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Report on the technical review of the fourth biennial report of Switzerland

Developed country Parties were requested by decision 2/CP.17 to submit their fourth biennial report to the secretariat by 1 January 2020. This report presents the results of the technical review of the fourth biennial report of Switzerland, conducted by an expert review team in accordance with the "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". The review took place from 16 to 20 March 2020 remotely.

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Contents

Abbreviations and acronyms

Annex I Party	Party included in Annex I to the Convention
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CHF	Swiss franc(s)
CH_4	methane
CO_2	carbon dioxide
CO_2 Act	Swiss Federal Act on the Reduction of CO_2 Emissions
CO_2 eq	carbon dioxide equivalent
CTF	common tabular format
ERT	expert review team
EU ETS	European Union Emissions Trading System
GDP	gross domestic product
GHG	greenhouse gas
GNI	gross national income
HFC	hydrofluorocarbon
IE	included elsewhere
IPPU	industrial processes and product use
KP2	second commitment period of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NDC	nationally determined contribution
NF_3	nitrogen trifluoride
NMVOC	non-methane volatile organic compound
non-Annex I Party	Party not included in Annex I to the Convention
N_2O	nitrous oxide
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
PaMs	policies and measures
PFC	perfluorocarbon
SF_6	sulfur hexafluoride
UNFCCC reporting guidelines on BRs	"UNFCCC biennial reporting guidelines for developed country Parties"
WAM	'with additional measures'
WEM	'with measures'
WOM	'without measures'

I. Introduction and summary

A. Introduction

1. This is a report on the centralized technical review of the BR4[1] of Switzerland. The review was organized by the secretariat in accordance with the "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", particularly "Part IV: UNFCCC guidelines for the technical review of biennial reports from Parties included in Annex I to the Convention" (annex to decision 13/CP.20).

2. In accordance with the same decision, a draft version of this report was transmitted to the Government of Switzerland, which provided comments that were considered and incorporated with revisions into this final version of the report.

3. The review was conducted together with the review of five other Annex I Parties from 16 to 20 March 2020 remotely[2] by the following team of nominated experts from the UNFCCC roster of experts: Parvana Babayeva (Azerbaijan), Souhila Bouilouta (Algeria), Hakima Chenak (Algeria), Kenel Delusca (Haiti), Ryan Deosaran (Trinidad and Tobago), Craig William Elvidge (New Zealand), Raul Jorge Garrido Vazquez (Cuba), Matej Gasperic (Slovenia), Liviu Gheorghe (Romania), Maria Ana Gonzalez Casartelli (Argentina), Yamikani Idriss (Malawi), Jean Claude Kabamba Lungenyi (Democratic Republic of the Congo), Christopher Manda (Malawi), Tendayi Marowa (Zimbabwe), Naoki Matsuo (Japan), Esther Mertens (Belgium), Detelina Petrova (Bulgaria), Mohan Poudel (Nepal), Janis Rekis (Latvia), Orlando Ernesto Rey Santos (Cuba), Kristina Saarinen (Finland), Mayuresh Sarang (Zimbabwe), Marina Shvangiradze (Georgia) and Robin White (Canada). Mr. Gasperic, Ms. Gonzalez Casartelli, Ms. Petrova, Mr. Rey Santos, Ms. Saarinen and Ms. Shvangiradze were the lead reviewers. The review was coordinated by Hajar Benmazhar, Veronica Colerio, Claudia do Valle Costa, Nalin Srivastava, Sevdalina Todorova and Sina Wartmann (secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the BR4 of Switzerland in accordance with the UNFCCC reporting guidelines on BRs (annex I to decision 2/CP.17).

1. Timeliness

5. The BR4 was submitted on 18 December 2019, before the deadline of 1 January 2020 mandated by decision 2/CP.17. The CTF tables were also submitted on 18 December 2019.

2. Completeness, transparency of reporting and adherence to the reporting guidelines

6. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by Switzerland in its BR4 mostly adheres to the UNFCCC reporting guidelines on BRs.

[1] The BR submission comprises the text of the report and the CTF tables, which are both subject to the technical review.

[2] Owing to the circumstances related to the coronavirus disease 2019, the technical review of the BR submitted by Switzerland had to be conducted remotely.

Table 1
Summary of completeness and transparency of mandatory information reported by Switzerland in its fourth biennial report

Section of BR	*Completeness*	*Transparency*	*Reference to description of recommendation(s)*
GHG emissions and removals	Complete	Transparent	–
Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies	Complete	Transparent	–
Progress in achievement of targets	Complete	Transparent	–
Provision of support to developing country Parties	Mostly complete	Mostly transparent	Issues 1–3 in table 10

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in chapter III below. The assessment of completeness and transparency by the ERT in this table is based only on the "shall" reporting requirements.

II. Technical review of the information reported in the fourth biennial report

A. Information on greenhouse gas emissions and removals related to the quantified economy-wide emission reduction target

1. Technical assessment of the reported information

7. Total GHG emissions[3] excluding emissions and removals from LULUCF decreased by 11.9 per cent between 1990 and 2017, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 10.8 per cent over the same period. Table 2 illustrates the emission trends by sector and by gas for Switzerland. Note that information in this paragraph and table 2 is based on Switzerland's 2019 annual submission, version 1.0, which has not yet been subject to review. All emission data in subsequent chapters are based on Switzerland's BR4 CTF tables unless otherwise noted. The emissions reported in the 2019 annual submission differ from the data reported in CTF table 1 in that they exclude indirect CO_2.

Table 2
Greenhouse gas emissions by sector and by gas for Switzerland for 1990–2017

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2016*	*2017*	*1990–2017*	*2016–2017*	*1990*	*2017*
Sector									
1. Energy	41 826.15	42 181.48	43 202.81	37 460.90	36 468.31	–12.8	–0.9	78.5	77.3
A1. Energy industries	2 519.46	3 171.88	3 846.46	3 379.90	3 298.53	30.9	–1.8	4.7	7.0
A2. Manufacturing industries and construction	6 443.44	5 924.60	5 813.74	4 964.80	4 917.71	23.7	–4.4	12.1	10.4
A3. Transport	14 639.14	15 926.58	16 326.37	15 151.19	14 883.98	1.7	–4.3	27.5	31.6
A4. and A5. Other	17 860.89	16 798.88	16 937.06	13 745.77	13 144.99	–26.4	–8.4	33.5	–27.9
B. Fugitive emissions from fuels	363.21	359.54	279.19	219.24	223.10	–38.6	1.8	0.7	0.5

[3] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF and including indirect CO_2 emissions, unless otherwise specified.

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2016*	*2017*	*1990–2017*	*2016–2017*	*1990*	*2017*
C. CO_2 transport and storage	NO	NO	NO	NO	NO	–	–	–	–
2. IPPU	3 576.49	3 143.33	3 967.97	3 913.87	3 910.08	9.3	–0.1	6.7	8.3
3. Agriculture	6 765.55	6 184.76	6 159.10	6 092.84	6 077.17	–10.2	–0.3	12.7	12.9
4. LULUCF	–2 484.43	5 569.23	–2 619.06	–2 115.32	–1 597.58	–35.7	–24.5	NA	NA
5. Waste	1 071.20	829.65	774.81	702.97	690.76	–35.5	–1.7	2.0	1.5
6. Other[a]	12.22	12.99	12.40	12.20	12.65	3.5	3.7	0.0	0.0
Gas[b]									
CO_2	44 162.47	43 612.24	45 043.25	39 186.55	38 171.74	–13.6	–2.6	82.9	80.9
CH_4	6 004.85	5 286.07	5 126.89	4 917.17	4 853.82	–19.2	–1.3	11.3	10.3
N_2O	2 830.73	2 626.31	2 448.57	2 362.38	2 393.87	–15.4	1.3	5.3	5.1
HFCs	0.02	633.91	1 307.87	1 490.86	1 511.70	75 584.0	1.4	0.0	3.2
PFCs	116.52	49.90	34.08	18.20	30.76	–73.6	69.0	0.2	0.1
SF_6	137.01	143.79	147.98	207.11	196.55	43.5	–5.1	0.3	0.4
NF_3	NA, NO	NA, NO	8.45	0.51	0.54	–	4.6	–	0.0
Total GHG emissions excluding LULUCF	**53 251.60**	**52 352.21**	**54 117.09**	**48 182.78**	**47 158.96**	**–11.4**	**–2.1**	**100.0**	**100.0**
Total GHG emissions including LULUCF	**50 767.16**	**57 921.44**	**51 498.03**	**46 067.46**	**45 561.38**	**–10.3**	**–1.1**	**–**	**–**
Total GHG emissions excluding LULUCF, including indirect CO_2[a]	**53 654.17**	**52 530.81**	**54 226.58**	**48 278.00**	**47 254.55**	**–11.9**	**–2.1**	**–**	**–**
Total GHG emissions including LULUCF, including indirect CO_2	**51 169.74**	**58 100.04**	**51 607.52**	**46 162.68**	**45 656.97**	**–10.8**	**–1.1**	**–**	**–**

Source: GHG emission data: Switzerland's 2019 annual submission, version 1.0.

[a] The total (without LULUCF, including indirect CO_2) reported in this table does not correspond to the emissions relevant to Switzerland's emission reduction target as all direct GHG emissions and indirect CO_2 emissions from sector 6 are included in the CTF tables but are not part of Switzerland's emission reduction target.

8. The decrease in total emissions was driven mainly by measures aimed at reducing fuel use and changes in the fuel mix from fuels with relatively high emission factors (e.g. bituminous coal and residual fuel oil) to fuels with relatively low emission factors (e.g. other fossil fuels, natural gas and biomass). Despite increased heating demand resulting from an increase in the number of apartments and offices, emissions from the energy sectors 1.A.4 (other sectors) and 1.A.5 (other) decreased by 26.4 per cent between 1990 and 2017. Various PaMs for limiting fuelwood demand, such as establishing standards for insulation and providing more efficient combustion equipment for both new and renovated buildings, reinforced the downward trend. Since 2008 there has been a steady reduction in the use of heating and process fuels. For example, in 2017, over 91 per cent of Switzerland's electric power was generated by hydroelectric and nuclear power plants (table 24, Swiss Federal Office of Energy, 2019). In addition, the decline in agricultural activities and livestock farming, which led to reduced fertilizer use, and the establishment of hydroelectric and nuclear power plants also contributed to the downward trend in emissions.

9. The decrease in emissions was offset, to some extent, by the increase in HFC emissions and emissions from the transport sector. HFC emissions increased steadily between 1995 and 2015, sinking for the first time in 2016, and transport sector emissions increased steadily between 1996 and 2007. Since 2008 there has been a steady reduction in GHG emissions from the transport sector. A relevant factor is the reduction in 'tank tourism' – motorists from neighbouring countries buying cheaper fuel in Switzerland – due to the sudden change in the exchange rate between the Swiss franc and the euro in 2014.

10. In brief, Switzerland's national inventory arrangements became operative in 2006 and, as stipulated in article 39 of the second CO_2 Act of 23 December 2011, the Federal Office for the Environment together with the Federal Department of the Environment, Transport,

Energy and Communications are responsible for assessing matters relating to climate protection. Accordingly, the Federal Office for the Environment coordinates Switzerland's national inventory system. The National Inventory System Supervisory Board operates under the Federal Office for the Environment and supervises the GHG inventory process. There have been no changes in these arrangements since the BR3.

