amount of material burned is three times greater than the amount approved by the authorities. The amount burned in Switzerland was extrapolated on the basis of the figures provided by the evaluated cantons. The Party also explained the assumptions made for determining both the AD and the EFs. Following the review of the NIR, and given the explanation provided on pages 451–453 of the NIR, the ERT considers that the Party has implemented the recommendation.
W.5	5.D Wastewater treatment and discharge – CH_4	Include in the NIR the explanation of the sources of AD for	Resolved. In the NIR (section 7.5.1) Switzerland explained that there is no technical difference between commercial and industrial wastewater (see figure 7-5). The Party further

ID#	*Issue and/or problem classification*[a,b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	(W.12, 2017) Transparency	commercial and industrial wastewater.	explained that the contribution of commercial and industrial wastewater streams cannot be separated from that of the domestic wastewater streams. Accordingly, CH_4 emissions from industrial and commercial wastewater are taken into account by applying the default parameter I of 1.25 in equation 6.3 of the 2006 IPCC Guidelines (vol. 6, section 6.2.2.3). The Party calculated the AD for wastewater in accordance with the 2006 IPCC Guidelines, as documented in the NIR (p.459).
Other			
O.1	Sector 6 (other) – all fuels – CO_2, CH_4 and N_2O (O.1, 2017) Transparency	Ensure that any recalculations are reported transparently in the NIR.	Resolved. Switzerland explained the recalculations performed between the 2016 and 2017 submissions in relation to estimates of emissions from fire-damaged estates and fire-damaged vehicles for 1990–2002. No recalculations were performed for the 2019 submission (see NIR section 8.2.5).
KP-LULUCF activities			
KL.1	General (KP-LULUCF activities) – (KL.1, 2017) (KL.3, 2016) (KL.3, 2015) Transparency	Address the transparency issues in ID#s L.6, L.7, L.9, L.10 and L.12 from the 2016 ARR and provide the necessary information in relation to KP-LULUCF activities.	Resolved. ID#s L.9 and L.10 from the 2016 ARR were addressed in the 2017 NIR. ID#s L.6, L.7 and L.11 (see also ID# KL.3 below) from the 2016 ARR (ID#s L.1, L.2 and L.3, respectively, in this report) have been addressed in section 11 of the 2019 NIR and the ERT considers the information provided to be sufficient.
KL.2	AR and deforestation – CO_2 (KL.2, 2017) (KL.4, 2016) (KL.4, 2015) Accuracy	Review the assumption that only 50 per cent of the difference between the carbon stocks before and after the change is reported as a source or sink, respectively, for afforestation (from settlements to forest land) and deforestation (from forest land to settlements) and, if necessary, revise the estimates for these KP-LULUCF activities.	Resolved. According to the NIR (section 6.1.3.2), in cases of land-use change from forest land to buildings and construction under settlements (i.e. deforestation), a loss of 20 per cent of the initial soil carbon stock is reported. In cases of land-use change from buildings and construction to forest land (i.e. afforestation), the regular stock-difference approach is used. These modifications are in line with the 2006 IPCC Guidelines (vol. 4, section 8.3.3.2).
KL.3	Deforestation – CO_2 (KL.3, 2017) (KL.5, 2016) (KL.5, 2015) Accuracy	Address ID# L.11 in the 2016 ARR and, if necessary, revise the estimates for deforestation.	Resolved. See also ID# L.3 above. The ERT is of the view that the method used by Switzerland for calculating the ratio of drained organic soils is acceptable and is the same method used in KP-LULUCF activities.
KL.4	FM – CO_2 (KL.10, 2017) Transparency	Report the recalculations in relation to KP-LULUCF activities in addition to clarifying in the NIR the reason behind the substantial inter-annual change in the time series for CO_2 emissions/removals from forest land remaining forest land between 2005 and 2006 and explaining why the introduction of data from the fourth NFI4 only affects the time period from 2006 onward (see ID# L.5 above).	Resolved. The recalculation in relation to KP-LULUCF activities has been reported in the NIR, as well as an explanation of why the introduction of data from NFI4 is only affecting the period from 2006 onward (NIR, sections 6.4.2.1, 6.4.5 and 11.3.1.1).
KL.5	FM – CH_4 and N_2O	According to ID# L.13 in the 2016 ARR, explain in the NIR the	Resolved. Switzerland has explained that emissions from controlled burning cover the