2. Assessment of adherence to the reporting guidelines

11. The ERT assessed the information reported in the BR4 of Switzerland and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

B. Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies

1. Technical assessment of the reported information

12. For Switzerland the Convention entered into force on 21 March 1994. Under the Convention Switzerland committed to reducing its GHG emissions by 20 per cent below the base-year (1990) level by 2020. The Party will assess achievement of its target under the Convention by accounting against its quantified emission limitation and reduction commitment under the second commitment period of the Kyoto Protocol. This means that Switzerland's commitment under the Convention will be considered fulfilled if it reaches its target for the second commitment period of the Kyoto Protocol. Switzerland's target under the Kyoto Protocol, which was derived from the Party's 2020 target under the Convention, is to reduce emissions by 15.8 per cent below the 1990 level in 2013–2020.

13. The target includes all GHGs included in 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", namely CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 and NF_3, as well as indirect CO_2. It also includes all Intergovernmental Panel on Climate Change sources and sectors included in the annual GHG inventory, apart from sector 6. The global warming potential values used are from the AR4. In absolute terms and taking into account base-year emissions for the second commitment period of the Kyoto Protocol, which equal 53,706.73 kt CO_2 eq, it means that Switzerland has to maintain average annual emissions in 2013–2020 at the level of 45,221.07 kt CO_2 eq, including accounting for units from market-based mechanisms and contributions from the LULUCF sector.

14. Switzerland will account for LULUCF using an activity-based approach that covers afforestation, reforestation and deforestation for accounting under Article 3, paragraph 3, and forest management under Article 3, paragraph 4, of the Kyoto Protocol. The Party will apply the accounting approaches, including use of the forest management cap, at the end of the commitment period. Specifically, the Party will use gross-net accounting for afforestation, reforestation and deforestation, and net-net accounting against a forest management reference level for forest management.

15. Switzerland reported in its BR4 that it plans to make use of market-based mechanisms to achieve its target (see chap. II.C.2 below). It will use international carbon credits generated from the flexible mechanisms under the Kyoto Protocol to compensate for some of its emissions in 2013–2020. The Party may also use Kyoto Protocol units carried over from the first commitment period.

16. Switzerland has committed to reducing its GHG emissions by 50 per cent by 2030 compared with the 1990 level, corresponding to an average reduction in GHG emissions by 35 per cent for 2021–2030 compared with the 1990 level. A reduction in GHG emissions of 35 per cent compared with the 1990 level is expected by 2025. Switzerland plans to make use of international carbon credits to achieve this target.

2. Assessment of adherence to the reporting guidelines

17. The ERT assessed the information reported in the BR4 of Switzerland and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting

guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

C. Progress made towards achievement of the quantified economy-wide emission reduction target

1. Mitigation actions and their effects

(a) Technical assessment of the reported information

18. Switzerland provided information on its package of PaMs implemented, adopted and planned, by sector and by gas, in order to fulfil its commitments under the Convention. The Party reported on its policy context and legal and institutional arrangements in place for implementing its commitments and monitoring and evaluating the effectiveness of its PaMs.

19. Switzerland provided information on a set of PaMs similar to those previously reported. It indicated that there have been no changes since its previous submission to its institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of progress towards its target.

20. In its reporting on its PaMs, Switzerland provided the estimated emission reduction impacts for most of them. Where estimated impacts were not provided, the Party supplied an explanation specific to each policy or measure. The Party described the different methodologies used to estimate the impacts of its individual or groups of PaMs. Justification for some impacts not being estimated and the approaches used to estimate impacts of PaMs are presented below.

21. Switzerland reported on its self-assessment of compliance with its emission reduction targets and national rules for taking action against non-compliance. It stated that the annual submission of its national GHG inventory is a fundamental process of its self-assessment. Furthermore, article 40 of the CO_2 Act obliges the Swiss Federal Council to periodically evaluate the effectiveness of each individual policy or measure and present its evaluation to the Parliament. The second CO_2 Act does not specify when those periodic evaluations should take place. Article 3 of the CO_2 Ordinance stipulates interim targets for 2015 in the form of limiting increases in GHG emission levels for the building, transport and industry sectors to 78.0, 100.0 and 93.0 per cent, respectively, above the 1990 level. An evaluation of the interim targets, conducted in April 2017, revealed that the transport sector had not met its interim target.

22. Since its BR3, Switzerland has issued new interim targets and evaluation reports on its performance under the national building refurbishment programme (in the 2018 report, cantons reported individually on measures implemented) and the Energy Act. The monitoring report on energy and electricity consumption and energy production from renewable sources and hydropower was published in November 2019. The report revealed that enhanced energy efficiency and use of renewable energy sources continue to evolve as planned but more needs to be done to further restructure the energy system.

23. Switzerland's climate policy is based on the Federal Constitution, in particular article 74 on environmental protection and article 89 on energy policy. The key overarching cross-sectoral policy reported by Switzerland is the CO_2 Act, which defines the objectives, instruments, measures and general rules relating to the implementation of the Swiss climate policy.

24. A CO_2 levy on heating and process fuels has had the most significant mitigation effect (see para. 25 below). Other policies that have delivered significant emission reductions are the building codes of the cantons, amounting to a reduction of 1,760 kt CO_2 eq in 2020, and partial compensation of CO_2 emissions from motor fuel use amounting to a reduction of 1,500 kt CO_2 eq in 2020.

25. Switzerland uses a levy surcharge system on fossil heating and process fuels to incentivize the transition to low-carbon technologies in all sectors. At CHF 96/t CO_2, the CO_2

levy on heating and process fuels has a quantified mitigation impact of 2,000 kt CO_2 eq in 2020, which is greater than the impact of 1,600 kt CO_2 eq reported in the BR3. This increase is due to the rise in levy prices from CHF 72/t CO_2. The current draft of the third CO_2 Act foresees a maximum levy rate of CHF 210/t CO_2. Companies can qualify for an exemption from the levy by establishing binding agreements to reduce their emissions, taking into account the technological potential and economic viability of the proposed measures.

26. Furthermore, the Party has an emissions trading scheme, the aim of which is to achieve GHG emission reductions through market-based mechanisms in emission-intensive industries. The emissions trading scheme of Switzerland has been linked with the EU ETS since 1 January 2020. For 2021–2030 the rate of reduction of the cap (the maximum amount of emission allowances per year) will be increased from 1.74 to 2.2 per cent/year. This is expected to increase the mitigation impact by an additional 1 Mt CO_2 by 2030. Large GHG emission-intensive companies are required to participate in the emissions trading scheme, based on a cap-and-trade principle, enabling the cost-effective achievement of climate protection targets.

27. Switzerland highlighted the mitigation actions that are under development, such as the third CO_2 Act, which is expected to come into force in 2021 and which will provide the overarching legal framework for strengthening a number of PaMs to be implemented in 2021–2030. Furthermore, with regard to the transport sector, the linking of Switzerland's emissions trading scheme with the EU ETS obliged aircraft operators that carry out domestic flights in Switzerland or flights from Switzerland to the European Economic Area to participate in the emissions trading scheme. In addition, the planned Carbon Offsetting and Reduction Scheme for International Aviation intends to achieve carbon-neutral growth of international aviation from 2020 onward.

28. Another measure relating to aviation is the International Civil Aviation Organization CO_2 emission standards for aircraft. In Switzerland, the standard will be applicable to Swiss-registered new aircraft type designs from 2020. It will also apply to relevant aircraft type designs already in production as of 2023; any such aircraft that do not meet the standard by 2028 will no longer be able to be produced until their designs are sufficiently modified.

29. Among the PaMs that provide a foundation for significant strengthening of mitigation impacts are the emissions trading scheme through its linkage with the EU ETS, the reform of the national buildings refurbishment programme, the building codes of the cantons and the partial compensation of CO_2 emissions from motor fuel use. The national buildings refurbishment programme will be strengthened through the increased availability of funds as a result of the revision of the Energy Act (2017). As part of the third CO_2 Act, the building codes of the cantons will be strengthened through the introduction of new emission standards at the federal level. The partial compensation programme requires fossil fuel importers to offset the CO_2 emissions from motor fuel use through investments in domestic emission reduction projects. Table 3 provides a summary of the reported information on the PaMs of Switzerland.

Table 3
Summary of information on policies and measures reported by Switzerland

Sector	*Key PaMs*[a]	*Estimate of mitigation impact in 2020 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	CO_2 Act (2002)	IE[a]
	Second CO_2 Act (2013)	IE[a]
	Third CO_2 Act (2021)	IE[a]
	CO_2 levy on heating and process fuels	2 000.00
	Emissions trading scheme	800.00
	Negotiated reduction commitments with companies (for exemption from the CO_2 levy)	400.00
Energy	Building codes of cantons	1 760.00
Energy efficiency	National buildings refurbishment programme	1 120.00

Sector	*Key PaMs*[a]	*Estimate of mitigation impact in 2020 (kt CO_2 eq)*
Transport	Partial compensation of CO_2 emissions from motor fuel use	1 500.00
	Mineral oil tax reduction on biofuels and natural gas	220.00
	CO_2 emission regulation for newly registered vehicles	210.00
IPPU	Provisions relating to substances stable in the atmosphere (HFCs, PFCs, SF_6, NF_3)[b]	1 158.00
	NMVOC incentive fee	380.00
Agriculture	Proof of ecological performance to receive direct payments	700.00
	Climate Strategy for Agriculture	Not estimated
	Agricultural Policy 2014–2017	200.00
LULUCF	Measures under the Forestry Policy 2020[c]	1 200.00
Waste	Ban on landfilling of combustible waste	177.00

Note: The estimates of mitigation impact are estimates of emissions of CO_2 eq avoided in a given year as a result of the implementation of mitigation actions.

[a] The impacts of the CO_2 Acts are reported separately for each individual measure under each Act.

[b] Includes the ordinance on air pollution control.

[c] Refers to implementation of the Forest Act and the Wood Action Plan.

30. Switzerland exempts energy-intensive companies from the electricity network surcharge under the Energy Act (either through a full or partial refund of the surcharge) if they commit to increasing their energy efficiency in a target agreement. Such an agreement must follow the guidelines set by the Government and be developed in collaboration with two specialized organizations. The impact of the measure has not been estimated as the total number of companies participating has not been fully determined. During the review, Switzerland clarified that, as of 2018, 256 companies had concluded a target agreement, of which 169 had claimed a reimbursement, with absolute savings of 1,510 GWh. The ERT noted that it would be helpful if Switzerland provided the energy efficiency target outcomes and, on the basis of those outcomes, calculated an expected mitigation impact.

31. Furthermore, the transport sector did not achieve its interim target for 2015 (see para. 21 above) and is not on track to contribute its share to the achievement of Switzerland's emission reduction target by 2020. The Party clarified that no sanction mechanisms are foreseen under the CO_2 Act in response to a missed interim target for 2015; however, the current trends in the transport sector are being taken into account in crafting the third CO_2 Act, which will potentially lead to stronger PaMs being implemented after 2020.

(b) Policies and measures in the energy sector

32. **Energy efficiency.** The SwissEnergy programme is a major policy instrument for engaging cantons, municipalities and industries in energy efficiency efforts. It also seeks to raise awareness and promote energy efficiency among environmental and consumer organizations. In addition, the CO_2 levy on heating and process fuels promotes energy efficiency, use of less CO_2 intensive energy sources and reduced use of such fuels. Since January 2018 the levy has amounted to CHF 96/t CO_2. Two thirds of the revenue is returned to households and businesses and one third is redistributed to the national buildings refurbishment programme and a technology fund granting loan guarantees to low-emission technology business initiatives. Lastly, exemption from the electricity network surcharge incentivizes energy-intensive companies to enhance their energy efficiency through target agreements.