ID#	*Issue and/or problem classification*[a,b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	(KL.4, 2017) (KL.6, 2016) (KL.6, 2015) Transparency	estimation of CH_4 and N_2O emissions from open burning of residues in forests and the allocation to the category controlled burning in CRF table 4(KP-II)4 (GHG emissions from biomass burning for forest management).	emissions from residues in forests (NIR section 11.5.2.4, p.531). Since the 2017 NIR, these emissions have been reported in the forest management category under the KP-LULUCF activities.
KL.6	FM – CH_4 and N_2O (KL.5, 2017) (KL.6, 2016) (KL.6, 2015) KP reporting adherence	According to ID# L.13 in the 2016 ARR, include the reallocated values in the FMRL, applying a technical correction if necessary.	Resolved. Switzerland has provided an updated technical correction of the FMRL in the NIR (section 11.5.2.4, pp.528–532). The emissions of CH_4 and N_2O from controlled burning were added to the corrected FMRL (NIR, section 11.5.2.4, p.531).
KL.7	HWP – CO_2 (KL.7, 2017) (KL.8, 2016) (KL.8, 2015) Accuracy	Estimate and report carbon stock changes for the product category paper using either the national or the internationally available data or provide transparent justification in the NIR as to why the available information on AD for paper is not transparent and verifiable.	Resolved. Switzerland included the paper and paperboard as a subcategory of HWP (NIR section 6.11.2.1 and table 6-34) using data from FAOSTAT and applying the first-order decay function.

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

[b] The review report of the 2018 annual submission of Switzerland was not available at the time of the review. Therefore, the previous recommendations reflected in table 3 are taken from the 2017 ARR. 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 Switzerland, and have not been addressed by the Party.

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

ID#	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[a]
General	No issues identified	
Energy		
E.3	Either estimate and include in the inventory CH_4 emissions from waste incineration on the basis of the study conducted by the Swiss Federal Laboratories for Material Testing and Research in 2013, or report emissions as “NE” instead of “NA” and provide a justification in the NIR, consistently with the UNFCCC Annex I inventory reporting guidelines, of why these emissions are considered insignificant	3 (2015/2016–2019)
IPPU	No issues identified	
Agriculture	No issues identified	
LULUCF	No issues identified	

ID#	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[a]
Waste	No issues identified	
KP-LULUCF activities	No issues identified	

[a] The report on the review of the 2018 annual submission of Switzerland 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. Table 5 contains findings made by the ERT during the individual review of the 2019 annual submission of Switzerland that are additional to those identified in table 3.

Table 5
Additional findings made during the individual review of the 2019 annual submission of Switzerland

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
General			
G.3	CPR	Although the values of the CPR and the assigned amount reported in the NIR (section 12.5) are the same as those provided in the report on the review of the report to facilitate the calculation of the assigned amount for the second period of the Kyoto Protocol of Switzerland (document FCCC/IRR/2016/CHE), the references provided in the documentation on those values in the NIR are not entirely clear. For the CPR, the Party refers to Switzerland's initial report under Article 7, paragraph 4, of the Kyoto Protocol for the second commitment period of the Kyoto Protocol (FOEN, 2016b), and the update to the report following the review (FOEN, 2016c). The value reported matches the value contained in document FCCC/IRR/2016/CHE. For the assigned amount, the NIR refers to "the final review report (UNFCCC, 2018)", while the assigned amount in the NIR is equal to the one presented in document FCCC/IRR/2016/CHE. In response to a question raised by the ERT on this issue, the Party agreed to change the references to ensure clarity. The ERT recommends that Switzerland correct the references regarding the values of the CPR and the assigned amount to document FCCC/IRR/2016/CHE.	Yes. Transparency
G.4	NIR	Switzerland reported information in the NIR (section 9.1) on indirect CO_2 emissions resulting from the atmospheric oxidation of NMVOCs and CO in addition to indirect N_2O emissions induced by the deposition of NO_X and NH_3. Indirect CO_2 emissions are accounted for in the Party's total emissions, while indirect N_2O emissions are not. According to the Party's NIR, indirect CO_2 emissions resulting from the atmospheric oxidation of CH_4 are generally not considered. During the review, the Party explained that indirect CO_2 emissions from the oxidation of CH_4 are not accounted for as the carbon is already accounted for as CH_4 emissions using appropriate global warming potential values. However, according to section 2.10.3 of the contribution of Working Group III to the IPCC Fourth Assessment Report (IPCC, 2007), the CO_2 produced from oxidation of CH_4, CO, and NMVOCs of fossil origin is not included in the global warming potential estimates since this carbon has been included in the national CO_2 inventories. According to the 2006 IPCC Guidelines (vol. 1, chap. 7, box 7.2), possible sources of indirect CO_2 emissions are fugitive emissions from energy use, carbon from non-CO_2 gases from IPPU emissions from agriculture, forestry and other land use where non-CO_2 gases have been explicitly deducted. The ERT encourages Switzerland to report indirect CO_2 emissions of fugitive CH_4 emissions from energy use and CH_4 emissions from the IPPU sector.	Not an issue/problem
Energy			
E.14	1. General (energy sector) –	No further issues were identified.	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
IPPU			
I.8	2.A.1 Cement production – CO_2	Switzerland reported in the NIR (section 4.2.2.1, p.197) that it is using a base EF of 525 kg CO_2/t clinker from a 2011 report by the Cement Sustainability Initiative. The base EF has been adjusted by adding a share of non-carbonate carbon in raw materials and data on cement kiln dust. The share of non-carbonate carbon in raw materials is a default value from the Cement Sustainability Initiative report (method B1, p.9: 0.2 per cent of raw materials). The EF of 0.35 kg CO_2/t clinker for cement kiln dust is estimated using plant-specific data available for 2013–2016. The emissions have been calculated for the whole time series using the adjusted EF. According to the NIR, emissions from cement production are now consistent between the Swiss emissions trading system and the GHG inventory. During the review, Switzerland explained that the base EF was checked with the cement industry before the beginning of the second commitment period of the Kyoto Protocol, and the Party considered the factor of 525 kg CO_2/t clinker to be adequate for estimating emissions from cement production. The Party also explained that cement plants report the EFs for cement kiln dust in their annual reports under the Swiss emissions trading systems and that these values can be used to confirm the EF used in the inventory. Category 2.A.1 (cement production) is a key category according to both the level and trend in the Party's inventory. Emissions are calculated using a tier 2 method, but no country-specific information on the CaO and MgO content in clinker has been used to estimate the CO_2 EF. The ERT recommends that Switzerland clarify in its NIR the assumptions on CaO and MgO content of clinker used in the base EF which forms the basis for the country-specific EF.	Yes. Transparency
I.9	2.A.4 Other process uses of carbonates – CO_2	Switzerland reported emissions from category 2.A.4.b (other uses of soda ash) as "NO" for 1990–2017. In the NIR (section 4.2.2.4, p.205) the Party explained that soda ash is mainly used in glass production, which is reported separately in category 2.A.3 (glass production). In addition, a small amount of soda ash is used in glazes of fine ceramics, and those emissions are included in category 2.A.4.a (ceramics). During the review, the Party informed the ERT that net imports of soda ash amounted to 18.8 kt in 2017. The Party also explained that a study had been carried out to ensure that the Swiss emissions inventory covers all relevant CO_2 emissions from carbonate use in industry (INFRAS, 2015). The study concluded that there are no relevant soda ash uses besides glass production and fine ceramics production. However, a total of 14.4 kt soda ash was used in Switzerland (imports minus known uses), and the Party is not currently able to confirm whether the use is emissive. On the basis of the explanation provided by Switzerland on the use of soda ash for glass production and in fine ceramics, and the study that confirms that no soda ash is used in flue gas or wastewater treatment, the ERT considers CO_2 emissions from category 2.A.4.b as insignificant. The ERT recommends that Switzerland report CO_2 emissions from category 2.A.4.b as "NE" in CRF table 2(I).A-Hs1 and explain in CRF table 9 that the emissions are considered insignificant. The ERT also recommends that the Party add a description to the NIR (section 4.2.2.4) explaining in quantitative terms (i.e. using approximated AD and IPCC default EFs) that these emissions are below the significance threshold defined in decision 24/CP.19, annex I, paragraph 37(b), as demonstrated by the Party during the review.	Yes. Transparency
I.10	2.D.3 Other (non-energy products from	Switzerland reported in the NIR (section 4.5.2.2, p.230) under category 2.D.3 (non-energy products from fuels and solvent use – other) the methodology used to calculate NMVOC emissions from solvent use, road paving with	Not an issue/problem