33. **Energy supply and renewables.** Switzerland decided to progressively phase out use of nuclear energy and further optimize the national energy system through its Energy Strategy 2050. In 2019, nuclear power generated 35 per cent of Switzerland's energy, which will need

to be replaced by other sources of low-carbon power generation. The aim of the Energy Strategy 2050 is to increase energy savings by promoting best practices for appliance use, energy labels and efficiency bonuses, and by raising public awareness (e.g. through the SwissEnergy programme). The Strategy also foresees an expansion of hydropower and new renewable energy sources and storage mechanisms through smart grids and transmission grid points to connect consumers.

34. **Residential and commercial sectors.** The aim of the national buildings refurbishment programme is to reduce the energy consumption of existing private and public buildings, while the building codes of the cantons provide stringent energy consumption standards for new buildings at the canton level. The planned third CO_2 Act foresees, unless emissions from buildings decrease by 50 per cent compared with the 1990 level by 2026–2027 as a result of the measures at the canton level, the prescription of emission standards by the national Government. The estimated impact mostly results from insulation requirements for refurbishment and new construction. The national buildings refurbishment programme functions as a fund that receives one third of the revenue from the CO_2 levy on heating and process fuels. The maximum amount earmarked for the programme amounts to CHF 300 million to 450 million annually, with average costs of CHF 64 per t CO_2 reduced. The mitigation impact of the national buildings refurbishment programme was calculated using a model that takes into account the investments costs and the CO_2 reduction resulting from each measure.

35. **Transport sector.** The assessment of the interim targets for 2015 indicated that the transport sector was not on track. However, while emissions from the transport sector are currently still above the 1990 level, the decreasing trend that started in 2008 is expected to continue according to the latest projections. At the same time, transport volumes are still undergoing significant growth. The sustainable management of this growth is the major challenge and focus of most policies concerning this sector. Switzerland has adopted the goal of ensuring that 15 per cent of newly manufactured cars are electric (under the 2022 road map on electric mobility) and will focus on spatial planning and promoting sustainable transport through measures such as strengthening the train service network, including reinstating a night service. The financing is ensured through a rail infrastructure fund.

36. Switzerland is also focusing on infrastructure that promotes public and non-motorized transport in suburban regions and conurbations (through the Agglomeration Programme) and Alpine road-to-rail traffic. Such efforts are reflected in the CO_2 emission regulation for newly registered vehicles and the energy label for new motor vehicles, and the heavy vehicle charge, which have a mitigation impact of 210 and 140 kt CO_2 in 2020, respectively. In its CO_2 Act, Switzerland established CO_2 emission standards for newly registered vehicles, with a target of 130 g CO_2/km for 2012–2019 for passenger cars. As part of the Energy Strategy 2050, the targets were strengthened to 95 g CO_2/km for passenger cars and 147 g CO_2/km for light commercial vehicles to be reached by 2020. In 2018, average emission levels per km reached 138 g CO_2/km (compared with 135 g CO_2/km in 2015), which is slightly higher than the target for 2012–2019 of 130 g CO_2/km. Car importers that did not meet the target paid penalties totalling CHF 31.7 million in 2018.

37. The surcharges on imported fuels enable domestic offset programmes to invest in sustainable projects, focusing on, among other areas, fuel switch renewable energy, transport (e.g. shifting transport of goods from road to rail transport, biofuel use), avoidance of emissions of CH_4, N_2O and fluorinated gases, and biological sequestration in wood products. The compensation for CO_2 emissions from motor fuel use has a large mitigation impact, which reached 1,500 kt CO_2 in 2020. This corresponds to an offset of 10 per cent of the total emissions from fuel imported in 2020. After 2020, the impact will increase depending on the provisions of the third CO_2 Act. The currently discussed version plans raising the share to be compensated to up to 90 per cent of total emissions from motor fuel use. Fifteen per cent of total emissions from motor fuel use need to be offset through domestic mitigation actions.

38. Switzerland's domestic aviation sector is small relative to its international aviation sector, and its actions are therefore focused on the latter. The average per passenger CO_2 emissions decreased by 42 per cent between 1990 and 2015. Switzerland is focusing on fleet renewal and efficiency improvements. All measures in this sector are reported in the BR4 as planned, and a mitigation impact remains to be estimated for all of them.

39. **Industrial sector.** Most industrial sector emissions are covered by the CO_2 Act and addressed through the other cross-cutting measures described above (such as the emissions trading scheme). Industrial companies with intensive electricity consumption can individually negotiate target agreements and thus be exempt from paying electricity surcharges. Other measures addressing the sector include the CO_2 levy on heating and process fuels and the negotiated binding agreements to set energy efficiency targets described in paragraph 24 above.

(c) Policies and measures in other sectors

40. **Industrial processes.** Other measures targeting emissions from the industrial processes sector not included in the CO_2 Act concern emissions of fluorinated gases and precursor gases, such as NMVOCs.

41. The most important measure is contained in annex 1.5 to the ordinance on chemical risk reduction, which sets out the provisions relating to substances stable in the atmosphere (HFCs, PFCs, SF_6 and NF_3) and applies to stationary sources, such as refrigerants, aerosol dispensers, plastic foams, solvents, extinguishing agents and electrical equipment (a source of SF_6). The mitigation impact is calculated separately for each pollutant. The dominant source of emissions is refrigerants, which account for 80 per cent of all such emissions.

42. In 2019, provisions were adopted to comply with the Kigali Amendment to the Montreal Protocol, in particular a measure to develop a licensing system to regulate the import and export of fluorinated gases, additional restrictions on servicing stationary equipment with refrigerants and bans on appliances that use specific types of fluorinated gases. As a result of the additional restrictions, the total estimated mitigation impact of all measures addressing fluorinated GHGs increased from 895 kt CO_2 eq (as reported in the BR3) to 1,158 kt CO_2 eq. Switzerland plans to further phase down use of HFCs to 15 per cent below the baseline level by 2036 through updates to the ordinance as technologically improved alternatives to HFCs become available.

43. In order to reduce NMVOC emissions, measures are in place to control pollution from stationary sources (through the ordinance on air pollution control) and reduce the use of NMVOCs through an incentive fee, a market-based instrument that imposes a surcharge of CHF 3/kg NMVOCs emitted since 2003. The NMVOC incentive fee is set out in the ordinance on the incentive tax on volatile organic compounds, which contains emission limits for NMVOCs for stationary installations. Together the incentive fee and implementation of the ordinance on air pollution control produced a decrease in emissions of 380 kt CO_2 in 2020.

44. **Agriculture.** According to the climate strategy for the agriculture sector, GHG emissions are to be reduced by at least one third by 2050 (compared with the 1990 level) through technical and organizational measures. Further emission reductions should be achieved by changing production structures and consumption patterns. None of the impacts of the strategy were quantified (i.e. no estimates of emission reductions were provided), as most of the related measures are aimed at transferring and exchanging knowledge. The Agricultural Policy 2014–2017, which was renewed for 2018–2021, involved the establishment of a direct payment system. This replaced the traditional subsidy system for livestock with direct payments for other activities, such as organic farming, grassland-based ruminant production, precise application of fertilizer, conservative soil cultivation by differentiating feeding programmes for pigs by age and nutrition need, and reduced use of plant protection agents for vines and sugar beet.

45. Switzerland also instituted a requirement for producers to provide proof of ecological performance in order to receive direct payments. As a result of measures implemented since 1990, the total number of cattle decreased by 14 per cent and the total commercial fertilizer consumption decreased by 23 per cent between 1990 and 2000. With regard to the requirement for proof of ecological performance, Switzerland launched a subsidy programme for a more efficient use of natural resources; by 2015, 24 bottom-up projects had been initiated, half of which had been completed. Two thirds of the projects concern the reduction of ammonia emissions. In 2016, two projects related to agricultural GHG emission reduction were launched; their collective emission reduction potential is estimated to be between 10 and 20 per cent of total emissions from Swiss farms. Projects implemented later include a

project on the use of humus (2017), a project on efficient nitrogen use (2018) and a project on the use of organic soils (2019). Since some of these projects have not been completed, an estimate of the potential mitigation impact was not calculated for the BR4.

46. **LULUCF.** With regard to the LULUCF sector, Switzerland implements its Forest Act, which envisions sustainable forest management and forest area conservation in the country. The mitigation impact of the Forest Act is currently not estimated; however, in future it will be quantified as part of Switzerland forest reference level. Switzerland's emphasis on harvested wood products is evident in the Wood Action Plan, which has been extended until 2020. The aim of the Wood Action Plan is to implement the Wood Resource Policy, which focuses on three areas: optimized cascade use, climate-appropriate building and refurbishment, and communication and knowledge transfer and cooperation. The mitigation impact could not be estimated for the individual measure, but is included in the estimation of the impact of the Forestry Policy 2020.

47. The aim of the Forestry Policy 2020 is to protect forests through the transition to adaptive forest management practices, such as the transition from older to younger forests and changes in species composition, including combating invasive species in the context of climate change solutions. Measures under the Forestry Policy 2020 seek to ensure sustainable forest management resilient to climate change while fostering innovation in the forestry and timber industry. Targets include increasing the consumption of sawn timber and other timber products by 20 per cent by 2020 (compared with the 2006 level) while achieving an additional reduction in emissions of 1,200 kt CO_2 eq by 2020 (compared with the 1990 level) through substituting wood for other building materials. This would also achieve equilibrium between the forest sink, wood use and the above-mentioned substitution in the long term. The mitigation impact was calculated on the basis of the use of substitute materials in the energy, building and housing, and industrial processes sectors. Switzerland confirmed during the review that the removals from wood products are only accounted for in the LULUCF sector and that the effect of substituting wood for other building products is accounted for in the energy and building sectors.

48. **Waste management.** Since 2000, Switzerland has had in place a regulatory measure that prohibits landfilling of combustible waste. The mitigation impact of this measure was calculated on the basis of CH_4 emissions from landfilling avoided under the WEM scenario, since in Switzerland all combustible solid waste is incinerated and used to generate heat and electricity. Since 2016, a secondary measure has been in place under the ordinance on the avoidance and management of waste, the aim of which is to increase the energy efficiency of existing incineration plants by imposing a mandatory minimum energy recovery rate of 55 per cent of the energetic content of incinerated waste by 2026. A conservative estimate of the mitigation impact of the measure is 28 kt CO_2 eq by 2020; however, it is expected that the impact will increase by 2026. To avoid emissions from the incineration of waste, Switzerland has a strategy in place for recycling waste and avoiding incineration, with 53 per cent of municipal waste being recycled in 2015.

(d) Response measures

49. Switzerland reported on its assessment of the economic and social consequences of its response measures. The Party presented several initiatives aimed at minimizing adverse impacts. These include:

(a) Progressively reducing or phasing out market imperfections, fiscal incentives, tax and duty exemptions, and subsidies for all GHG-emitting sectors, taking into account the need for energy price reforms to reflect market prices and externalities;

(b) Removing subsidies associated with the use of environmentally unsound and unsafe technologies;

(c) Cooperating in the technological development of non-energy use of fossil fuels and supporting developing country Parties to this end;

(d) Cooperating in the development, diffusion and transfer of advanced fossil fuel technologies that emit less GHGs, and/or technologies relating to fossil fuels that capture and

store GHGs, and encouraging their wider use, and facilitating the participation of the least developed countries and other non-Annex I Parties in this effort;

(e) Strengthening the capacity of developing country Parties to improve efficiency in upstream and downstream activities relating to fossil fuels, taking into consideration the need to improve the environmental efficiency of such activities;

(f) Assisting developing country Parties that are highly dependent on the export and consumption of fossil fuels in diversifying their economies.

(e) Assessment of adherence to the reporting guidelines

50. The ERT assessed the information reported in the BR4 of Switzerland and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

2. Estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry

(a) Technical assessment of the reported information

51. For 2016, Switzerland reported in CTF table 4 annual total GHG emissions excluding LULUCF of 48,264.79 kt CO_2 eq, which is 10.1 per cent below the 1990 level.

52. For 2017, Switzerland reported in CTF table 4 annual total GHG emissions excluding LULUCF of 47,240.85 kt CO_2 eq, which is 12.0 per cent below the 1990 level.

53. Switzerland reported that it intends to use units from market-based mechanisms under the Kyoto Protocol. It reported in CTF tables 4 and 4(b) that it did not use any units from market-based mechanisms in 2016 or 2017 and that it will account for the contributions from market-based mechanisms (including carry-over units) at the end of the commitment period.

54. On its use of units from LULUCF activities, Switzerland reported in CTF tables 4 and 4(a) that in 2016 and 2017 it used units equivalent to 356.63 and 265.49 kt CO_2 eq, respectively, to offset 0.7 and 0.6 per cent of its total GHG emissions, respectively. Table 4 illustrates Switzerland's total GHG emissions, the contribution of LULUCF and the use of units from market-based mechanisms to achieve its target.

Table 4
Summary of information on the use of units from market-based mechanisms and land use, land-use change and forestry by Switzerland to achieve its target

Year	*Emissions excluding LULUCF (kt CO_2 eq)*	*Contribution of LULUCF (kt CO_2 eq)*[a]	*Use of units from market-based mechanisms (kt CO_2 eq)*[b]	*Net emissions including LULUCF and market-based mechanisms (kt CO_2 eq)*
1990 (base year)	53 706.73	NA	NA	NA
2010	54 213.14	NA	NA	NA
2011	50 122.13	NA	NA	NA
2012	51 547.43	NA	NA	NA
2013	52 318.61	–243.48	IE	52 075.13
2014	48 452.78	1 013.50	IE	49 466.28
2015	47 900.85	–483.99	IE	47 416.86
2016	48 264.79	–356.63	IE	47 908.16
2017	47 240.85	–265.49	IE	46 975.36
2018	NA	NA	7 736.39	NA
2020 target[c]	NA	NA	NA	42 965.38

Sources: Switzerland's BR4 and CTF tables 1, 2(a), 4, 4(a)I, 4(a)II, 4(b) and 6(a).

[a] Emissions and removals from the LULUCF sector are accounted for using an activity-based approach.

[b] Switzerland will account for contributions from market-based mechanisms (including carry-over units) at the end of the commitment period; therefore, no annual numbers can be provided. However, Switzerland reported the amount of units from market-based mechanisms in the Party holding accounts in the national registry at the end of 2018 as a

provisional estimate. Consequently, the contributions from market-based mechanisms for the preceding years are included in the provisional estimate for 2018 and, thus, reported as "IE".

[c] Switzerland will assess the fulfilment of the quantified economy-wide emission reduction target under the Convention by accounting against its quantified emission limitation or reduction commitment under the second commitment period of the Kyoto Protocol.

55. In assessing the Party's progress towards achieving the 2020 target, the ERT noted that Switzerland's emission reduction target under the Convention is 20 per cent below the 1990 level. The ERT also noted that the Party will assess the achievement of its target under the Convention by accounting against its quantified economy-wide emission limitation and reduction commitment under the second commitment period of the Kyoto Protocol (see para. 13 above). Switzerland's target under the Kyoto Protocol is to reduce emissions by 15.8 per cent below the 1990 level in 2013–2020, corresponding to mean annual emissions of 45,221.07 kt CO_2 eq, including accounting for units from market-based mechanisms and contributions from the LULUCF sector. Over 2013–2017 (i.e. the first five years of the second commitment period of the Kyoto Protocol), Switzerland's mean annual emissions (not yet including units from market-based mechanisms and contributions from the LULUCF sector) amounted to 48,835.58 kt CO_2 eq. Over the same period, provisional estimates for the contribution of LULUCF using an activity-based approach were at an annual mean of –67.22 kt CO_2 eq.

56. Switzerland reported that it will account for contributions from market-based mechanisms at the end of the commitment period; therefore, no annual numbers were provided in the BR4. The Party reported the amount of assigned amount units and certified emission reductions held in the Party holding accounts in the national registry at the end of 2018 as a provisional estimate. Consequently, the contributions from market-based mechanisms for the preceding years were included in the provisional estimate for 2018 and reported as "IE". The values reported for 2018 included the number of units in the Party holding accounts at the end of 2018 (1,941,872 certified emission reduction units), the number of units in the previous period surplus reserve account (5,794,523 assigned amount units) and in the retirement account for the second commitment period (no certificates have been retired so far).

57. The ERT noted that Switzerland faces challenges in implementing mitigation actions that will deliver the emission reductions needed to make sufficient progress towards its target and may face challenges in achieving its target under the Convention without using market-based mechanisms. The Party plans to use market-based mechanisms to reach its target.

(b) Assessment of adherence to the reporting guidelines

58. The ERT assessed the information reported in the BR4 of Switzerland and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

3. Projections overview, methodology and results

(a) Technical assessment of the reported information

59. Switzerland reported updated projections for 2020, 2025, 2030 and 2035 relative to actual GHG inventory data for 2017 under the WEM scenario. The WEM scenario reported by Switzerland includes PaMs implemented and adopted until 2017.

60. In addition to the WEM scenario, Switzerland reported the WAM and WOM scenarios. The WAM scenario includes planned PaMs, while the WOM scenario excludes all PaMs implemented, adopted or planned after 1990. Switzerland provided a definition of its scenarios, explaining that its WEM scenario includes policies such as those specified in the second CO_2 Act (which entered into force in 2013), while its WAM scenario includes those anticipated in the third CO_2 Act (currently under discussion by the Parliament). In addition, Switzerland listed the key PaMs considered, by sector, under each scenario, and included further explanation in the text of the BR4 how each measure had been included in each of the scenarios.

61. The definition of the scenarios indicates that they were prepared in accordance with the UNFCCC reporting guidelines on BRs. The starting (bifurcation) point is generally 1990 for the WOM scenario and 2017 for the WEM and WAM scenarios (see figure 1). However, this is not the case for all measures. For example, the bifurcation point of the WEM and WOM scenarios is 2011 for the agriculture sector and 2017 for the LULUCF sector, rather than 1990. The ERT noted that applying a unique (consistent) bifurcation point for all measures in each sector would facilitate understanding and assessment of the results of the scenario projections. The ERT also noted that further analysis to specifically assess only the effects of the second CO_2 Act (creating another WOM scenario that begins in 2013 rather than including all measures since 1990) may provide useful insights on the latest efforts and inform climate policymaking.

62. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case) as well as NF_3 for 1990–2035 for the WOM scenario and 2017–2035 for the WEM and WAM scenarios. The projections are also provided in an aggregated format for each sector and for a Party total using global warming potential values from the AR4. Switzerland reported on factors and activities affecting emissions for each sector.

63. Switzerland reported emission projections for indirect GHGs emitted from the energy, IPPU, agriculture and waste sectors, such as carbon monoxide and NMVOCs, while projections of indirect CO_2 emitted from the sector other, such as sulfur dioxide and nitrogen oxides, were not provided since these are outside the scope of Switzerland's 2020 emission reduction target (although they are included in the historical inventory). The excluded sector other covers emissions from fire damage in buildings and motor vehicles, which account for around 0.03 per cent of the Party's total GHG emissions.

64. Emission projections related to fuel sold to ships and aircrafts engaged in international transport were reported separately and were not included in the totals.

(b) Methodology, assumptions and changes since the previous submission

65. The methodology used for the preparation of the projections is mostly the same as that used for the preparation of the emission projections for the BR3. Switzerland reported supporting information further explaining the methodology and the changes made since the BR3. Key changes originate from differences in scenarios (e.g. new legislative developments), changes to the starting year (from 2015 to 2017) and an extension of the time frame covered through to 2035. These changes are clearly presented in the BR4. The resulting differences in estimated emissions compared with those reported in the previous submission are not significant: for 2030, estimated emissions are 0.6 per cent lower for the WEM scenario, 0.5 per cent lower for the WOM scenario and 0.1 per cent higher for the WAM scenario.

66. The ERT noted that significant changes were reported in the projections for international transport, which were calculated separately from the total (these were 21.1 per cent higher for 2020 and 36.4 per cent higher for 2030 than in the previous submission for the WEM scenario), based on an assumption of a much greater demand on the aviation sector.

67. The methodology that Switzerland used to calculate its GHG projections is based on a package of sectoral models for energy, IPPU, agriculture, LULUCF, waste and indirect CO_2, and international transport. For non-energy sectors, bottom-up estimation (for the IPPU, agriculture and waste sectors and international transport) and an empirical model (for LULUCF) were applied, while for energy a general equilibrium model covering the whole economy was used. For transport, a road traffic model was used to provide inputs to the general equilibrium model for energy. A general equilibrium model is suitable for comprehensive estimation, including of indirect effects, such as the effects stemming from interactions between PaMs, rebound effects and spill-over effects. Therefore, the ERT noted that analysing these effects in addition to evaluating the aggregated effects might provide additional relevant insights and feedback on the policymaking process. Causal relations need to be carefully assessed, additionally comparing with bottom-up analyses. Such analyses should be described for key actions in future BRs.

68. Furthermore, the ERT noted that Switzerland's economy is closely linked to and influenced by its neighbouring countries (e.g. through power trade and tank (fuel) tourism) and that it might consider potentially including links with its neighbours in the general equilibrium model in the longer term.

69. To prepare its projections, Switzerland relied on key underlying assumptions relating to population, GDP, crude oil and natural gas import prices, area of floor space to be heated, heating degree days, passenger transport and vehicle fleet numbers. The assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections. These external parameters reflect the influence of the building sector (winter temperature, floor space and gas price) and the transport sector (transport demand, vehicle number and oil price) – the two dominant sectors in Switzerland – as well as the overall drivers of emissions (population and GDP growth). Drivers of GHG emission increases (2017–2030) are growth in population (by 0.9 per cent/year on average), GDP (by 1.4 per cent/year), floor space (by 1.1 per cent/year) and transport demand (by 0.6 per cent/year), while negative drivers are the increase in energy prices (by 5.5 per cent/year for crude oil and 3.5 per cent/year for natural gas) and the decrease in heating degree days (by 0.4 per cent/year owing to the warming climate).

70. Switzerland provided information on sensitivity analyses. Sensitivity analyses were conducted for some of the important external assumptions, such as GDP, and oil and gas prices. Sensitivity analyses were also conducted on autonomous technological progress on energy efficiency and the sum of mitigation impacts of PaMs not related to carbon-pricing. The analyses show that 1 per cent increases in GDP, autonomous energy efficiency improvement and energy prices led to changes in CO_2 emissions of 1.14, –0.16 and –0.28 per cent, respectively.