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
	fuels and solvent use) – NMVOCs	asphalt and asphalt roofing, and under category 2.G.4 (other product manufacture and use – other) the methodology used to calculate NMVOC emissions from domestic solvent use, printing and other solvent and product use (NIR section 4.8.2.4, p.259). The same methodological descriptions are contained in Switzerland's 2019 informative inventory report (FOEN, 2019). As these emissions are reported as precursor emissions and only indirect CO_2 emissions from NMVOCs are included in the total emissions of Switzerland, the ERT considers that it would be sufficient to reference Switzerland's informative inventory report in the NIR with regard to methodologies used to estimate NMVOC emissions for categories 2.D.3 and 2.G.4. The ERT encourages Switzerland to report calculations of these indirect CO_2 emissions from NMVOCs in chapter 9 of the NIR instead of reporting in sectoral chapters.	
I.11	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2	Switzerland reported in the NIR (sections 4.5.2.2 and 4.8.2.4) CO_2 emissions from post-combustion of NMVOC emissions under categories 2.D.3 (non-energy products from fuels and solvent use – other) and 2.G.4 (other product manufacture and use – other). A number of industrial plants are required by Swiss law to use facilities and equipment to reduce NMVOC exhaust gases and room ventilation output. This requirement is often met by feeding air with high NMVOC content into a burning chamber in boilers or other facilities with the intention of incinerating the NMVOC emissions. The Party explained that the amount of NMVOCs eliminated in post-combustion is not included in the NMVOC emissions reported in the NIR and no indirect CO_2 emissions are estimated. The Party also explained that CO_2 emissions from the post-combustion of NMVOCs are calculated using a tier 2 method and country-specific EFs. During the review, Switzerland informed the ERT that more than 100 industrial plants use post-combustion to eliminate NMVOC emissions, while the 10 largest facilities, which account for over 60 per cent of total NMVOC emissions, submit annual information on NMVOC quantities and the respective carbon content based on the composition of solvents. Data on other facilities are gathered every five years. The methodological description is not sufficiently clear to ascertain how the EFs in tables 4-37 and 4-55 of the NIR are defined or the reasons for the inter-annual changes in EFs. The ERT recommends that Switzerland improve the transparency of the reporting of CO_2 emissions from post-combustion of NMVOC emissions by including sufficient information on the EFs and methodology used for the estimation.	Yes. Transparency
Agriculture			
A.7	3. General (agriculture) – mature dairy cattle - CH_4 and N_2O	Switzerland reported in the NIR that a constant average body weight of 650 kg is assumed for mature dairy cattle (section 5.2.2.2.1, p.279) and other mature cattle (CRF table 3.As2) over the entire time series. A constant weight assumption means that the gross energy intake calculations do not account for small annual variances in weight, thus reducing the accuracy of the emission estimates. During the review, Switzerland provided justification for this assumption and links to related research, in addition to briefly discussing the feasibility of using meat production statistics to help to verify the assumption of a constant average body weight and the potential issues involved. The ERT considers that the research used to estimate the weight of mature dairy cattle and other mature cattle is consistent with volume 4, chapter 10, section 10.2.2, of the 2006 IPCC Guidelines but notes that carrying out comparisons using slaughter weight data can be a useful validation exercise.	Not an issue/problem

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		The ERT encourages Switzerland to investigate the potential of using other data sources such as meat production statistics to calculate the annual average body weight of mature dairy cattle and other mature cattle in accordance with volume 4, chapter 10, section 10.2.2, of the 2006 IPCC Guidelines, or to use these other data sources to further validate the assumption of a constant average body weight, and report on the progress made in the next submission.	
A.8	3.C Rice cultivation – CH_4	Switzerland first reported the harvested area of upland rice in the 2018 submission (CRF table 3.C), stating that it was equal to 90 x 10^9 m^2 (constant) between 1997 and 2017. The constant used by the Party converts to 90,000 km^2 or 9 Mha, a number that seemed too large. In response to a question raised by the ERT, Switzerland noted that the reported number was incorrect and confirmed that the actual estimated area in CRF table 3.C should be 90 ha. Switzerland stated that this error would be corrected for the next submission. The ERT recognizes that CH_4 emissions from upland rice cultivation are assumed to be zero, which is in line with guidance provided in the 2006 IPCC Guidelines (vol. 4, section 5.5.2).	Yes. Accuracy
		The ERT recommends that Switzerland correct the error in CRF table 3.C regarding the harvested area of upland rice.	
A.9	3.G Liming – CO_2	Switzerland reported in the NIR (section 5.8.2.2, p.326) that AD on the use of lime and dolomite are estimated on the basis of research and expert judgment. During the review, Switzerland provided more information on the sources for the expert judgment. The ERT considers that these sources provide valid estimates for lime use and reasonable justification for the assumption that lime use in Switzerland is roughly constant.	Yes. Transparency
		The ERT recommends that Switzerland either document in the NIR how the expert judgment used to estimate AD on the use of lime and dolomite was sourced or make this information available in background documents.	
A.10	3.G Liming – CO_2	Switzerland reported in CRF table 3.G that no dolomite was used in 1993 (and reported the emissions as "NO"), which creates a break in the time series, as dolomite use was reported for the other years in the time series, including 1992 and 1994. During the review, Switzerland provided a detailed explanation that drew on import and sales data to justify why dolomite use in 1993 was estimated as zero. The ERT is satisfied with the explanation provided by Switzerland.	Yes. Transparency
		The ERT recommends that Switzerland provide a brief explanation in the documentation box in CRF table 3.G on why dolomite use in 1993 is reported as "NO".	
LULUCF			
L.6	Land representation	In the NIR (section 6.1.3, p.334), Switzerland explained that all land besides other land is considered to be managed. Other land is unmanaged. However, in CRF table 4.1, total unmanaged land is reported as "NO" for all years of the time series, while the total area of other land is larger than zero. During the review, Switzerland explained that the statement in NIR section 6.1.3 is correct and that CRF table 4.1 will be corrected accordingly in the next submission.	Yes. Convention reporting adherence
		The ERT recommends that Switzerland correct the reporting of other land and unmanaged land in CRF table 4.1 to ensure consistency between the NIR and the CRF tables.	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
L.7	4.A Forest land – CO_2	A comparison between table 6-16 of the 2019 NIR (p.359) and table 6-15 of the 2018 NIR (p.362) reveals that the input parameters, number of trees and references for the applied allometric biomass functions have changed between the two submissions. Therefore, it appears that the allometric equations applied for estimating growing stocks of various tree components have been changed. However, the NIR does not mention any changes or allude to their consequences. During the review, Switzerland explained that it has not changed its allometric equations, and has only referenced a more accessible publication. The new publication contains all the references to the previous source. In addition to the updated references, there are editorial differences between table 6-16 of the 2019 NIR and table 6-15 of the 2018 NIR, which hampers comparison of the 2018 and 2019 NIRs. The change in the number of trees used in the initial parameterization of the allometric equations was the result of quality checks of the data and literature that form the basis of the allometric equations. Switzerland emphasized that the parameters for the allometric equations were not revised in the course of the QA/QC activities and that no recalculations were therefore performed. Switzerland also acknowledged that there are several typographical errors in table 6-16 of the NIR and confirmed that this table will be corrected in the next submission. In addition, chapter 2.3.3 of the publication by Didion and Thürig (2018), which is cited in the NIR, does not clearly explain how stumps after cutting are included in the dead organic matter pool. The ERT recommends that Switzerland correct the typographical errors in table 6-16.	Yes. Transparency
L.8	4.A Forest land – CO_2	In the NIR (section 6.4.2.1, p.356), Switzerland states that the estimates for living biomass, deadwood and litter do not currently take into account trees with a DBH of below 12 cm with branches, foliage and roots, or non-tree understory vegetation, including shrubs, ferns, grasses, sedges and herbs. Switzerland has not provided any justification as to why these small trees and non-tree vegetation are not included in the calculation of living biomass, deadwood and litter. During the review, Switzerland explained that the Swiss NFI has a DBH threshold of 12 cm and in relation to the total forest area, small trees have a negligible influence on the growing population and its changes. Although trees below the threshold are only measured in the 'regeneration plots', as Switzerland's country-specific allometric functions only apply to trees with a DBH greater than or equal to 12 cm, the Party does not take into consideration trees with a DBH of below 12 cm. The Party further explained that with regard to non-tree vegetation, work to estimate biomass and carbon stocks and changes in these areas is ongoing in the context of planned improvements, with a view to estimating the litter turnover produced by non-tree vegetation as an input in the simulations of carbon stocks and carbon stock changes in the litter and mineral soil pools on forest land (see NIR section 6.4.6). The Party stated that preliminary results indicate that the contribution of non-tree vegetation (i.e. living biomass, deadwood, litter and mineral soil) to total carbon stock changes (i.e. from living biomass, dead wood, litter, and mineral soil on forest land) is negligible, referring to Didion et al. (2018). No evidence is provided to support the assumption that small trees with a DBH of below 12 cm have a negligible influence on the growing tree population and related changes. Moreover, small trees with a DBH of below 12 cm may make a significant contribution as inputs in the simulations of carbon stocks and carbon stock changes in the deadwood, litter and mineral soil pools on forest land. The ERT recommends that Switzerland either include trees with a DBH 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.	Yes. Accuracy