71. During the review, Switzerland clarified that the assumed sensitivity to energy prices is consistent with observed changes. The ERT was informed that Switzerland uses sensitivity analyses only to check the behaviour of the models applied. However, the analyses can provide useful insights on adjusting climate policy to hedge against the risk of unexpected variation in assumptions in the future, since the target is set on an absolute value of emission reductions independent of such assumptions. In this regard, the ERT noted the usefulness of including heating degree days in sensitivity analyses because fluctuations in Swiss GHG emissions are primarily affected by winter temperatures.

(c) Results of projections

72. The projected emission levels under different scenarios and information on the quantified economy-wide emission reduction target are presented in table 5 and figure 1.

Table 5
Summary of greenhouse gas emission projections for Switzerland

	GHG emissions (kt CO_2 eq per year)	*Change in relation to base-year level (%)*	*Change in relation to 1990 level (%)*
Quantified economy-wide emission reduction target under the Convention[a]	42 965.38	–20.0	
Inventory data (1990)[b]	53 640.92	–0.1	–0.0
Kyoto Protocol base-year data[c]	53 706.73	–0.0	0.1
Inventory data 2017	47 240.85	–12.0	–11.9
WOM projections for 2020	55 993.26	4.4	4.4
WEM projections for 2020	45 813.26	–14.7	–14.6
WAM projections for 2020	45 711.72	–14.9	–14.8
WOM projections for 2030	53 568.40	–0.3	–0.1
WEM projections for 2030	41 535.49	–22.7	–22.6
WAM projections for 2030	35 048.74	–34.7	–34.7

Source: Switzerland's BR4 and CTF tables 4 and 6.
Note: The projections for 2020 and 2030 are for GHG emissions excluding LULUCF and including indirect CO_2 (for the energy, IPPU, agriculture and waste sectors).

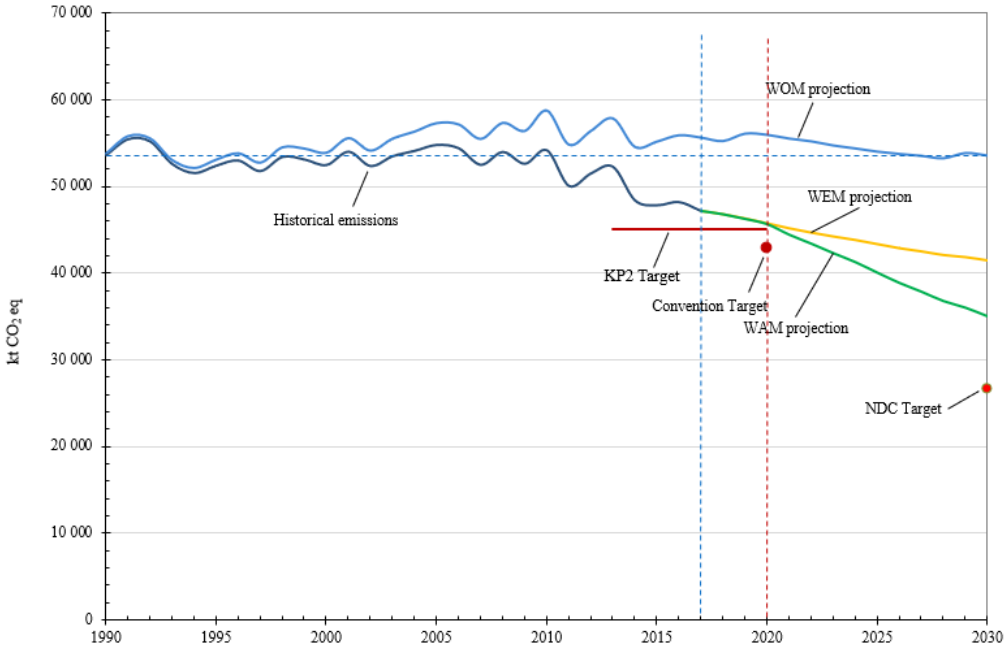
[a] Switzerland plans to meet its Convention target consistently with its commitment under the second commitment period of the Kyoto Protocol in terms of its targets (Switzerland's target decreases linearly by 1.2 per cent annually from –8 per cent of the 1990 level in 2010 to –20 per cent in 2020), scope of GHGs and sectors covered, the inclusion of international credits and the accounting methodologies applied, especially for LULUCF.

[b] The latest inventory data (CTF table 1) are slightly different from those shown in CTF table 6 (shown above) because CTF table 6 data do not include emissions (including indirect CO_2) under the sector other (sector 6) in order to maintain consistency with the target coverage.

[c] The base-year emissions do not include LULUCF and are fixed for the purposes of the second commitment period of the Kyoto Protocol (see document FCCC/IRR/2016/CHE, table 6).

Figure 1

Greenhouse gas emission projections reported by Switzerland



Source: Switzerland's BR4 and CTF table 6 (total GHG emissions excluding LULUCF and including indirect CO_2, noting that the targets are set for including LULUCF values).

73. Switzerland's total GHG emissions excluding LULUCF and including indirect CO_2 (for the energy, IPPU, agriculture and waste sectors) are projected to be 45,813.26 and 41,535.49 kt CO_2 eq in 2020 and 2030, respectively, under the WEM scenario, which is a decrease of 14.6 and 22.6 per cent, respectively, below the 1990 level. Under the WAM scenario, emissions in 2020 and 2030, amounting to around 45,711.72 and 35,048.74 kt CO_2 eq, respectively, are projected to be lower than those in 1990 by 14.8 and 34.7 per cent, respectively.

74. Switzerland's economy-wide target under the Convention is to reduce its total emissions by 20 per cent below the 1990 level by 2020 (see para. 12 above and table 5) including LULUCF (using activity-based accounting). The Party will assess achievement of its target under the Convention by accounting against its quantified emission limitation and reduction commitment under the second commitment period of the Kyoto Protocol. In absolute terms and taking into account base-year emissions for the second commitment period of the Kyoto Protocol, which equal 53,706.73 kt CO_2 eq, it means that Switzerland has to maintain average annual emissions in 2013–2020 at the level of 45,221.07 kt CO_2 eq, including accounting for units from market-based mechanisms and contributions from the LULUCF sector. The 2020 projections suggest that Switzerland may face challenges in achieving its 2020 target under the Convention without using flexible mechanisms.

75. However, careful analysis of the progress tracked using the results of the projections will be required for the following reasons:

(a) The base-year level does not include LULUCF;

(b) The 2020 target level is set for emissions including LULUCF (using activity-based accounting);

(c) Land-based accounting for LULUCF is used for the historical GHG inventory (including 2017);

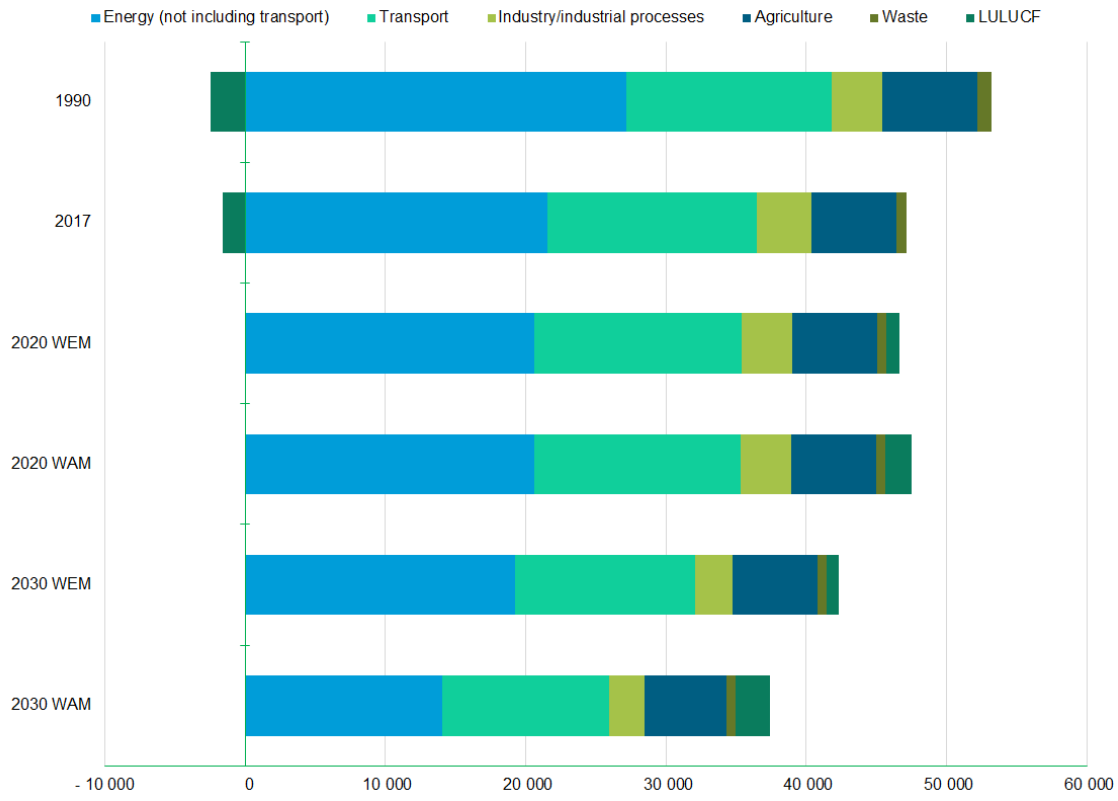
(d) The projections including LULUCF were calculated using land-based accounting;

(e) LULUCF projections may require significant technical modifications (as described in the BR4).

76. Switzerland presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in figure 2 and table 6. The level of the base-year emissions was determined excluding LULUCF for the Convention and Kyoto Protocol targets, while the contribution of LULUCF (net removals) is shown in figure 2. On the other hand, under both the WEM and the WAM scenario, LULUCF contributes considerable net positive emissions (see figure 2). Switzerland explained that this is owing to its forestry policy to increase the harvesting rate in order to strengthen sustainable forest management (and the larger carbon stock in the long term), while the calculation method should be modified technically so that it is consistent with that used for the GHG inventory.

77. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy sector excluding transport, amounting to projected reductions of 6,607.79 kt CO_2 eq (24.3 per cent) for 1990–2020 and 7,955.87 kt CO_2 eq (29.3 per cent) for 1990–2030. The transport sector is projected to show slight increases in emissions in 2020 compared with the 1990 level of 192.71 kt CO_2 eq (1.3 per cent) with slight reductions compared with the 1990 level projected for 2030 of 1,775.17 kt CO_2 eq (2.1 per cent). The IPPU sector is projected to show slight increases in emissions in 2020 compared with the 1990 level of 34.4 kt CO_2 eq (1.0 per cent) with, however, reductions in emissions compared with the 1990 level projected for 2030 of 901.25 kt CO_2 eq (25.2 per cent).

Figure 2
Greenhouse gas emission projections for Switzerland presented by sector



Source: Switzerland's BR4 CTF table 6.

Table 6
Summary of greenhouse gas emission projections for Switzerland presented by sector

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Sector	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Energy (not including transport)	27 187.01	20 579.22	20 600.41	19 231.14	14 026.76	–24.3	–24.2	–29.3	–48.4
Transport	14 639.14	14 831.85	14 712.97	12 863.97	11 910.18	1.3	0.5	–2.1	–18.6
Industry/industrial processes	3 576.49	3 610.89	3 607.04	2 675.24	2 543.21	1.0	0.9	–25.2	–28.9
Agriculture	6 765.55	6 038.11	6 038.11	6 018.51	5 821.86	–10.8	–10.8	–11.0	–13.9
LULUCF	–2 484.43	928.60	1 878.60	878.60	2 428.60	137.4	175.6	135.4	197.8
Waste	1 071.20	658.48	658.48	650.47	650.47	–38.5	–38.5	–39.3	–39.3
Indirect CO_2[a]	401.54	94.71	94.71	96.17	96.27	–76.4	–76.4	–76.0	–76.0
Total GHG emissions excluding LULUCF and including indirect CO_2	**53 640.92**	**45 813.26**	**45 711.72**	**41 535.49**	**35 048.74**	**–14.6**	**–14.8**	**–22.6**	**–34.7**

Source: Switzerland's BR4 CTF table 6.
[a] Switzerland did not include indirect CO_2 emissions from sectors 1, 2, 3 and 5 in its emission reduction targets. No emissions from sector 3 are currently reported as indirect CO_2 emissions. As emissions from sector 6 are not considered for Switzerland's emission reduction targets, the corresponding indirect CO_2 emissions from this sector have also been excluded.

78. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by sector remain the same for 2020, while a larger contribution of emission reductions is provided by the energy sector including transport in 2030.

79. Switzerland presented the WEM and WAM scenarios by gas for 2020 and 2030, as summarized in table 7.

Table 7
Summary of greenhouse gas emission projections for Switzerland presented by gas

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Sector	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2	44 151.51	37 038.90	36 941.89	33 492.30	27 388.47	–16.1	–16.3	–24.1	–38.0
CH_4	6 004.19	4 799.06	4 799.06	4 724.76	4 562.05	–20.1	–20.1	–21.3	–24.0
N_2O	2 830.13	2 374.39	2 373.71	2 395.27	2 307.00	–16.1	–16.1	–15.4	–18.5
HFCs	0.02	1 362.35	1 360.59	687.65	582.87	6.8×10^6	6.8×10^6	3.4×10^6	2.9×10^6
PFCs	116.52	34.79	32.70	33.78	27.99	–70.1	–71.9	–71.0	–76.0
SF_6	137.01	108.56	108.56	105.06	83.59	–20.8	–20.8	–23.3	–39.0
NF_3	0.00	0.50	0.50	0.50	0.50	–	–	–	–
Indirect CO_2	401.54	94.71	94.71	96.17	96.27	–76.4	–76.4	–76.0	–76.0
Total GHG emissions without LULUCF	**53 640.92**	**45 813.26**	**45 711.72**	**53 640.92**	**45 813.26**	**–14.6**	**–14.8**	**–22.6**	**–34.7**

Source: Switzerland's BR4 CTF table 6.

80. For 2020, under the WEM scenario, the most significant reductions are projected for CO_2 emissions at 7,112.61 kt CO_2 eq (16.1 per cent), followed by reductions in CH_4 emissions of 1205.13 kt CO_2 eq (20.1 per cent). On the other hand, HFC emissions are projected to increase between 1990 and 2020 by 1,362.33 kt CO_2 eq (6.8×10^6 per cent).

81. For 2030, under the WEM scenario, the most significant reductions are projected for CO_2 at 10,659.2 kt CO_2 eq (24.1 per cent), mostly driven by the transport sector, followed by reductions in CH_4 emissions of 1,279.43 kt CO_2 eq (21.3 per cent). HFC emissions continue to be above the 1990 level by 687.63 kt CO_2 eq (3.4×10^6 per cent), which is 50 per cent lower than in 2020.

82. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by gas remain the same owing to the short time frame. By 2030, the most significant reductions are projected for CO_2 with 16,763.04 kt CO_2 eq (38.0 per cent) and for CH_4 with 1,442.12 kt CO_2 eq (24.0 per cent). HFC emissions continue to be above the 1990 level by 582.85 kt CO_2 eq (2.9×10^6 per cent).

(d) Assessment of adherence to the reporting guidelines

83. The ERT assessed the information reported in the BR4 of Switzerland and recognized that the reporting is complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

D. Provision of financial, technological and capacity-building support to developing country Parties

1. Technical assessment of the reported information

(a) Approach and methodologies used to track support provided to non-Annex I Parties

84. In its BR4, Switzerland reported information on its provision of financial, technological and capacity-building support to non-Annex I Parties.

85. Switzerland provided details on how the support it has provided is "new and additional", including how it has determined resources as being "new and additional". Switzerland considers the resources generated from its increase in public climate finance to be "new and additional". The finance increase was partly driven by the Parliament's decision in 2011 to raise the level of ODA to 0.5 per cent of GNI by 2015, and its decision to shift the focus of its development assistance to climate change issues. However, the ERT noted that Switzerland's ODA in 2017 and 2018 comprised 0.47 and 0.44 per cent of its GNI, respectively, and thus was below the level called for by the Parliament. During the review, Switzerland explained that the decrease in ODA is mainly attributable to the drop in asylum-related costs recorded in Switzerland's ODA, and to the Government's cost-cutting measures that were approved by the Parliament. Switzerland also explained that, in each new budget cycle, the Government makes new commitments to support climate action in partner countries and this support can therefore be considered new.

86. Switzerland reported the support that it has provided to non-Annex I Parties, distinguishing between support for mitigation and adaptation activities and recognizing the capacity-building elements of such support. It explained how it tracks finance for adaptation and mitigation using the Rio markers, namely that a reduction factor of 50 per cent is applied for activities with an indirect impact on climate change adaptation or mitigation (significant marker) and a reduction factor of 85 per cent is applied for activities with a direct impact on climate change adaptation or mitigation (principal marker).

87. The BR4 includes information on the national approach to tracking the provision of support, indicators, delivery mechanisms used, and allocation channels tracked, which, as explained in the BR4, is the same approach that Switzerland used for its NC7.

88. Switzerland described the methodology and underlying assumptions used for collecting and reporting information. It reported the contributions to the multilateral development banks as ODA at the time of depositing of promissory notes and not at the time of encashment. To assess the climate relevance of its bilateral, regional and multi-bilateral cooperation, Switzerland uses the Rio marker methodology; double counting between adaptation and mitigation activities is excluded by netting out potential overlaps between the respective Rio markers. To assess the climate-specific share of the multilateral contributions, Switzerland used the 2016 and 2017 shares for its 2017 and 2018 contributions, respectively, given that the specific share was not published by the time the report was finalized. Switzerland reported that other multilateral institutions might also carry out climate-specific activities; however, they were not included because no climate-specific average was published by the OECD Development Assistance Committee. A robust methodology was

used for preparing the information on private financial support mobilized that ensured that the inputs to the report are transparent and comparable. This methodology was developed by Switzerland together with other donors for an OECD report on climate finance provided by developed countries in 2013–2017.

(b) Financial resources

89. Switzerland reported information on its provision of financial support to non-Annex I Parties as required under the Convention, including on financial support provided, committed and pledged, allocation channels and annual contributions.

90. Switzerland described how its resources address the adaptation and mitigation needs of non-Annex I Parties. It also described how those resources assist non-Annex I Parties in mitigating GHG emissions and adapting to the adverse effects of climate change and any economic and social consequences of response measures, and contribute to technology development and transfer and capacity-building related to mitigation and adaptation.

91. Switzerland reported that its bilateral climate support addresses the adaptation and mitigation needs of non-Annex I Parties through a cooperative, bilateral dialogue in which the needs and priorities of the recipient countries are assessed. This dialogue is coordinated every four years by the Swiss development cooperation offices. In terms of multilateral climate finance, Switzerland reported that it has been aiming to better integrate and align its portfolio with the communicated nationally determined contributions of developing countries. Further, all of Switzerland's multilateral activities are endorsed by the recipient countries in order to ensure that the projects are in line with the recipient countries' priorities and that the funded interventions are sustainable.

92. With regard to the most recent financial contributions aimed at enhancing the implementation of the Convention by developing countries, Switzerland reported that its climate finance has been allocated on the basis of priority areas of the recipient countries in order to ensure their ownership of the projects. Switzerland's bilateral and regional climate-relevant activities are related to generating new and relevant knowledge on climate policy, developing and implementing technology, harnessing and replicating successful practices, developing national skills and capacity and implementing climate actions.

93. Table 8 summarizes the information reported by Switzerland on its provision of financial support. The ERT noted that the values provided in the CTF tables as contributions through bilateral channels included mobilized private finance, and this was confirmed by Switzerland during the review. Even if the values provided by Switzerland in the CTF tables are referred to in table 8, as well as elsewhere in this report, the ERT considers that it is important to highlight that these values include mobilized private finance. Based on the calculation performed by the ERT and further confirmed by Switzerland, the total bilateral contributions excluding private finance amounted to USD 214.60 million in 2017 and USD 228.20 million in 2018.

Table 8
Summary of information on provision of financial support by Switzerland in 2017–2018
(Millions of United States dollars)

	Year of disbursement	
Allocation channel of public financial support	*2017*	*2018*
ODA	2 883.82	2 796.23
Climate-specific contributions through multilateral channels, including:	131.99	112.10
Global Environment Facility	21.50	20.59
Least Developed Countries Fund	2.02	1.64
Special Climate Change Fund	0.51	0.51
Adaptation Fund	0.00	0.00
Green Climate Fund	34.22	0.00
Trust Fund for Supplementary Activities	1.07	0.46
Other multinational climate change funds	1.34	0.47

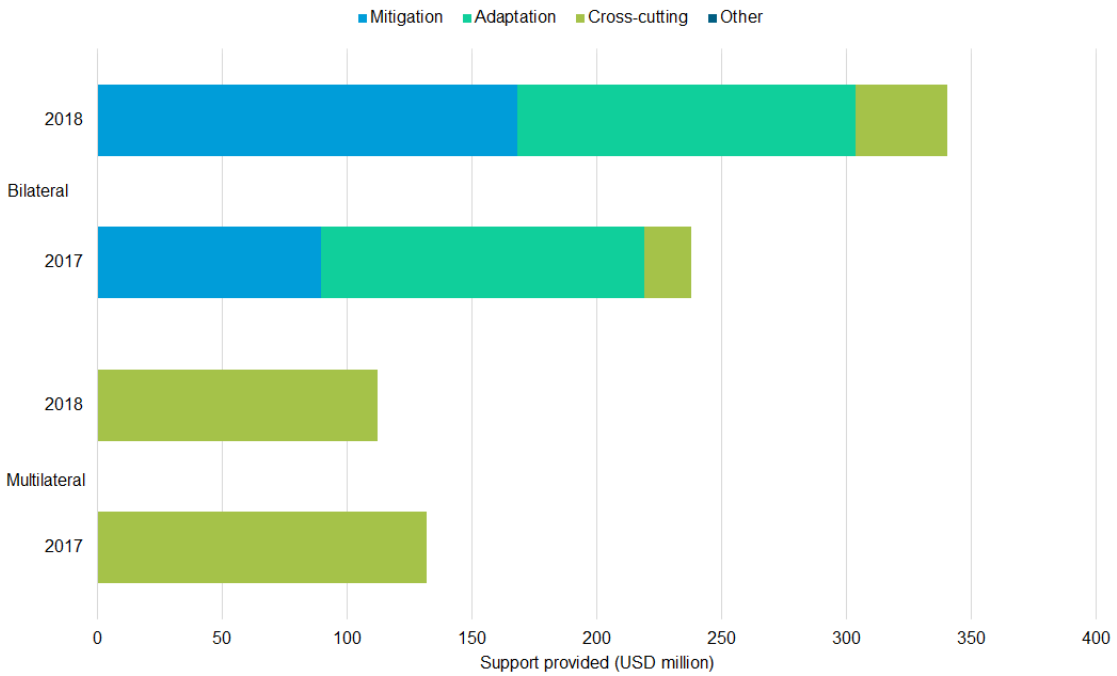
	Year of disbursement	
Allocation channel of public financial support	*2017*	*2018*
Financial institutions, including regional development banks	59.37	78.44
United Nations bodies	11.96	9.98
Climate-specific contributions through bilateral, regional and other channels	238.17	340.41

Sources: BR4 CTF tables and Query Wizard for International Development Statistics, available at http://stats.oecd.org/qwids/.