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
Waste			
W.6	5.C Incineration and open burning of waste – CH_4 and N_2O	The AD for sewage sludge applied as fertilizer reported in table 5-22 (p.315) of the NIR contradict the information on the reporting of sewage sludge under the waste sector provided in NIR chapter 7 (p.438); according to the former, sewage sludge was applied to soils in 1990–2008, while the latter indicates that all sewage sludge has been incinerated since 2010 because its use as fertilizer was no longer permitted. During the review, the Party explained that the use of sewage sludge as fertilizer has been prohibited in Switzerland since 2003, although a transition period was applied to some areas before its use was completely phased out. For example, the ban allowed some cantons to prolong the transition period until 2008 (Federal Department of Environment, Transport, Energy and Communications, 2003). Table 5-22 (NIR, p.315) displays a time series of sewage sludge AD used in agriculture. AD for sewage sludge is given as zero for all years from 2009 onward. The ERT recommends that the Party align the reporting on sewage sludge between the agriculture and waste sectors. In particular, the ERT recommends that the Party address the above-mentioned inconsistency by explaining how the last year of sewage sludge application to agricultural soils was 2008, while the first year when all sewage sludge was incinerated was 2010.	Yes. Transparency
KP-LULUCF activities			
KL.8	General (KP-LULUCF activities)	No further problems were identified.	Not an issue/problem

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

VI. Application of adjustments

11. The ERT did not identify the need to apply any adjustments to the 2019 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. Switzerland 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

13. 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 Switzerland for submission year 2019 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as submitted by Switzerland in its 2019 annual submission

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

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

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions including indirect CO_2 emissions[b]*				*KP-LULUCF activities (Article 3.4 of the Kyoto Protocol)*	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*	*Land-use change (Article 3.7 bis as contained in the Doha Amendment)[c]*	*KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)[d]*	*CM, GM, RV, WDR*	*FM*
FMRL								220.00
Base year	50 767.16	53 251.60	51 169.74	53 654.17	NA		NA	
1990	50 767.16	53 251.60	51 169.74	53 654.17				
1995	48 353.89	52 188.90	48 619.27	52 454.28				
2000	57 921.44	52 352.21	58 100.04	52 530.81				
2010	51 498.03	54 117.09	51 607.52	54 226.58				
2011	48 608.41	50 028.65	48 716.40	50 136.64				
2012	49 589.13	51 455.52	49 696.24	51 562.63				
2013	50 160.61	52 229.40	50 265.45	52 334.25		143.40	NA	–2 877.37
2014	47 704.95	48 364.10	47 806.11	48 465.26		134.09	NA	–1 611.08
2015	45 630.01	47 815.88	45 728.48	47 914.35		121.56	NA	–3 096.04
2016	46 067.46	48 182.78	46 162.68	48 278.00		127.98	NA	–2 975.10
2017	45 561.38	47 158.96	45 656.97	47 254.55		146.23	NA	–2 902.22

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

[a] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases. 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.