94. Switzerland reported on its climate-specific public financial support, totalling USD 370.16 million in 2017 and USD 452.50 million in 2018. The Party has increased its contributions, as reported in its local currency, by 28 per cent since the BR3 (or 9 per cent excluding mobilized private finance). With regard to future financial pledges aimed at enhancing the implementation of the Convention by developing countries, Switzerland stated that it remains committed to increasing its share of mobilized private finance in order to mobilize jointly with other developed countries USD 100 billion/year by 2020 to address the needs of developing countries as agreed in decision 2/CP.15; however, it did not include information on the public contributions it has committed to providing. Switzerland stated that all its public climate finance was provided in the form of grants, and it only reports the financial flows when they are disbursed (not committed). During the reporting period, Switzerland focused particularly on projects and programmes in Asia, for which it allocated USD 109.9 million through bilateral channels, followed by projects and programmes in Africa, for which it allocated USD 92 million through bilateral channels in 2017 and 2018.

95. Information on financial support from the public sector provided through multilateral and bilateral channels and the allocation of that support by target area is presented in figure 3 and table 9.

Figure 3
Provision of financial support by Switzerland in 2017–2018



Sources: Switzerland's BR4 CTF tables 7, 7(a) and 7(b) and information provided during the review.

Table 9
Summary of information on channels of financial support used in 2017–2018 by Switzerland
(Millions of United States dollars)

	Year of disbursement				*Share (%)*	
Allocation channel of public financial support	*2017*	*2018*	*Difference*	*Change (%)*	*2017*	*2018*
Detailed information by type of channel						
Multilateral channels						
Mitigation	–	–	–	–	–	–
Adaptation	–	–	–	–	–	–
Cross-cutting	131.99	112.10	–19.89	–15.1	100.0	100.0
Other	0.00	–	–	–	–	–
Total multilateral	**131.99**	**112.10**	**–19.89**	**–15.1**	**100.0**	**100.0**
Bilateral channels						
Mitigation	89.46	168.30	78.83	88.1	37.6	49.4
Adaptation	129.69	135.52	5.83	4.5	54.5	39.8
Cross-cutting	19,02	36.59	17.57	92.4	8.0	10.7
Other	–	–	–	–	–	–
Total bilateral	**238.17**	**340.41**	**102.24**	**42.9**	**100.0**	**100.0**
Total multilateral and bilateral	**370.16**	**452.50**	**82.35**	**22.2**	**100.0**	**100.0**

Source: Switzerland's BR4 CTF tables 7, 7(a) and 7(b) and information provided during the review.

96. The BR4 includes detailed information on the financial support provided though multilateral, bilateral and regional channels in 2017 and 2018. More specifically, Switzerland contributed through multilateral channels, as reported in the BR4 and CTF table 7(a), USD 131.99 million and USD 112.10 million for 2017 and 2018, respectively. The contributions were made to specialized multilateral climate change funds, such as the Global Environment Facility (USD 21.50 million in 2017 and USD 20.59 million in 2018) and the Green Climate Fund (USD 34.22 million in 2017), and multilateral financial institutions, such as the World Bank (USD 43.31 million in 2017 and USD 48.49 million in 2018), the African Development Bank (USD 8.86 million in 2017 and USD 13.73 million in 2018) and the Asian Infrastructure Investment Bank (USD 6.21 million in 2017 and USD 14.73 million in 2018).

97. The BR4 and CTF table 7(b) also include detailed information on the total financial support provided though bilateral channels in 2017 and 2018 (USD 238.17 million and USD 340.41 million, or USD 214.60 million and USD 228.20 million excluding mobilized private finance), respectively. During the reporting period, Switzerland focused particularly on Asia, allocating 33.5 per cent of the total bilateral financial resources in 2017 and 31.2 per cent in 2018 to that region. The Africa region received the next largest share of resources (27.7 per cent in 2017 and 26.5 per cent in 2018), followed by Latin America (20.5 in 2017 and 22.7 per cent in 2018).

98. The BR4 provides information on the types of support provided. In terms of the focus of public financial support, as reported in CTF table 7 for 2017, the shares of the total public financial support allocated for mitigation, adaptation and cross-cutting projects were 24.2, 35 and 40.8 per cent, respectively. In addition, in 2017, 35.7 per cent of the total public financial support was allocated through multilateral channels and 64.3 per cent through bilateral, regional and other channels. In 2018, the shares of total public financial support allocated for mitigation, adaptation and cross-cutting projects were 37.2, 29.9 and 32.9 per cent, respectively. Furthermore, for 2018, 24.8 per cent of the total public financial support was allocated through multilateral channels and 75.2 per cent through bilateral, regional and other channels.

99. The ERT noted that Switzerland did not report allocations to any particular sector through bilateral and multilateral channels, but reported that most of its contributions were allocated to cross-cutting support. In a footnote to CTF table 7 Switzerland explained that, owing to technical issues in its database, all data were aggregated at the country level (rather than at the activity level), and as Switzerland is active in multiple sectors in each country it

chose to report all entries as cross-cutting. During the review, Switzerland clarified that reporting at the activity level would involve an additional administrative burden and create a high risk of reporting errors, as this would need to be done manually. However, in order to illustrate the diversity of the projects, programmes and regions in which it supports climate action, Switzerland provided the ERT with a supplementary document enumerating the projects and programmes it supported from 2015 to 2018, indicating the sectors involved and the contributions allocated to mitigation and adaptation support. Relevant sectors include agriculture, silviculture, water, environmental policy and administration and rural development.

100. CTF tables 7(a) and 7(b) include information on the types of financial instrument used for providing assistance to developing countries, which are only in the form of grants, for both bilateral and multilateral channels. In CTF table 7 Switzerland explained that it defines a grant as a transfer made in cash, goods or services for which no repayment is required. Regarding mobilized private finance, Switzerland reported that the instruments used were in the form of equity, guarantees, shares in collective investment vehicles (flat structure) or simple co-financing projects.

101. Switzerland reported information on the mobilization of private finance. It clarified that there was a substantial increase in private finance during the reporting period, from USD 8.5 million in 2016 to USD 112 million in 2018. During the review, the Party clarified that this substantial increase was achieved in part through the activities of Swiss Export Risk Insurance. It also explained that private finance is mobilized for the exporting goods and technologies sector. The Party reported on how it uses public funds to promote private sector financial support for developing countries to increase mitigation and adaptation efforts in developing countries by leveraging significant co-financing from the private sector.

102. Switzerland explained its approach to reporting on private financial flows leveraged by bilateral climate finance for mitigation and adaptation activities in non-Annex I Parties, and highlighted related success stories in its reporting. The Party explained that, in reporting to the OECD, it had participated in a donor group that provided methodological input for establishing robust methodologies for measuring and reporting mobilized private finance.

103. Switzerland described the difficulty of collecting information and reporting on private financial flows leveraged by multilateral climate finance for mitigation and adaptation activities in non-Annex I Parties. In this regard, it indicated that reporting at the bilateral level on private finance mobilized through multilateral channels would not do justice to the complexity and joint efforts of all partners involved in multilateral institutions.

(c) Technology development and transfer

104. Switzerland provided information on steps, measures and activities related to technology transfer, access and deployment benefiting developing countries, including information on activities undertaken by the public and private sectors. Switzerland provided examples of support provided for the deployment and enhancement of the endogenous capacities and technologies of non-Annex I Parties.

105. In order to promote the transfer and deployment of climate-friendly technologies, Switzerland relies on two export promotion agencies, Switzerland Global Enterprise, which is mandated to make information on Swiss clean technology available in a database to facilitate identifying Swiss partners for environmentally sound solutions, and Swiss Export Risk Insurance, which provides services to private technology suppliers.

106. The ERT noted that Switzerland reported on its measures and activities, including on activities implemented since its NC7 and BR3, as well as success stories in relation to technology transfer, and in particular on measures taken to promote, facilitate and finance the transfer and deployment of climate-friendly technologies. Switzerland provided specific examples of projects and programmes targeting technology development and transfer that it supported. In this regard, Switzerland is active in the cement sector: a trilateral collaboration project between Cuba, India and Switzerland, in which Switzerland invested around CHF 5 million, has the aim of investigating and validating the technical, economic and ecological viability of a new type of low-carbon cement. Switzerland also invested CHF 14.5 million in a programme aimed at enhancing the resource productivity, competitiveness and

environmental performance of selected existing industrial parks in Colombia, Egypt, Peru, Ukraine and Viet Nam. The ERT noted that the examples of projects and programmes that support technology development and transfer provided in the BR4 only include one that was not already described in the NC7 and BR3.

107. Switzerland did not systematically identify the technology development and transfer components of Swiss-funded projects given the integrated nature of its support measures, which also makes it impossible to single out and quantify the respective components of those projects. The Party stated that it would need to fundamentally redesign its entire national reporting system in order to isolate the technology transfer components of projects, which would involve a considerable increase in the administrative burden and reduce the resources available for project implementation. Switzerland will therefore continue reporting its technology transfer activities in qualitative terms based on specific examples.

(d) Capacity-building

108. In its BR4, Switzerland supplied information on how it has provided capacity-building support for mitigation, adaptation and technology that responds to the existing and emerging needs identified by non-Annex I Parties. Switzerland described measures and activities related to capacity-building support in textual format.

109. Switzerland reported that it has supported climate-related capacity development activities relating to adaptation, mitigation, climate financing and other sectors. Switzerland also reported on how it has responded to the existing and emerging capacity-building needs of non-Annex I Parties by following the principles of national ownership and country-driven demand. The measures and activities described by Switzerland in the BR4 include the provision of training and advisory services for financial institutions in Africa and Asia with the objective of building their expertise on regulatory policies, procedures and standards that promote environmental and social sustainability. Switzerland organized workshops for different countries interested in applying a tool developed by the Swiss Agency for Development and Cooperation that integrates climate and disaster risk reduction into development cooperation at the strategic programmatic and operational level, enhancing the resilience of systems and communities. Switzerland also cooperates at the global level through the One UN Climate Change Learning Partnership.

2. Assessment of adherence to the reporting guidelines

110. The ERT assessed the information reported in the BR4 of Switzerland and identified issues relating to completeness and transparency and thus adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table 10.