[b] The Party reported indirect CO_2 emissions in CRF table 6.

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

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

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

	CO_2[a]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1990	44 553.05	6 004.19	2 830.13	0.02	116.52	NA, NO	137.01	NA, NO
1995	43 667.73	5 687.38	2 733.30	241.96	17.48	NA, NO	93.23	NA, NO
2000	43 777.90	5 285.45	2 625.76	633.91	49.90	NA, NO	143.79	NA, NO
2010	45 140.40	5 126.30	2 448.06	1 307.87	34.08	NA, NO	147.98	8.45
2011	41 073.40	5 074.64	2 394.97	1 381.14	32.24	NA, NO	159.53	6.22
2012	42 341.28	5 048.84	2 457.56	1 454.53	35.95	NA, NO	208.91	0.36
2013	43 269.42	4 986.80	2 349.74	1 435.64	24.47	NA, NO	252.46	0.09
2014	39 318.95	4 986.57	2 394.84	1 471.74	21.42	NA, NO	258.84	0.40
2015	38 814.21	4 962.34	2 329.76	1 513.60	24.69	NA, NO	255.76	0.49
2016	39 269.65	4 916.57	2 361.89	1 490.86	18.20	NA, NO	207.11	0.51
2017	38 254.76	4 853.20	2 393.35	1 511.70	30.76	NA, NO	196.55	0.54
Per cent change 1990–2017	**–14.1**	**–19.2**	**–15.4**	**6 100 091.4**	**–73.6**	**NA**	**43.5**	**NA**

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

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

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	41 869.70	3 932.46	6 765.55	–2 484.43	1 073.21	13.26
1995	41 896.34	3 146.25	6 522.99	–3 835.00	875.51	13.19
2000	42 198.13	3 302.57	6 184.76	5 569.23	831.25	14.10
2010	43 210.98	4 066.95	6 159.10	–2 619.06	776.11	13.44
2011	39 148.13	4 092.85	6 120.19	–1 420.24	760.97	14.50
2012	40 539.13	4 086.64	6 182.21	–1 866.39	739.45	15.20
2013	41 459.18	4 068.80	6 057.23	–2 068.80	733.40	15.63
2014	37 413.29	4 137.02	6 178.11	–659.15	724.35	12.49
2015	37 078.06	4 008.52	6 097.09	–2 185.87	717.18	13.50
2016	37 467.03	4 000.78	6 092.84	–2 115.32	704.14	13.21

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
2017	36 474.24	3 997.56	6 077.17	–1 597.58	691.89	13.71
Per cent change 1990–2017	**–12. 9**	**1.7**	**–10.2**	**–35.7**	**–35.5**	**3.4**

Note: Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions. Totals include indirect CO_2 emissions reported in CRF table 6.

Table 4

Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year[a]–2017, for Switzerland

(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[b]	*Activities under Article 3, paragraph 3, of the Kyoto Protocol*		*FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol*				
	Land-use change	*AR*	*Deforestation*	*FM*	*CM*	*GM*	*RV*	*WDR*
FMRL				220.00				
Technical correction				–2 710.49				
Base year	NA				NA	NA	NA	NA
2013		–20.07	163.47	–2 877.37	NA	NA	NA	NA
2014		–17.89	151.98	–1 611.08	NA	NA	NA	NA
2015		–19.42	140.98	–3 096.04	NA	NA	NA	NA
2016		–19.18	147.16	–2 975.10	NA	NA	NA	NA
2017		–18.85	165.09	–2 902.22	NA	NA	NA	NA
Per cent change base year–2017					**NA**	**NA**	**NA**	**NA**

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

[a] 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.

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

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

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

Key parameters	*Values*
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: not elected (g) WDR: not elected
Election of activities under Article 3, paragraph 4	None
Election of application of provisions for natural disturbances	No for AR and 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	NA
2. Deforestation	NA
3. FM	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 Switzerland. 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 Switzerland
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
CPR	**325 591 672**	–	–	**325 591 672**
Annex A emissions for 2017	–	–	–	–
CO_2[a]	38 254 757	–	–	38 254 757
CH_4	4 853 202	–	–	4 853 202
N_2O	2 393 351	–	–	2 393 351
HFCs	1 511 700	–	–	1 511 700
PFCs	30 756	–	–	30 756
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	196 547	–	–	196 547
NF_3	536	–	–	536
Total Annex A sources	**47 240 848**	–	–	**47 240 848**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2017	–	–	–	–
AR	–18 850	–	–	–18 850
Deforestation	165 085	–	–	165 085
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2017	–	–	–	–
FM	–2 902 215	–	–	–2 902 215

[a] CO_2 emissions include indirect CO_2 emissions reported in CRF table 6.