Table 10
Findings on provision of support to developing country Parties from the review of the fourth biennial report of Switzerland

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 17	The Party reported the bilateral climate finance disbursed in 2017 and 2018 for both mitigation and adaptation to climate change in its BR4. However, the ERT noted that the values provided as bilateral climate finance for mitigation and adaptation included

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
	Issue type: transparency Assessment: recommendation	mobilized private finance, and this was not transparently reported in the BR4. The ERT noted that this is not in accordance with paragraph 17 of the UNFCCC reporting guidelines on BRs, which require the reporting of support provided, committed and/or pledged, and not support mobilized. During the review Switzerland confirmed that the values provided in the BR4 and CTF table 7 for bilateral climate finance for adaptation and mitigation included mobilized private finance, but that the values for climate finance for adaptation and mitigation can be derived from tables 40 and 41 provided in the BR4. However, the ERT considers that the information is not transparently reported in the BR4. The ERT recommends that Switzerland enhance the transparency of the reporting of the public bilateral climate finance for mitigation and adaptation by providing the total values provided for mitigation and adaptation without including mobilized private finance, which should be reported separately.
2	Reporting requirement related to paragraph 18 Issue type: transparency Assessment: recommendation	The Party reported in CTF table 7(b) the projects and programmes for which it has provided financial support. The ERT noted that some of the contributions listed in these tables include Ukraine as a recipient country. It noted that this is not in line with requirements of paragraph 18 of the UNFCCC reporting guidelines on BRs, which requires reporting on the assistance provided to non-Annex I Parties. During the review Switzerland explained that the financial support provided to Ukraine was unintentionally included in the totals, given that Ukraine is considered to be an eligible ODA recipient country under the OECD Development Assistance Committee methodology. The ERT recommends that Switzerland include only non-Annex I Parties as recipient countries in CTF table 7(b) or exclude the support provided to Annex I Parties from the totals in CTF table 7(b).
3	Reporting requirement related to paragraph 22 Issue type: completeness Assessment: recommendation	The Party did not provide any information in CTF table 8 on the provision of support for technology development and transfer, which is not in line with paragraph 22 of the UNFCCC reporting guidelines on BRs. However, the ERT noted that relevant information to be included in CTF table 8 was provided in the BR4 for a number of projects and programmes that contribute to technology development and transfer. This information includes the recipient country, the sector involved, the target area (mitigation/adaptation) and the total funding. During the review Switzerland explained that it is not possible to determine the financial resources within the overall budget of a project or programme that correspond to technology transfer activities given that there is no international consensus and commonly accepted methodology on how to quantify technology transfer components of projects, and that, in order to quantify technology transfer components of projects, it would have to fundamentally redesign its entire national reporting system. The ERT reiterates the recommendation made in the previous three review reports for the Party to enhance the completeness of its reporting by providing information on the provision of technology development and transfer support in CTF table 8. The ERT considers that at a minimum, providing qualitative information on activities and measures for technology transfer support in the CTF table, consistently with that reported in the BR4, could improve the completeness of reporting by the Party.
4	Reporting requirement related to paragraph 23	The Party did not provide information in CTF table 9 on the provision of capacity-building support. This is not in line with paragraph 23 of the UNFCCC reporting guidelines on BRs. However, relevant information, including the recipient country,

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
	Issue type: completeness Assessment: encouragement	the sector involved, the target area (mitigation/adaptation) and the total funding provided, to be included in CTF table 9 is provided in the BR4 for a number of projects and programmes which contribute to capacity-building. During the review Switzerland explained that capacity-building is integrated within various climate actions that it undertakes in its cooperation activities, and that if it were to isolate the capacity-building component of the climate-related activities, it would need to fundamentally redesign its entire national reporting system. The ERT reiterates the encouragement made in the previous three review reports on the technical reviews of the BR1, BR2 and BR3 for the Party to provide information on the provision of capacity-building support, to the extent possible, in CTF table 9 in its next BR. The ERT considers that the provision in CTF table 9 of at least qualitative information on activities and measures for capacity-building support in CTF table 9 could improve the completeness of the reporting by the Party.

Note: Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete, transparent and thus adhering to the UNFCCC reporting guidelines on BRs.

III. Conclusions and recommendations

111. The ERT conducted a technical review of the information reported in the BR4 and CTF tables of Switzerland in accordance with the UNFCCC reporting guidelines on BRs. The ERT concludes that the reported information mostly adheres to the UNFCCC reporting guidelines on BRs and provides an overview of emissions and removals related to the Party's quantified economy-wide emission reduction target; assumptions, conditions and methodologies related to the attainment of the target; the progress of Switzerland towards achieving its target; and the Party's provision of support to developing country Parties.

112. Switzerland's total GHG emissions excluding LULUCF and including indirect CO_2 covered by its quantified economy-wide emission reduction target were estimated to be 11.9 per cent below its 1990 level, whereas total GHG emissions including LULUCF and indirect CO_2 were 10.8 per cent below its 1990 level, in 2017. Emission decreases were driven by continued mitigation efforts, such as improving the efficiency of energy supply, removing subsidies associated with use of environmentally unsound technologies, improving the energy efficiency of buildings, improving combustion equipment efficiency and decreasing the cattle population. In the energy sector, emissions from the production of non-metallic minerals have decreased as energy consumption has declined and fuel switching has occurred (from coal and fuel oil to other fossil fuels and biomass). Those factors outweighed the increase in emissions from transport resulting from population growth and economic development.

113. Under the Convention Switzerland committed to achieving a quantified economy-wide emission reduction target of 20 per cent below the 1990 level by 2020. The Party will assess achievement of its target under the Convention by accounting against its quantified emission limitation and reduction commitment under the second commitment period of the Kyoto Protocol (see para. 12 above). In absolute terms, this means that Switzerland has to reduce its emissions from 53,706.73 kt CO_2 eq (in the base year) to average annual emissions of 45,221.07 kt CO_2 eq for 2013–2020.

114. Switzerland's annual total GHG emissions excluding LULUCF and including indirect CO_2 in 2017 were 12 per cent (47,240.85 kt CO_2 eq) below the base-year level. Switzerland reported in CTF table 4 that the contribution of LULUCF was –265.49 kt CO_2 eq in 2017 and the use of market-based mechanisms accounted for 0.00 kt CO_2 eq, resulting in net emissions of 46,975.36 kt CO_2 eq, or 4,009.98 kt CO_2 eq above the 2020 target. Switzerland reported that it will begin to use market-based mechanisms at the end of the commitment period; therefore, no annual numbers related to market-based mechanisms were provided. However, a total of 7,736.39 kt CO_2 eq of Kyoto Protocol units held in the Party holding accounts in the national registry as at the end of 2018 was reported as a preliminary estimate.

115. The GHG emission projections provided by Switzerland in its BR4 correspond to the WOM, WEM and WAM scenarios. Under these scenarios, emissions are projected to be 4.3 per cent above and 14.7 and 14.9 per cent below the 1990 level by 2020, respectively. On the basis of the reported information, the ERT concludes that Switzerland may face challenges in achieving its 2020 target (see para. 73 above) under both the WEM and the WAM scenario without using flexible mechanisms.

116. Switzerland has committed to reducing its GHG emissions by 50 per cent by 2030 compared with the 1990 level, corresponding to an average reduction in GHG emissions of 35 per cent for 2021–2030 compared with the 1990 level. By 2025, a reduction in GHG emissions of 35 per cent compared with the 1990 level is expected. Switzerland plans to make use of international carbon credits to achieve this target.

117. Switzerland's main policy framework relating to energy and climate change is the second revision of the CO_2 Act. Another key piece of legislation supporting Switzerland's climate change goals developed since the BR3 is the Energy Strategy 2050. The mitigation actions with the most significant impact are the CO_2 levy on heating and process fuels, the building codes of the cantons and the partial compensation of CO_2 emissions from motor fuel use.

118. Switzerland continues to provide climate financing to developing countries in line with the Parliament's decision to raise the level of ODA to 0.5 per cent of GNI by 2015. Even though this target was not fulfilled during the reporting period (ODA comprised 0.47 and 0.44 per cent of GNI in 2017 and 2018, respectively), the Party has increased its contributions to climate financing by 28 per cent (including mobilized private finance) since the BR3 compared with the annual average. Switzerland's public financial support totalled USD 370.16 million in 2017 and USD 452.50 million in 2018; 35.7 per cent of the total public financial support was allocated through multilateral channels and 64.3 per cent through bilateral, regional and other channels.

119. Switzerland provided qualitative information on support for technology development and transfer and capacity-building. In the area of technology transfer, Switzerland was involved in promoting low-carbon cement, resource efficiency and cleaner production. The Party highlighted its involvement in the global programme on Resource Efficient and Cleaner Production in developing and transition countries, which aims at enhancing the resource productivity, competitiveness and environmental performance of selected industrial parks in developing countries and countries in transition. In the area of capacity-building, Switzerland is primarily involved in training activities for financial institutions in order to foster their understanding of social and environmental standards. One example of support for capacity-building reported in Switzerland's BR4 is the programme on Environment and Social Risk Management in Asia and Sub-Saharan Africa by the International Finance Cooperation targeted at adaptation and developing the capacities of financial regulators and institutions.

120. In the course of the review, the ERT formulated the following recommendations for Switzerland to improve its adherence to the UNFCCC reporting guidelines on BRs in its next BR:

(a) To improve the completeness of its reporting by providing information on the provision of technology development and transfer support in CTF table 8 (see issue 3 in table 10);

(b) To improve the transparency of its reporting by:

(i) Clearly distinguishing between public support and mobilized private financial support provided for developing countries (see issue 1 in table 10);

(ii) When reporting provision of public financial support through bilateral, regional and other channels in CTF table 7(b), including only non-Annex I Parties as recipient countries or excluding support provided to Annex I Parties from the totals in CTF table 7(b) (see issue 2 in table 10).

Annex

Documents and information used during the review

A. Reference documents

2019 GHG inventory submission of Switzerland. Available at https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/national-inventory-submissions-2019.

BR4 of Switzerland. Available at https://unfccc.int/sites/default/files/resource/CHE_BR4_2020.pdf.

BR4 CTF tables of Switzerland. Available at https://unfccc.int/documents/204759.

Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention. Available at https://unfccc.int/topics/mitigation/workstreams/pre-2020-ambition/compilation-of-economy-wide-emission-reduction-targets-to-be-implemented-by-parties-included-in-annex-i-to-the-convention.

"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". Annex to decision 24/CP.19. Available at http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications". FCCC/CP/1999/7. Available at http://unfccc.int/resource/docs/cop5/07.pdf.

"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". Annex to decision 13/CP.20. Available at http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf.

Report on the technical review of the BR3 of Switzerland. FCCC/TRR.3/CHE. Available at https://unfccc.int/sites/default/files/resource/trr3_CHE.pdf.

"UNFCCC biennial reporting guidelines for developed country Parties". Annex I to decision 2/CP.17. Available at http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf.

B. Additional information provided by the Party

The following documents[1] were provided by Switzerland:

Swiss Federal Office of Energy, 2019: Gesamtenergiestatistik 2018. Swiss Federal Office of Energy, Bern. 805.006.18, 10.07.2019. https://tinyurl.com/gest-2018-bfe 02.12.2019

OECD (2019), Climate Finance Provided and Mobilised by Developed Countries in 2013-17, OECD Publishing, Paris, https://doi.org/10.1787/39faf4a7-en.

[1] Reproduced as received from the Party.