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

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2016	–	–	–	–
CO_2[a]	39 269 650	–	–	39 269 650
CH_4	4 916 574	–	–	4 916 574
N_2O	2 361 890	–	–	2 361 890
HFCs	1 490 855	–	–	1 490 855
PFCs	18 197	–	–	18 197
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	207 113	–	–	207 113
NF_3	512	–	–	512
Total Annex A sources	**48 264 791**	–	–	**48 264 791**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2016	–	–	–	–

	Original submission	*Revised estimate*	*Adjustment*	*Final*
AR	–19 180	–	–	–19 180
Deforestation	147 162	–	–	147 162
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2016	–	–	–	–
FM	–2 975 099	–	–	–2 975 099

[a] CO_2 emissions include indirect CO_2 emissions reported in CRF table 6.

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

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2015	–	–	–	–
CO_2[a]	38 814 214	–	–	38 814 214
CH_4	4 962 336	–	–	4 962 336
N_2O	2 329 760	–	–	2 329 760
HFCs	1 513 600	–	–	1 513 600
PFCs	24 694	–	–	24 694
Unspecified mix of HFCs and PFCs	NA, NO	–	–	NA, NO
SF_6	255 757	–	–	255 757
NF_3	487	–	–	487
Total Annex A sources	**47 900 847**	–	–	**47 900 847**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015	–	–	–	–
AR	–19 425	–	–	–19 425
Deforestation	140 982	–	–	140 982
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015	–	–	–	–
FM	–3 096 042	–	–	–3 096 042

[a] CO_2 emissions include indirect CO_2 emissions reported in CRF table 6.

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

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2014	–	–	–	–
CO_2[a]	39 318 954	–	–	39 318 954
CH_4	4 986 569	–	–	4 986 569
N_2O	2 394 845	–	–	2 394 845
HFCs	1 471 743	–	–	1 471 743
PFCs	21 420	–	–	21 420
Unspecified mix of HFCs and PFCs	NA, NO	–	–	NA, NO
SF_6	258 842	–	–	258 842
NF_3	404	–	–	404
Total Annex A sources	**48 452 777**	–	–	**48 452 777**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014	–	–	–	–
AR	–17 891	–	–	–17 891
Deforestation	151 977	–	–	151 977
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014	–	–	–	–

	Original submission	*Revised estimate*	*Adjustment*	*Final*
FM	–1 611 076	–	–	–1 611 076

[a] CO_2 emissions include indirect CO_2 emissions reported in CRF table 6.

Table 5
Information to be included in the compilation and accounting database for 2013 for Switzerland
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2013	–	–	–	–
CO_2[a]	43 269 415	–	–	43 269 415
CH_4	4 986 799	–	–	4 986 799
N_2O	2 349 738	–	–	2 349 738
HFCs	1 435 636	–	–	1 435 636
PFCs	24 475	–	–	24 475
Unspecified mix of HFCs and PFCs	NA, NO	–	–	NA, NO
SF_6	252 457	–	–	252 457
NF_3	95	–	–	95
Total Annex A sources	**52 318 615**	–	–	**52 318 615**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013	–	–	–	–
AR	–20 069	–	–	–20 069
Deforestation	163 470	–	–	163 470
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013	–	–	–	–
FM	–2 877 372	–	–	–2 877 372

[a] CO_2 emissions include indirect CO_2 emissions reported in CRF table 6.

Annex III

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

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

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B. UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2015, 2016 and 2017 annual submissions of Switzerland, contained in documents FCCC/ARR/2015/CHE, FCCC/ARR/2016/CHE and FCCC/ARR/2017/CHE.

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 Switzerland for 2019. Available at https://unfccc.int/sites/default/files/resource/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 are reproduced as received:

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